

BURY EMERGENCY DEPARTMENT, FAIRFIELD HOSPITAL, BURY

PHASE 2 GROUND INVESTIGATION REPORT

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Client Name: Ridge and Partners LLP

Client Address: 7 Brewery Place, Brewery Wharf, Leeds, LS10 1NE

Site Address: Fairfield General Hospital, Rochdale Old Road, Bury, BL9 7TD

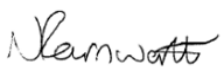
Curtins
Merchant Exchange
17-19 Whitworth Street West
Manchester, M1 5WG
Tel: 0161 236 2394
www.curtins.com

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Author	Signature	Date
R Taylor BSc (Hons) MSc GradCIWEM Geo-Environmental Engineer		01 August 2025
J Lord BSc (Hons) MSc Senior Geo-Environmental Engineer		01 August 2025

Reviewed	Signature	Date
M Holroyd BSc (Hons) MSc Senior Geo-Environmental Engineer		01 August 2025

Authorised	Signature	Date
N Farnworth BSc (Hons) MCIWEM C.WEM Principal Geo-Environmental Engineer		

EXECUTIVE SUMMARY

Appointment	Curtins were instructed by Ridge and Partners LLP to undertake an intrusive site investigation at Bury Emergency Department, Fairfield General Hospital, Rochdale Old Road, Bury, BL9 7TD. The site is centered on National Grid Reference 383210, 411620 and covers an area of approximately 0.03Ha. It is understood that the development proposals include the construction of a single storey extension to the existing building.
Current Site Status	The site is comprises of a section of the Fairfield General Hospital complex, with an 'Emergency Vehicles' parking area and soft landscaping. A small retaining wall separates the soft landscaping from the existing structure, with surface cover around the perimeter of the building occupied by concrete flagging and gravel. The topography of the site generally slopes upwards towards the east within the soft landscaping and emergency vehicles parking area.
Summary of Phase 1	In earliest mapping from 1851 the site comprised entirely of agricultural land, with a field boundary crossing the west of the site from north-west to south-east. In mapping from 1890, the Bury Union Workhouse appeared on site (constructed in 1857). By 1929, this was renamed the Public Assistance Institution, and later the Fairfield General Hospital in 1956. By 1992, the section of the Fairfield General Hospital on site was demolished, and by 1999 reconfiguration and construction of a new hospital building was constructed, with a section of carparking area on site. In early mapping, the immediate surrounding area comprised predominantly agricultural land, with Rochdale Old Road located 75m north with residential properties beyond. By 1890, the immediate surrounding area comprised the Bury Union Workhouse, with burial grounds and Infectious Diseases Hospital located between 100m – 200m west of the site. By 1910, the Bury Union Workhouse was extended 50m – 140m to the south east and was labelled as a Hospital by 1930. 255m north-west of the site was Smethurst Hall Brick Works, and 180m north-west was an associated Clay Pit. Water Tanks and Towers were located 95m east of the site, and an additional rectangular building constructed 50m north of the site. By 1984, the Brick Works was replaced by residential housing, with the clay pit appearing infilled. By 1992, a section of the building located 2m – 45m west of the site was demolished and replaced by a new building. BGS mapping indicates that the site is underlain by Glacial Till superficial soils and Woodhead Hill Rock Sandstone and Pennine Lower Coal Measures Formation bedrock.
Fieldworks Undertaken	Site investigation works were undertaken between the 06th and 08th of May 2025 This site investigation comprised 6no window sample boreholes and 3no hand excavated foundation pits. Ground gas and groundwater monitoring standpipes were installed within four boreholes. Four return monitoring visits have been undertaken.
Encountered Ground Conditions	The ground conditions encountered during the Curtins ground investigation generally comprised of Topsoil or Tarmac surface covering, overlying predominantly granular Made Ground deposits with localised cohesive Made Ground. The Made Ground is overlying Glacial Till deposits. Bedrock was confirmed in all borehole locations and comprised of the Woodhead Hill Rock Formation Sandstone. Topsoil deposits were encountered from surface in WS01, and WS03 to WS04 to depths of between 0.31 and 0.34m bgl (141.68 and 139.94m AOD). The topsoil comprised of grass overlying fine to coarse sand with frequent rootlets Tarmacadam was encountered to depths of 0.10m bgl (140.37m to 142.04m AOD). The tarmac was immediately underlain by a light greyish brown hardcore material. Granular Made Ground soils were encountered underlying the sub-base or Topsoil at depths of between 0.28m and 1.40m (140.09m and 138.97m AOD), comprising clayey gravelly, fine to coarse sand. Gravel of sandstone, mudstone, coal, concrete, siltstone and brick. Cohesive Made Ground soils were encountered in WS05 underlying the sub-base at depths of between 1.00m and m bgl (139.37m and m AOD), comprising soft brown sandy gravelly clay with a high cobble content. Gravel and cobbles comprising of sandstone, limestone, brick and coal. Superficial soils consistent with Glacial Till were encountered in all borehole location underlying the Made Ground in all exploratory hole locations (with the exception of HP01) to proven depths ranging between 1.45m to 3.27m bgl (138.83m to 137.92m AOD). This deposit was encountered as both cohesive and granular deposits, comprising of firm to very stiff, sandy to very sandy, very gravelly, clay. Gravels comprised of sandstone, mudstone and coal and medium dense very gravelly fine to coarse sand The Woodhead Hill Rock Formation was encountered underlying the Glacial Till in WS01 to WS04, at depths of between 1.45m and 3.27m bgl (138.83m and 137.92m AOD), encountered to a maximum depth of 5.45m bgl (135.74m AOD) Highly to completely weathered bedrock deposits consistent with the Chester Formation Sandstone were encountered in all exploratory hole locations from depths ranging between 1.70m to 2.00m bgl (37.04m to 36.67m AOD) to maximum depths of 2.28m to 3.27m bgl (36.31m to 35.47m AOD). The full extent of this deposit was not proven during the ground investigation. Encountered as a very dense yellowish-brown sandstone No groundwater strikes were recorded in any exploratory hole locations during the ground investigation works. Subsequent groundwater identified groundwater from depths ranging between 1.19m and 1.98m bgl in the Made Ground, and 3.65m and 3.78m bgl in the Glacial Till. However, this is likely representative of localised perched groundwater rather than an established groundwater table.

Environmental Laboratory Testing	With respect to the proposed development (Commercial end-use) Generic Assessment Criteria thresholds for human health were not exceeded in any of the samples. All soil samples were screened for asbestos. Asbestos was positively identified within WS06 at 0.30-0.40m bgl, comprising of Amosite Insulation at <0.001% w/w quantification.
Ground Contamination and Ground Gas Assessment	A Low-risk rating is identified to site end-users and to construction workers, from contamination in soils from direct contact, dermal uptake, soil and dust ingestion and inhalation with Made Ground soils. No exceedances of Commercial General Assessment Criteria were identified within soil during the ground investigation. Asbestos was encountered at low quantities (<0.001%), as such an asbestos management plan to be put in place during construction works due to presence of asbestos fibres in shallow Made Ground. In addition, now proposed soft landscaping is understood to be included as part of the development. Construction workers should be provided with appropriate PPE and sanitary facilities with respect to the environmental testing results enclosed herein. A Low-risk rating is identified to groundwater and surface waters respectively from leachable contamination in site soils through vertical and horizontal migration through the superficial deposits, accounting for the lack of contamination sources on-site. A Low-risk rating is identified from ground gas generating sources. The gas and flow rates identified during the investigation indicates the site is classified as CS1. No gas protection measures are required.
Geotechnical Assessment	In consideration of shallow foundations, the Made Ground is not considered a suitable bearing stratum for foundations given variability in both thickness and composition, alongside poor geotechnical properties. The underlying superficial Glacial Till deposits have primarily been encountered as variable with low to medium strength cohesive material with SPT N values between 1 and 50. It is assumed that shallow foundations will be placed on the Woodhead Rock Formation sandstone at depths ranging between 1.45m and 3.27m bgl (138.83m and 137.92m AOD) in the yellow brown sandstone deposits of Woodhead Hill Rock Formation. In the absence of proposed loadings an estimated safe bearing capacity of 200kPa for strip foundations should be assumed until further information becomes available. A suspended floor slab should be adopted for the proposed development. The preliminary design of buried concrete according to Table C2 of BRE Special Digest 1:2005 should be in accordance with Class DS-1.
Recommendations	Based on the findings of the ground investigation, the following recommendations are made: 1. Construction workers to be provided with appropriate PPE and sanitary facilities with reference to environmental testing certificates appended herein. 2. Asbestos management plan to be put in place during construction works due to presence of asbestos fibres in shallow Made Ground. 3. Probing of mine shaft 383411-014 to determine the depth and the state of cap and any backfill of the treated disused mine shaft along with grouting of the feature to prevent any possible future collapse of the mine entry

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1 INTRODUCTION

1.1 Project Background

Curtins were instructed by Ridge and Partners LLP to undertake an intrusive site investigation at Bury Emergency Department, Fairfield General Hospital, Rochdale Old Road, Bury BL9 7TD.

It is understood that development proposals include the construction of a single storey extension to the existing building. The site is situated on National Grid Reference 383210, 411620 and covers an area of approximately 0.03Ha.

Proposed development plans are enclosed in Appendix A.

1.2 Scope of Services

This investigation aims to characterise the geo-environmental and geotechnical conditions for the proposed development.

Specifically, the Phase 2 report is intended to determine:

- a) If there is a risk of the proposed end user being adversely impacted upon by potential contamination in shallow site soils that may be present on the site due to its known current, recent and historical use;
- b) If there is a risk of groundwater and/or surface water being adversely impacted upon by potential contamination that may be present on the site due to its known current, recent and historical use;
- c) If there is a risk to the end user from soil gases including methane, carbon dioxide, carbon monoxide and hydrogen sulphide; and,
- d) The likelihood of the proposed development being adversely impacted by geotechnical issues.

In addition, engineering recommendations for the proposed single-storey building are provided.

No intrusive investigation into historic coal mining features have been carried out as part of this investigation.

Detailed flood risk assessment, ecology and archaeological studies are outside the scope of this report.

2 PHASE 1 PRELIMINARY SITE ASSESSMENT SUMMARY

This section presents a summary of the current site setting, history, geology, and hydrogeology/ hydrology, previously detailed in the Curtins Phase 1 Report (Ref. 1). As such, it is advised that this report is read in conjunction with the Phase 1 Report (Ref. 1). A summary of the pertinent Phase 1 Preliminary Risk Assessment (PRA) Report information specifically for the proposed development site is presented in the following sub-sections.

This information will feed into the geotechnical assessment (refer to Section 11.0) and geo-environmental risk assessments (refer to Section 7.0).

2.1 Current Setting

The site comprises of a section of the Fairfield General Hospital complex, with an 'Emergency Vehicles' parking area and soft landscaping. A small retaining wall separates the soft landscaping from the existing structure, with surface cover around the perimeter of the building occupied by concrete flagging and gravel. The topography of the site generally slopes upwards towards the east within the soft landscaping and emergency vehicles parking area.

The site boundary is illustrated in Figure 1 below.

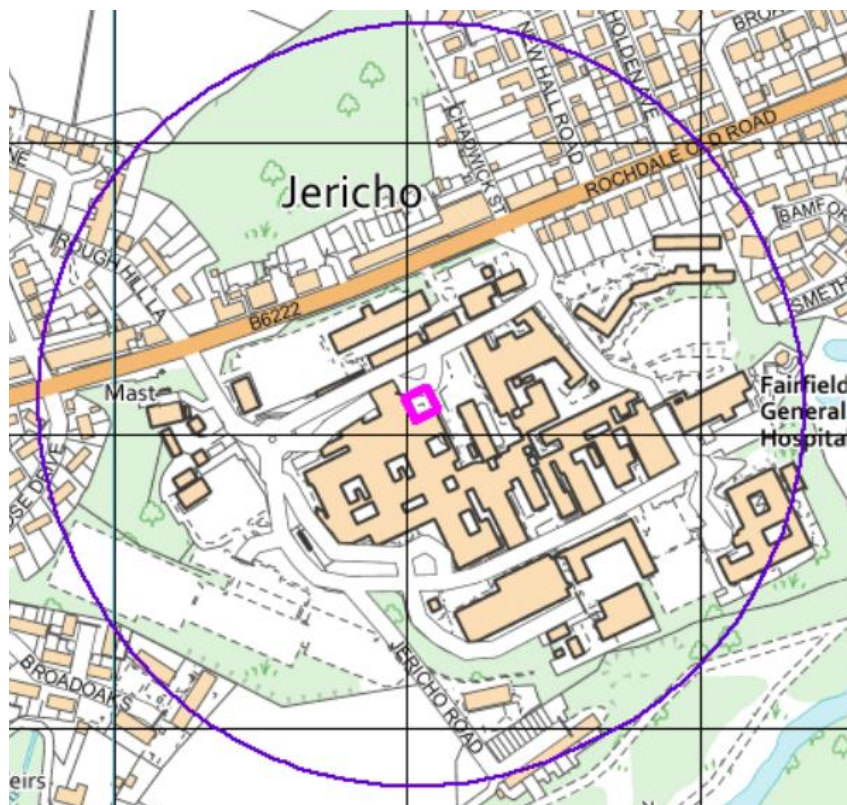


Figure 1 – Site Location Plan (site boundary shown in pink)

The site surrounding land use is summarised in Table 1.

Table 1 – Surrounding Area

Surrounding Area	N	Access road within Fairfield General Hospital with carparking and the Occupational Speech & Language Therapy Departments building.
	E	Soft landscaping and carparking with Fairfield General Hospital buildings beyond.
	S	Fairfield General Hospital buildings.
	W	Fairfield General Hospital Accident & Emergency Department.

2.2 Previous Site Use

2.2.1 On-site

In earliest mapping from 1851 the site comprised entirely of agricultural land, with a field boundary crossing the west of the site from north-west to south-east. In mapping from 1890, the Bury Union Workhouse appeared on site (constructed in 1857). By 1929, this was renamed the Public Assistance Institution, and later the Fairfield General Hospital in 1956. By 1992, the section of the Fairfield General Hospital on site was demolished, and by 1999 reconfiguration and construction of a new hospital building was completed, with a section of carparking area on site.

2.2.2 Off-Site

In early mapping, the immediate surrounding area comprised predominantly agricultural land, with Rochdale Old Road located 75m north with residential properties beyond. By 1890, the immediate surrounding area comprised the Bury Union Workhouse, with burial grounds and Infectious Diseases Hospital located between 100m – 200m west of the site. By 1910, the Bury Union Workhouse was extended 50m – 140m to the south east and was labelled as a Hospital by 1930. 255m north-west of the site was Smethurst Hall Brick Works, and 180m north-west was an associated Clay Pit. Water Tanks and Towers were located 95m east of the site, and an additional rectangular building constructed 50m north of the site. By 1984, the Brick Works was replaced by residential housing, with the clay pit appearing infilled. By 1992, a section of the building located 2m – 45m west of the site was demolished and replaced by a new building.

2.3 Published Geology

A review of the British Geological Survey (BGS) map, 1:50,000 Scale, Bedrock and Superficial Edition, Manchester, Sheet 085, indicates the following geological sequence:

- Glacial Till Deposits underlain by;
- Woodhead Hill Rock Sandstone, likely underlain by Pennine Lower Coal Measures Formation

2.3.1 Made Ground Deposits

The BGS maps do not indicate Made Ground on site, however given the phases of development on-site Made Ground is anticipated.

2.3.2 Superficial Deposits

Superficial deposits are recorded as Glacial Till which comprise of a heterogeneous mixture of clay, sand, gravel and boulders.

2.3.3 Bedrock Deposits

Bedrock deposits are indicated to comprise the Woodhead Hill Rock Formation and the Pennine Lower Coal Measures Formation. There are 2 No. fault lines in close proximity to the site, located approximately 145m south-west of the site, striking north-west to south-east, downthrow to the south-west away from site and approximately 190m north-east of the site striking north-south, downthrow to the east away from site.

2.3.4 Non-Coal Mining and Quarrying

Curtins Phase 1 report (Ref 1) confirmed that there is 1 No. disused Fireclay mine shaft located approximately 98m south-west of the site. Curtins Phase 1 report (Ref 1) confirmed that the closest BGS recorded (non-coal) mineral site was 'Smethurst Hall Brickworks' located 189m north-west of the site at Duckworth Fold, Bury where common clay and shale was extracted.

Based on the forgoing commentary the likelihood of encountering relic non-coal mining features on-site is unlikely and, therefore, has not been considered further.

The risks associated with historic coal mining legacy are discussed in Section 3.

2.3.5 Other Pertinent Existing Geological Records

The Curtins Phase 1 Report (Ref.1) reports that there is 'no hazard to very low risk' from the following ground stability hazards on and around the site: collapsible ground, running sands, landslides, shrinking or swelling clay and ground dissolution. No hazard is identified in relation to compressible ground. A moderate hazard is identified in relation to compressible ground associated with the Alluvium, underlying the site at its southern boundary.

UK Radon Mapping (Ref. 2) confirms the site is situated in an area where <1% of homes are above the radon action level. If this document is being referred to by an employer/prospective employer utilising space in the proposed development as workplaces, they are reminded of their responsibilities in respect of radon in the workplace under the Health and Safety at Work Act 1974. This is a reminder of legal requirements an employer should be aware of and comply with. This is not related to and does not impact upon the Local Authority Planning requirements and the discharge of conditions advised by a planning application decision notice.

2.4 Hydrogeology and Hydrology

The Woodhead Hill Rock and Pennine Lower Coal Measures Formation bedrock is classified as a Secondary A Aquifer, defined as:

"Secondary A Aquifers comprise permeable layers that can support local water supplies, and may form important base flow to rivers"

The Glacial Till Deposits is classed as a Secondary Undifferentiated Aquifer, defined as:

"Secondary Undifferentiated Aquifers are designated where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the strata."

The closest surface water feature is recorded to be approximately 259m east of the site boundary and comprises of five large man-made fishing ponds.

There have been 2 No. pollution incidents recorded within 250m of the site, the closest recorded 214m south-east of the site at Fairfield Hospital which was classified as a Category 3 – Minor Incident where crude sewage entered a tributary to the River Roch due to ineffective pumping in 1997.

There are no surface water abstractions within 250m of the site. The closest recorded surface water abstraction point is located 695m north of the site operated by Wills Fabric Ltd for boiler feed.

There are no active discharge consents within 250m of the site.

The site is not recorded within a Source Protection Zone (SPZ). The closest potable groundwater abstraction is located 817m north-east of the site at Lower Tack Lea Farm, Bury for General Agriculture and Private Water Supply (Domestic) use.

2.5 Landfill, Pollution and Ground Gas Sources

The Curtins Phase 1 (Ref. 1) confirmed that there is 1 No. BGS recorded landfill site located within 250m of the site, located 130m north-west at Roughill Lane, Jericho, Bury.

The closest Historical Landfill Site was located 119m north-west of the site in Jericho, Bury where deposited waste of "Liquid Sludge" included industrial, commercial and household waste with the last input in 1975.

There are no operational licensed waste management facilities located within 500m of the site. The closest waste management facility was 428m south of the site, the Prettywood West Extension Landfill Site where non-biodegradable wastes were deposited. This license has since been revoked.

The closest Local Authority Pollution Prevention and Control Permit is located 438m north-east of the site at Save Service Station (Petrol Station), 602-621 Rochdale Old Road.

The Curtins Phase 1 (Ref. 1) noted 3 No. areas of potentially infilled land within 250m of the site, the closest is located 116m north-west of the site relating to unknown filled ground (pit, quarry etc) this is likely the Smethurst Hall Brick Works Clay Pit.

2.6 Unexploded Ordnance (UXO) Risk Assessment

It should be noted that the following assessment is only applicable to the Curtins Ground Investigation described in this report only. Where the client is looking to determine the risk from UXO throughout the entire enabling works and construction phase of below ground level development, the Principal Contractor appointed for the enabling and construction works must obtain their own Detailed UXO Risk Assessment Report to advise their specific works.

UXO Risk Mapping indicates that the risk posed by UXO associated with WW2 bombing to be Low-Risk within the site. Areas designated as Low-Risk are those that shows a low bombing density of 15 bombs or less per 1000 acre or higher.

With reference to historical mapping, there are no 'ruins' (evidence of bomb damage) detailed on-site or within the immediate surrounding area. The Curtins Phase 1 (Ref. 1), states that that a bomb fell within the Fairfield Hospital Grounds in 1940 and caused "relatively little damage or injury". Further to this, there was demolition of the old Workhouse buildings and construction of a new Fairfield General Hospital building in the 1990s, limiting the potential of encountering UXO during the Curtins ground investigation.

If unexploded ordnance is discovered during any works, stop immediately, prevent access to the area, and inform the police. If the site boundary or location changes, then the UXO risk should be reassessed.

2.7 Summary of Phase 1 PCSM

A summary of potential pollutant linkages at the development site identified in the Curtins Phase 1 Report (Ref. 1) presented in Table 2, were identified as requiring further investigation to enable the safe redevelopment of the site.

Table 2 – Summary of Phase 1 Preliminary Conceptual Site Model

Source	Pathway	Receptor	Risk
On-Site Sources of Potential Contamination: - Made Ground of unknown composition from uncontrolled deposition of materials onsite during the construction and demolition of the Bury Union Workhouse and subsequent Fairfield General Hospital. - Historical (now demolished) buildings were constructed and maintained during a period when asbestos containing materials may have been used and may be encountered in Made Ground soils. - Potential for hydrocarbon contamination from fuel spills in the carparking area. Off-site Sources of Potential Contamination: - Made Ground of unknown composition from uncontrolled deposition of materials onsite during the construction and demolition of the Bury Union Workhouse and subsequent Fairfield General Hospital.	Direct contact, ingestion, inhalation (dust and vapours)	End-user of site Construction and Maintenance Workers	Moderate/ Low
	Vertical and horizontal migration through the superficial deposits (soils)	Controlled Waters (Groundwater) Secondary A Aquifer associated with the bedrock deposits. Site is not located within a Source Protection Zone. No potable groundwater abstractions located within 500m of the site.	Low
		Controlled Waters (Surface Water) Man-made fishing ponds located 259m east of the site, River Roch located 335m south of the site.	Low

Source	Pathway	Receptor	Risk
On and off-site soils with the potential to generate ground gases: Suspected Made Ground deposits onsite.	Vertical and horizontal migration	End-user of site	Moderate/ Low

Potential contaminants of concern associated with the sources identified within the site history and the Conceptual Site Model in Sections 3.0 and 7.0 respectively include but are not limited to: broad range aliphatic and aromatic hydrocarbons present within any fuel oils; polycyclic aromatic hydrocarbons (PAHs); inorganic compounds including heavy metals; and asbestos present in discarded building materials.

Potential contaminants associated with the air-born dust/particulates include but are not limited to polycyclic aromatic hydrocarbons and inorganic compounds including toxic metals that are also accounted for by potential on-site contaminants of concern.

The qualitative risk assessment determined the above risks associated with the proposed development of the site warrant further investigation.

It was recommended that a ground investigation is conducted to both confirm this assessment and provide data in support of the structural and civil engineering design. The scope of the investigation undertaken is detailed in *Section 3.0*.

3 COAL MINING RISK ASSESSMENT SUMMARY

This section presents a summary of the Coal Mining Risk Assessment detailed in the Curtins Phase 1 Report (Ref. 1). As such, it is advised that this report is read in conjunction with the Phase 1 Report (Ref. 1). A summary of the pertinent Phase 1 Coal Mining Risk Assessment (CMRA) Report information specifically for the proposed development site is presented in the following sub-sections.

3.1 Geology

The Pennine Lower Coal Measures are recorded to underly the site. Given the geological context, the Sand Rock Coal has the potential to be present beneath the site at depths of approximately ~30m taking into account the distance and dip of the strata.

Borehole record indicates superficial deposits indicative of Glacial Till from ground level to 0.91m bgl, with deposits indicative of weathered bedrock encountered at 0.91m bgl (broken red sandstone). Evidence of shallow coal mine workings were encountered in the form of "Waste Ground" encountered between 23.62m and 24.84m bgl.

An extract from BGS Mapping for the area is presented in Figure 2 below.

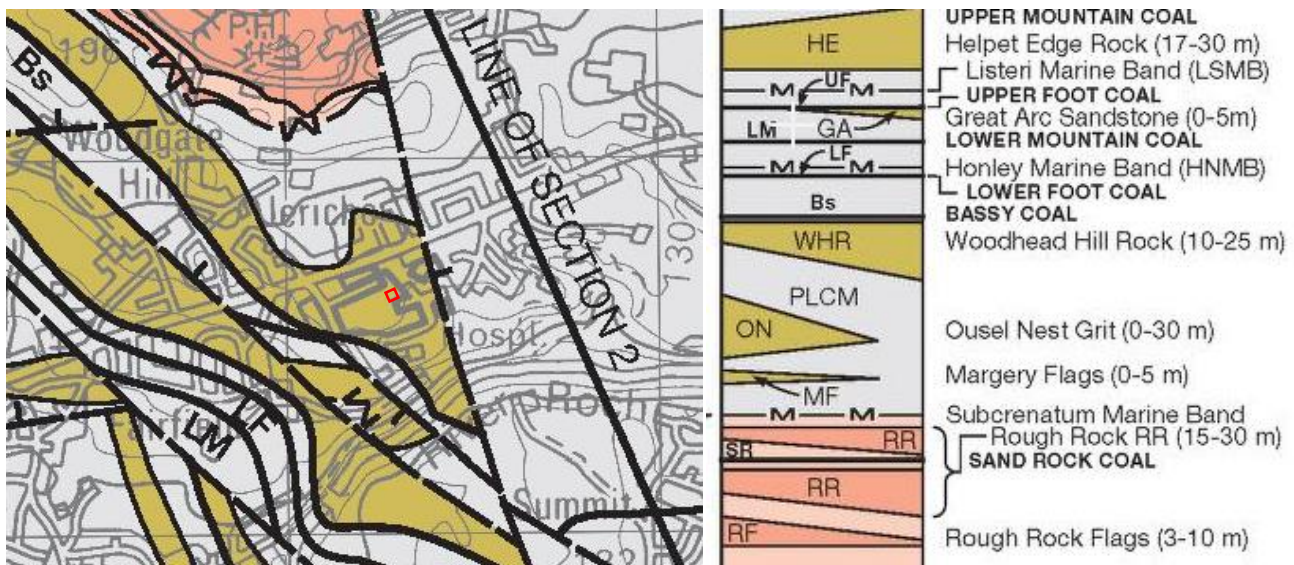


Figure 2 - BGS Geological Mapping extract, 1:50,000 Manchester (2010) Sheet 085
Extract from stratigraphic column relating to rocks underlying the site included on the right hand side.
(Box = approximate site location).

3.2 Mining Remediation Authority Records

The Mining Remediation Authority records indicate the site is within a Development High Risk Area, due to the presence of a disused mine entry within the north-western site boundary.

A historic BGS recorded borehole from 1923 noted "Waste Ground" (Old Coal Workings) between 23.62m – 24.84m bgl located approximately 110m north-east of the site.

No mine gas has been recorded within 500m of the site boundary according to the Mining Remediation Authority Consultants Mining Report. A review of Mining Remediation Authority guidance "Coal seams with a history of spontaneous combustion" published in 2015 indicates that seams may have a history of spontaneous combustion where roof coal has been left in place.

The risk associated with deep mine workings (shafts) is considered to be Moderate, as there is a disused mine shaft located within the north-western site boundary. The Mining Remediation Authority notes that this was capped during

construction of the hospital in c. 1995, with the cap located in August 2023. It was recommended that an intrusive mining specific investigation and treatment specification is undertaken for the probing and grouting of the mine entry.

The risk associated with deep (>30m bgl) and shallow (<30m bgl) mine workings, is considered to be Low, as there is no past underground coal mining recorded beneath the site or within the immediate surrounding area.

There is potential for release of mine gas emissions sourced from unrecorded worked coal seams beneath the site during future drilling or construction. Although no named coal seams beneath the site have a history of spontaneous combustion, spontaneous combustion may occur where roof coal is left in place.



Figure 3 – Mining Remediation Authority Recorded Development High Risk Area (Left) Highlighted in Black Hatching. Mining Remediation Authority Recorded Mine Entries (right) Highlighted by Red X. Approximate Site Boundary in Red.



Figure 4 – Mining Remediation Authority Recorded Mine Entry Potential Zone of Influence in Brown.

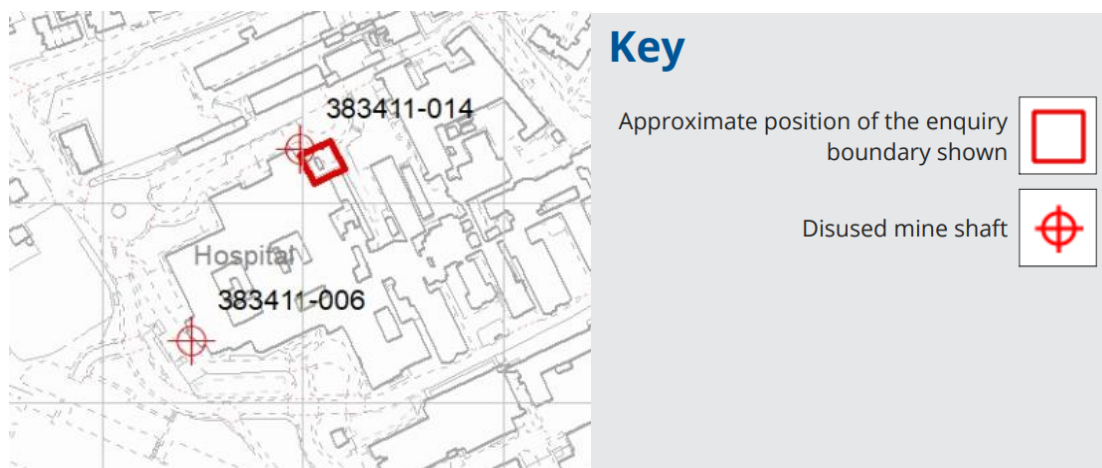


Figure 5 - Extract of Mining Remediation Authority Consultants Coal Mining Report
(Ref. 51003488596001) (Box = approximate site location).

3.3 Historical Records

A letter was written to the Coal Authority by Bury Health Care Trust (1995) which notes that an unrecorded mine shaft was encountered during the earthworks for the construction of the existing hospital. A circular feature was identified with 2m diameter, lined in masonry.

The Coal Authorities response is included which states that the onus for treatment of mine entries on development sites is with the developer.

3.4 Summary of CMRA

A summary of mining risks pertaining to the development identified in the Curtins Phase 1 Report (Ref. 1) presented in Table 3.

Table 3 – Summary of Coal Mining Risks

Scenario	Risk	Actions
Deep Mining (Shafts)	Moderate	Probing to determine the depth and the state of any backfill of the treated disused mine shaft along with grouting of the feature to prevent any possible future collapse of the mine entry. No build zones to be implemented to ensure developments are not constructed within the potential collapse zone of the shaft.
Deep Mining (Voids, broken ground)	Low	No further action required.
Shallow Mining (Voids, broken ground)	Low	No further action required.
Mine Gases	Moderate / Low	Ground Investigation should include ground gas monitoring, where investigating historic coal mining legacy. Water flush during drilling to mitigate against mine release and migration of mine gas emissions, where investigating historic coal mining legacy.
Spontaneous Combustion	Moderate	During deep ground investigation to assess risks of historic coal mining legacy, mine gas monitoring to be undertaken and water flush to be used to mitigate potential risks associated with spontaneous combustion.

In relation to the above risks, the following documents have been produced:

- Scope of Works for Treatment of Mine Shafts, Bury Emergency Department, Fairfield Hospital, Bury (report ref. 086745-CUR-XX-XX-T-GE-00004-P01, dated June 2025)
- Specification for Treatment of Mine Shafts, Bury Emergency Department, Fairfield Hospital, Bury (report ref. 086745-CUR-XX-XX-T-GE-00005-P01, dated June 2025)

4 PHASE 2 INVESTIGATION SCOPE OF WORKS

Site investigation works were undertaken between the 06th and 08th of May 2025.

The scope of the ground investigation was designed in general accordance with current UK guidance including ICE UK Specification for Ground Investigation, Third Edition (2020) (Ref. 3) and with techniques outlined in Eurocodes 7 - BS EN 1997-1:2007 (Ref. 4), BS 5930:2015+A1:2020 Code of Practice for Ground Investigations (Ref. 5).

The scope and rationale are summarised in *Table 4*.

Table 4 – 2024 Ground Investigation Scope of Works

Exploratory Hole Type	Exploratory Hole Reference	Exploratory Hole Depth (m bgl)	Rationale
Window Sample Boreholes	WS01	1.60	• Confirm shallow ground conditions. • Collect soil samples for chemical and geotechnical testing. • Undertake in-situ testing. • Install monitoring wells to facilitate return ground gas and groundwater level monitoring and assessment.
	WS02	2.00	
	WS03	2.80	
	WS04	3.60	
	WS06	5.45	
Hand Excavated Foundation Pits	HP01	1.20	• Confirm depth and dimensions of existing structures foundations.
	HP02	1.20	
	HP03	0.64	

**Mine shaft investigations are outside the scope of this investigation. Refer to Coal Mining Specification and Scope for requirements regarding mine shaft adjacent to site*

4.1 Soil Logging and Sampling

Exploratory borehole arisings were logged on site by a qualified Engineer. All exploratory holes were logged in accordance with the requirements of BS 5930:2015+A1:2020 (Ref. 5) including recording observed visual and olfactory indications of contamination. Exploratory hole logs are provided in *Appendix B*.

4.2 Monitoring Well Installations

50mm diameter standpipes were installed in four window sample boreholes to enable post-investigation monitoring of ground gases and groundwater levels.

A bentonite seal was placed above and below the screened section (response zone) of the borehole to minimise potential for downward migration of contaminants and the creation of a preferential migratory pathway. A gravel aggregate surround was installed in the annulus between the sides of the borehole in the response zone. The monitoring wells were primarily designed to assess the potential for ground gas and groundwater monitoring.

The installed response zones are summarised in *Table 5* below.

Table 5 – Monitoring Well Response Zones

Exploratory Hole Ref	Response Zone(s) m bgl (m AOD)	Strata Description
WS01	0.70 – 1.20 (139.58 – 139.08)	Made Ground
WS04	2.00 – 3.00 (139.19 – 138.19)	Glacial Till (Cohesive)
WS05	3.50 – 4.50 (138.50 – 137.50)	Glacial Till (Granular)
WS06	1.00 – 2.00 (141.15 – 140.15)	Made Ground

Copies of borehole logs can be referred to in *Appendix B* of this report.

4.3 Post Investigation Monitoring

4.3.1 Ground Gas and Groundwater Monitoring

Four gas and groundwater level monitoring visits have been undertaken, between the 30th May and 7th July 2025 to assess the groundwater and gas conditions as identified in the Preliminary Conceptual Site Model in the Phase 1 Preliminary Site Assessment (Ref. 1).

5 LABORATORY ANALYSIS

Representative soil samples were selected for laboratory geotechnical and chemical testing, based on field observations and with consideration of the development proposals.

Selected environmental soil samples were placed in laboratory provided containers and stored in cool boxes prior to being transported to the nominated laboratory under the laboratory's chain of custody documentation. The laboratory selected by Curtins for chemical analysis was Envirolab (UKAS and MCERTS accredited), and for geotechnical analysis was I2 Analytical (UKAS accredited).

Sampling positions were generally located in a non-targeted, systematic array to give adequate and representative coverage of the site's proposed end use and the immediate environmental setting.

5.1 Environmental Chemical Analysis

The contaminants of concern potentially present on the site were considered to include, amongst others; organic matter, fill, hydrocarbons (e.g. fuel/oils) the extent of which is captured by the broad environmental testing suite listed in Table 6.

Table 6 – Environmental Chemistry Analysis Suite: Soils

Testing Suite Reference	Analyte	Limit of Detection
Soils Suite A	Asbestos Screen	-
	pH Value	0.01 pH
	Soil Organic Matter (SOM)	0.14% w/w
	Arsenic, Cadmium Chromium, Chromium VI, Copper, Lead, Selenium, Zinc, Nickel	1 mg/kg
	Boron (water soluble)	1 mg/kg
	Mercury	0.17 mg/kg
	Cyanide (total)	1 mg/kg
	Phenols (screen)	0.2 mg/kg
	PAHs (USEPA 16)	0.1 to 0.8 mg/kg
	TPH (Aro/Alc Split)	0.01 to 0.1 mg/kg
	Water Soluble 2:1 Sulphate	0.01 g/l

One sample, obtained from WS06 (0.30m-0.40m bgl) was scheduled for asbestos quantification, where amosite insulation was identified in the soil matrix. The limit of detection of asbestos in soils was 0.001% w/w.

Environmental testing can be referred to in *Appendix C*, with testing undertaken on a total of six soil samples across the site.

5.2 Groundwater Analysis

The Preliminary CSM carried out as part of the Phase 1 appraisal summary has shown a low risk to controlled waters. No evidence of gross contamination was identified during the ground investigation and therefore no groundwater samples were obtained or tested as part of this investigation.

5.3 Geotechnical Analysis

Soil samples for testing were prepared in accordance with BS1377- 1:2016 (Ref. 6). The field and laboratory geotechnical testing undertaken is summarised in Table 7.

Table 7 – Geotechnical Testing Soils

Test Type.	Quantity	Standard
Field Testing		
Standard Penetration Test	19	BS 5930:2015+A1:2020
Laboratory Testing		
pH	13	BS1377:1990, Part 3
Water Soluble Sulphate 2:1 SO ₄	13	BS1377:1990, Part 3
Water Content	9	BS1377:1990 Part 2
Atterberg 4 Point	9	BS1377:1990 Part 2
Particle Size Distribution (wet sieve)	1	BS1377:1990 Part 2

The results of the geotechnical testing are summarised in *Section 6.0* of this report. Copies of the geotechnical testing certificates are presented in *Appendix D*.

6 GROUND CONDITIONS

The ground conditions encountered during the Curtins ground investigation generally comprised of Topsoil or hardstanding over Made Ground deposits, underlain by cohesive Glacial Till with localised granular deposits. Bedrock was confirmed to comprised of sandstone consistent with the Woodhead Hill Rock Formation.

6.1 General

A summary of the ground conditions encountered during the site investigation works is presented in Table 7, with detailed information presented in the exploratory hole logs included in *Appendix B*.

Table 8 – Summary of Ground Conditions Encountered

Strata	Depth to Top of Strata m bgl (m AOD)	Thickness (m)		Description
		Min	Max	
Topsoil	GL (142.0 – 140.28)	0.31	0.34	Grass overlying fine to coarse sand with frequent rootlets.
Made Ground	GL – 0.34 (142.15 – 139.94)	0.52	2.50	Tarmac, underlain by very sandy gravel (hardcore). And/or Clayey gravelly, fine to coarse sand. Gravel of sandstone, mudstone, coal, concrete, siltstone and brick And/or Soft brown very sandy very gravelly clay, with high to moderate cobble content. Gavel of
Glacial Till Deposits	0.52 – 2.50 (141.03 – 138.67)	0.10	2.30	Firm to very stiff sandy, very gravelly, clay. Gravel of sandstone, mudstone and coal.
Woodhead Hill Rock Formation	1.45 – 3.27 (138.83 – 137.92)	0.02 ¹	0.33 ¹	Very dense yellowish brown sandstone.

¹ Thickness not proven.

6.2 Topsoil

Topsoil deposits were encountered from surface in WS01, and WS03 to WS04, from ground level (142.00m and 140.28m AOD), encountered to depths of between 0.31 and 0.34m bgl (141.68 and 139.94m AOD). The topsoil comprised of grass overlying fine to coarse sand with frequent rootlets.

6.3 Made Ground

In hardstanding areas, the surface covering comprised tarmac (0.10m), underlain by a granular sub-base of light grey very sandy gravel of limestone to depths of 0.28m and 0.21m bgl in WS02 and WS06 respectively.

Hand pits around the perimeter of the building recorded a surface covering of reddish brown medium and coarse gravel of flint, of thickness 0.10m.

Made Ground soils were recorded to a maximum depth of between 0.52m and 2.50m bgl.

Granular Made Ground soils were encountered underlying the sub-base or Topsoil at depths of between 0.28m and 1.40m (140.09m and 138.97m AOD), comprising brown or grey, locally clayey, gravelly, fine to coarse sand with cobbles. Gravel of sandstone, mudstone, coal, concrete, siltstone and brick.

Cohesive Made Ground soils were encountered in WS05 underlying the sub-base at depths of between 1.00m and m bgl (139.37m and m AOD), and WS02 beneath gravelly sand, comprising soft brown sandy gravelly clay with a high cobble content. Gravel and cobbles comprising of sandstone, limestone, brick and coal.

6.4 Glacial Till Deposits

Superficial soils consistent with Glacial Till Deposits were encountered directly beneath the Made Ground in all exploratory hole locations (with the exception of HP01). The base of the Glacial Till was proven at depths ranging between 1.45m to 3.27m bgl (138.83m to 137.92m AOD). Glacial Till was encountered as both cohesive and granular deposits.

The cohesive deposits were encountered in all exploratory hole locations (with the exception of HP01), to depths ranging between 0.64m and 3.45m bgl (140.91m to 137.92m AOD). The cohesive material typically comprised of firm to very stiff, sandy to very sandy, very gravelly, clay. Gravels comprised of sandstone, mudstone and coal.

The granular deposits were encountered in WS05 and HP02, to depths ranging between 0.90m and 4.52m bgl (140.70m to 137.48m AOD). The granular material typically comprised medium dense very gravelly fine to coarse sand.

6.5 Woodhead Hill Rock Formation

The Woodhead Hill Rock Formation was encountered underlying the Glacial Till in WS01 to WS04, at depths of between 1.45m and 3.27m bgl (138.83m and 137.92m AOD), encountered to a maximum depth of 5.45m bgl (135.74m AOD). The full extent of this deposit was not proven during the ground investigation works.

The Woodhead Hill Rock Formation was encountered as yellowish-brown sandstone. In-situ SPTs undertaken in this stratum indicated a very dense material, with all tests undertaken refusing (SPT N > 50).

6.6 Obstructions Encountered

No obstructions were encountered during the site investigation works.

6.7 Groundwater

No groundwater strikes were recorded during the ground investigation works.

Four groundwater monitoring visits have been undertaken between the 30th May and 7th July 2025, the results of which are presented in Table 9.

Table 9 – Groundwater Monitoring Results

Location	Installation Strata	Response Zone(s) m bgl	Depth m bgl (m AOD)			
			30/05/25	19/06/25	24/06/25	07/07/25
WS01	0.70 – 1.20 (139.58 – 139.08)	Made Ground	Dry	Dry	1.19 (139.09)	Dry
WS04	2.00 – 3.00 (139.19 – 138.19)	Glacial Till (Cohesive)	Dry	Dry	Dry	Dry
WS05	3.50 – 4.50 (138.50 – 137.50)	Glacial Till (Granular)	3.78 (138.22)	3.66 (138.34)	3.65 (138.35)	3.66 (138.34)
WS06	1.00 – 2.00 (141.15 – 140.15)	Made Ground	1.98 (140.17)	1.98 (140.17)	1.97 (140.18)	Dry

It is considered likely that groundwater encountered during the monitoring period is perched water.

6.8 Observed Potential Contamination

No other visual or olfactory contamination beyond anthropogenic inclusions within the Made Ground deposits was noted during the intrusive works.

7 GROUND MODEL

7.1 Made Ground

Due to the variable nature of Made Ground in terms of strength and composition, this layer is not deemed to be a suitable founding stratum. As such, limited geotechnical testing was undertaken on this stratum and characteristic geotechnical design parameters have not been derived.

Table 10 – Summary of Geochemical Test Results – Made Ground

Parameter	No. of Tests	Results	
		Min	Max
Field Tests			
SPT 'N' Value (uncorrected)	4	1	50
Laboratory Tests – General			
pH*	6	7.68	10.35
Water Soluble Sulphate (mg/l)*	6	<10	20

*Taken from the Environmental Testing results and Geotechnical Testing Results.

7.2 Glacial Till

A summary of the field and laboratory test results from samples of Glacial Till are summarised in Table 11.

Table 11 – Summary of Geotechnical Test Results – Glacial Till

Parameter		No. of Tests	Min	Results	Max
Field Tests					
SPT 'N' Value (uncorrected)		11	1		50*
Laboratory Tests – General					
Atterberg Tests	Liquid Limit (%)	6	23		33
	Plastic Limit (%)	7	15		18
	Plasticity Index (%)	6	9		18
	Modified Plasticity Index (%) ¹	6	9		17
Water Content (%)		7	11		21
pH		6	6.16		8.07
Water Soluble Sulphate (mg/l)		6	14		43

¹ Modified in accordance with BRE Digest 240 (1993)

*SPT Refusal

The SPT 'N' (uncorrected) results for the cohesive Glacial Till Deposits range between 1 and 50. The SPT 'N' (uncorrected) results are plotted against elevation on Figure 6.

A total of 6 No. Atterberg Tests were undertaken within the cohesive Glacial Till, reporting a modified Plasticity Index results of between 9% and 17% suggesting that the cohesive material has a low volume change potential in accordance with the NHBC Technical Standard, Chapter 4.2, Building near trees (Ref. 7).

A Casagrande Chart showing Plasticity Index plotted against Liquid Limit is provided as Figure 8.

The undrained shear strength (c_u) of the cohesive Glacial Till Deposits has been estimated through the relationship between SPT 'N' Values and Plasticity Indices (Ref. 8)

The estimated undrained shear strength (c_u) of the cohesive Glacial Till Deposits is determined using the relationship between SPT N_{60} values and the Plasticity Index (PI) (Ref. 9) as presented in Equation 1:

$$c_u = \text{SPT } N_{60} \times f_1 \quad [\text{Equation 1}]$$

Where:
 $\text{SPT } N_{60}$ is Corrected Standard Penetration Test
 f_1 is the Stroud factor

In the absence of an SPT Energy Certificate uncorrected SPT N values have been used. A conservative f_1 value of 6.0 was chosen based on the highest modified PI of 15% (across all cohesive results). Therefore, for SPT N values of between 1 and 23, estimated c_u values range between 6 and 138kPa, indicating extremely low to high strength clay. A plot of estimated undrained shear strength versus elevation is provided as Figure 7.

Characteristic weight densities ranging between 16kN/m³ and 18kN/m³ are recommended depending on the strength of the clay, based on BS 8004:2015+A1:2020 for soils above the water table (Ref. 10).

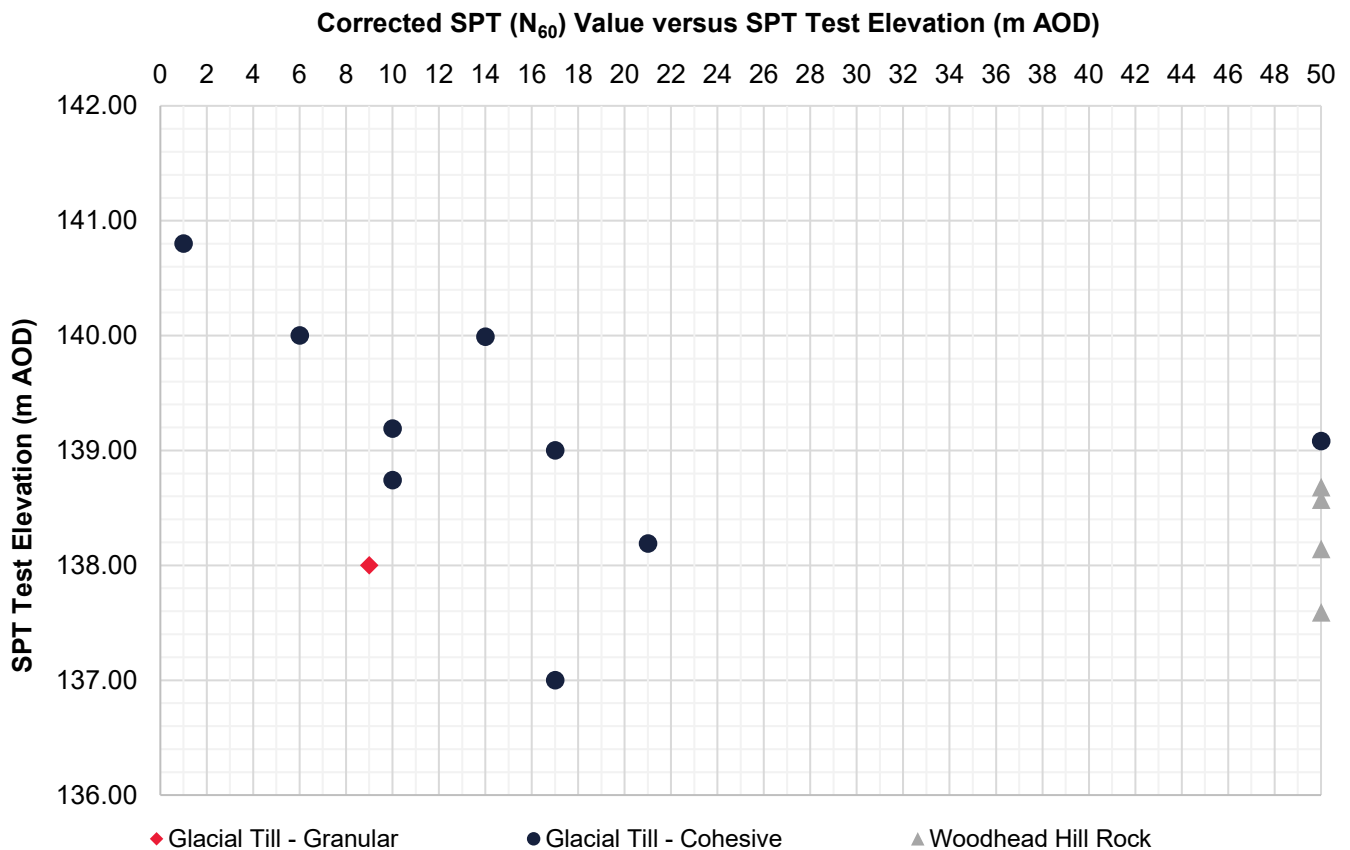


Figure 6 – SPT 'N' Values (uncorrected) vs. Depth (m AOD)

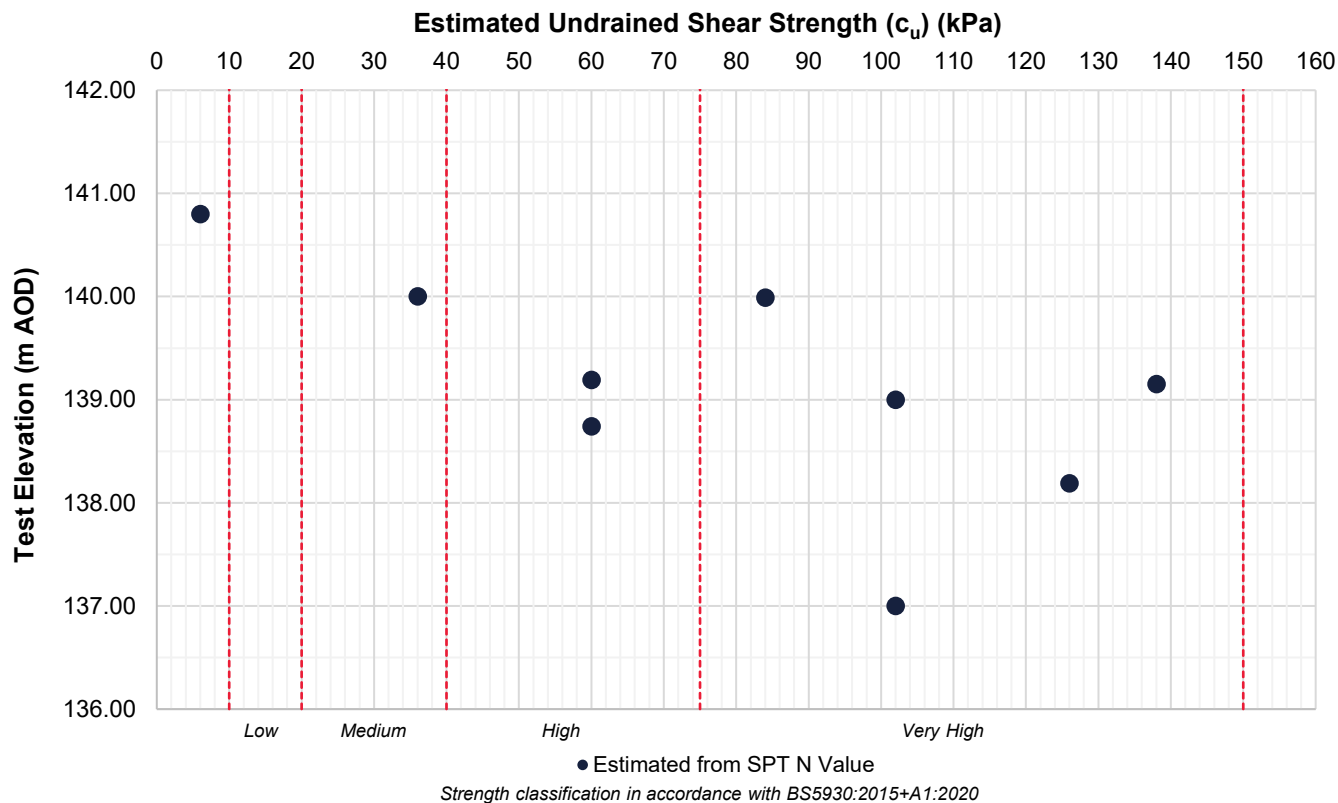


Figure 7 – Relationship between Undrained Shear Strength and Depth (m AOD) – Cohesive Glacial Till

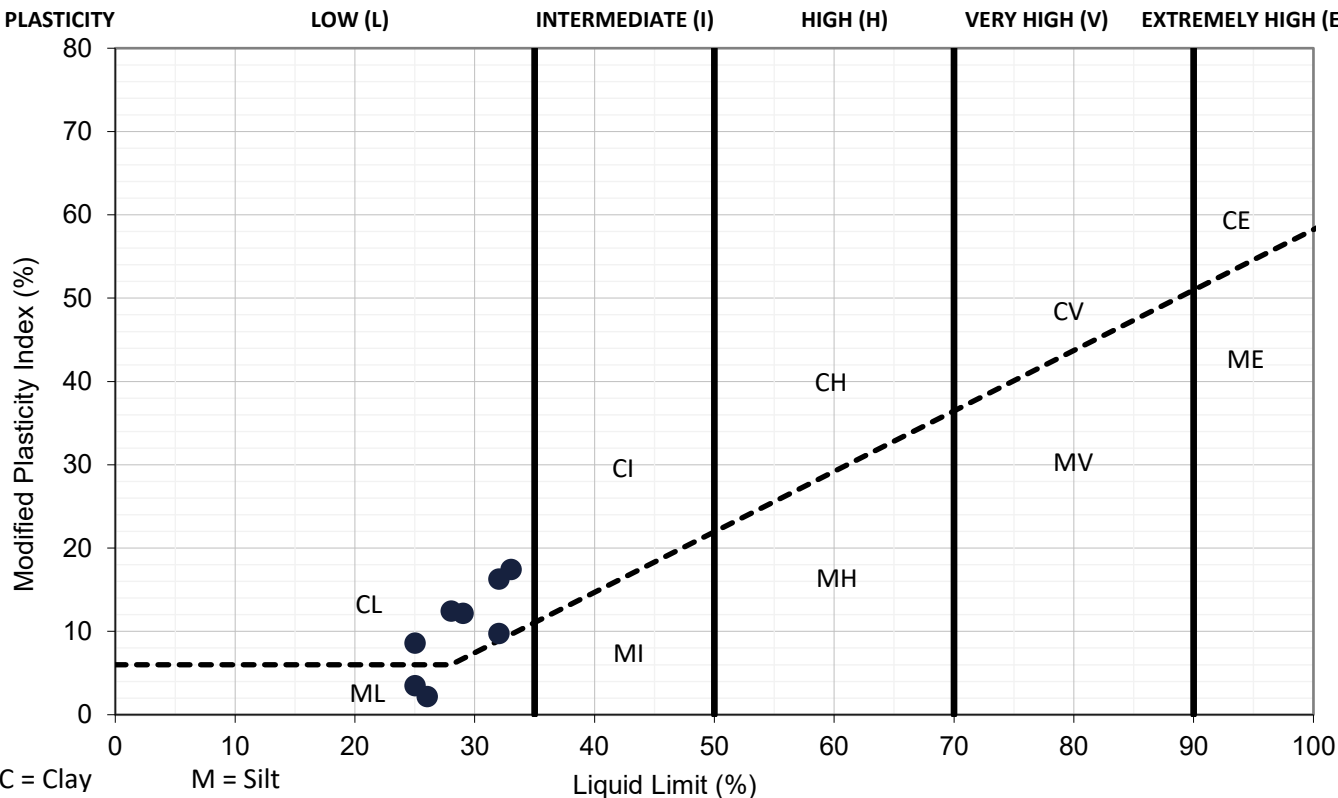


Figure 8 – Casagrande Plasticity Chart – Cohesive Glacial Till

7.3 Woodhead Hill Rock Formation – Sandstone

The geotechnical test results recorded within the stratum are summarised below in Table 11.

Table 12 – Summary of Geotechnical Test Results – Woodhead Hill Rock Formation- Sandstone

Parameter	No. of Tests	Results	
		Min	Max
Field Tests			
SPT 'N' Value (uncorrected)	4	50*	50*
Laboratory Tests – General			
Water Content (%)	2	12	41
pH	1	7.18	
Water Soluble Sulphate (mg/l)	1	28	

¹ Modified in accordance with BRE Digest 240 (1993)

*SPT Refusal

Four SPT tests were undertaken within the bedrock deposits, recorded 'N' values of >50 (refusal) suggesting very dense material.

No strength testing was undertaken in the bedrock as core samples were not recovered as part of this ground investigation.

No groundwater strikes were recorded in any exploratory hole locations during the ground investigation works. As such, using guidance provided in BS8004 (Ref. 10) a characteristic weight density of 18kN/m³ is recommended for the dense to very dense sand (assuming above the water table).

7.4 Aggressive Ground Conditions

The classification of the site in terms of concrete in aggressive ground is based on the guidance provided in Table C2 of the Building Research Establishment (BRE) Special Digest 1, 3rd edition of 2005 (Ref. 11).

A summary of the results obtained during are summarised in Table 13, and Table 14 details the classification.

Table 13 – Summary of BRE Suite Results

Stratum	Quantity	Range
Made Ground	pH	7.68 – 10.35
	Water Soluble Sulphate (mg/l)	<10 - 20
Glacial Till	pH	6.16 – 8.07
	Water Soluble Sulphate (mg/l)	14 – 43
Woodhead Hill Rock Formation (Sandstone)	pH	7.18
	Water Soluble Sulphate (mg/l)	28

Table 14 – Aggressive Chemical Environment for Concrete (ACEC) Site Classification

Stratum	Design Sulphate Class	Aggressive Chemical Environment
Made Ground	DS-1	AC-1
Glacial Till	DS-1	AC-1
Chester Formation Sandstone	DS-1	AC-1

(1) ACEC assessment was based on the mobile groundwater condition in a brownfield scheme area.

Results obtained from the site indicate that all strata can be classified as DS-1 in relation to concrete in aggressive ground with an ACEC class of AC-1.

8 GROUND AND GROUNDWATER CONTAMINATION ASSESSMENT

This section of the report includes the assessment of the potential contamination, solid, liquid and gas, identified on the subject site which may present a risk to the proposed end users, associated utilities, and the wider environment.

In LCRM guidance published by the Environment Agency (Ref.12), the risk to human health or controlled waters is determined through an assessment of pollutant linkages between a source of contamination (within the ground or groundwater either on or off site) and a sensitive receptor such as end users of the site, building materials, edible plants grown in gardens or groundwater abstracted for drinking. This is termed a source-pathway-receptor relationship. The same model is applied to the assessment of risk arising from ground gases as detailed within BS8576:2013 (Ref.13).

These models have a common approach, which is one of a tiered assessment. At each stage of the assessment further detail can be applied to the conceptual site model to provide a detailed interpretation on a site by site basis. As part of the planning process this approach is adopted to establish either if the site is 'suitable for use' or whether additional work or else remedial work is required for the site to be deemed so.

The sub-sections hereafter therefore incorporate the second Tier (Tier 2) of the approach described in EA guidance, otherwise referred to as the Generic Quantitative Risk Assessment (GQRA). The GQRA builds on the qualitative risk assessment (Tier 1) presented within Section 2 of this report, in conjunction with observations made during the ground investigation and is based solely on the results of the chemical and other testing data obtained as part of Curtins ground investigation. The GQRA is used to build/refine the Conceptual Site Model (CSM) for the site as detailed and presented in Section 9.0 of this report.

More detail on Curtins risk assessment methodology, rationale and hierarchy for human health risk assessment is enclosed in Appendix G.

8.1 Human Health GQRA

8.1.1 Adopted Soil Human Health GACs Screening Methodology

Current development proposals include an extension to the existing school, as a standalone block.

With consideration of the proposed end use it is considered that the proposed use of the site is analogous with a '*Commercial*' end use scenario.

The soil organic matter (SOM) content has an influence on the volatilisation of organic contaminants (i.e., the higher the SOM, the lower the volatilisation rate and therefore inhalation exposure risk). Soil organic matter (SOM) values for the site soils ranged from 0.23% to 4.05%. Consideration of the geometric mean results in a calculated value of 1.16%.

As such a conservative comparison against Tier 1 thresholds for a SOM of 1% for all site soils has been adopted for *Commercial* end-use. The adopted GAC's are listed in *Appendix F*.

8.1.2 Generic Assessment Criteria Screening of Soil Laboratory Results

The results of the environmental testing can be referred to in Appendix C, with testing undertaken on a total of six Made Ground soil samples across the site.

A review of the chemical analysis results determined that concentrations of benzo(a)pyrene were recorded below the laboratories limit of detection in all samples collected. Therefore, it is not possible to assess the genotoxic PAHs using a surrogate marker approach in accordance with Public Health guidance. Rather, samples assessed against individual PAH compounds, utilising the relevant C4SL or S4UL Generic Assessment Criteria.

With respect to the proposed '*Commercial*' end use, soil chemical analysis results did not record any exceedances when compared against GAC screening thresholds.

All soil samples were screened for asbestos. Asbestos was positively identified within WS06 at 0.30-0.40m bgl, comprising of Amosite Insulation at <0.001% w/w quantification.

9 GROUND GAS ASSESSMENT

The assessment of risk presented by ground gases is assessed with reference to guidance published by CIRIA (Assessing Risks Posed by Hazardous Ground Gases to Buildings, C665 (Ref. 14), BSI Publication Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings BS8485:2015 (Ref. 15) and other broadly accepted references such as the Ground Gas Handbook 2009 (Ref. 16).

The ground gas risk assessment adopts a tiered approach. In the first instance this involves a re-evaluation of the Conceptual Site Model described within the Phase 1 Preliminary Site Assessment and thereafter validating this conceptual model with the ground gas data, the semi-quantitative risk assessment.

9.1 Ground Gas Monitoring Results

To characterise the site's ground gas regime and validate the qualitative assessment of ground gas risk standpipe installations were incorporated within four borehole locations as detailed in *Section 3.2*.

Four ground gas monitoring visits have been completed, with barometric pressure recorded between 990mb and 1010mb. Rising barometric pressure was recorded on the fourth monitoring visit. The results log sheets are contained within *Appendix E* and summarised in *Table 14*.

Table 15 – Summary of Ground Gas Monitoring Results

Exploratory Hole ID	Maximum Methane Concentration (%)	Maximum Carbon Dioxide Concentration (%)	Minimum Steady Oxygen Concentration (%)	Maximum Gas Flow (l/hr)	
				Maximum	Steady State
WS01	0.1	2.4	18.5	<0.1	<0.1
WS04	<0.1	2.0	18.7	<0.1	<0.1
WS05	<0.1	1.3	19.6	<0.1	<0.1
WS06	<0.1	0.4	20.1	<0.1	<0.1

Maximum carbon dioxide concentrations were recorded at 0.1% in WS01 on the first visit. All other methane concentrations were recorded below the limit of detection in all wells throughout the monitoring period, at <0.1.

Maximum carbon dioxide concentrations were recorded between 0.4% v/v and 2.4% v/v .

Carbon Monoxide and Hydrogen Sulphide was recorded below the limit of detection in all wells throughout the monitoring period.

Peak air flow rates were generally recorded below the instruments limit of detection (<0.1l/hr) in all boreholes across all monitoring visits.

9.2 Ground Gas Assessment

The Preliminary Conceptual Site Model (PCSM) presented within the Phase I Preliminary Risk Assessment identified Made Ground as a potential sources of ground gas generation. Noxious and asphyxiate gases were attributed to include, but not limited to, carbon dioxide, carbon monoxide, methane, and hydrogen sulphide. The Phase 1 PCSM identified a **Moderate/Low** Risk.

During the ground investigation a limited thickness of Made Ground soils were encountered from ground level to depths of between 0.52m and 2.50m bgl (141.03m and 138.97m AOD) typically with limited putrescible content. Natural deposits were encountered as cohesive Glacial Till overlying the Wood Hill Rock Formation.

The development plans indicate that the site will comprise the construction of a single storey extension to the existing hospital building. This risk assessment considers the monitoring data from borehole installations within the site. The assessment has been undertaken in accordance with guidance within BS8485:2019 (Ref. 15).

In accordance with BS8485:2015 (Ref.15), consideration of the recorded soil gas flow rates, presented above, enables hazardous gas flow rates (Q_{hg}) to be evaluated. Q_{hg} can be derived for both 'representative' and 'worst case' scenarios, and a comparison made in support of an appropriate assessment of ground gas risk.

A total of four monitoring visits have been undertaken to date, in various atmospheric conditions. Monitoring has been undertaken in a range of atmospheric conditions, including rising and steady barometric state. It is considered that a representative dataset has been obtained. With consideration of the representative dataset, it is appropriate to use steady state air flow rates within the ground gas risk assessment.

For a 'borehole' scenario (highest hazardous gas flow rate that is realistically possible i.e. in a single borehole) highest steady state flow rates and maximum gas concentrations are adopted, where as for the 'worst-case' check the highest steady state air flow rates and peak gas concentrations, from any borehole at any time, within the same strata, are used.

Evaluation of the 'borehole' scenario and worst-case check' records a maximum Q_{hg} of 0.0024l/hr for carbon dioxide 0.0001l/hr for methane (across all exploratory holes on all monitoring visits). In accordance with BS8485 guidance, the 'worst case check' scenario GSV indicates a Characteristic Situation 1 (CS-1).

The potential risks from ground gases to the excavations are to be dealt with by the Contractor, in accordance with the Confined Space Regulations, during construction. Appropriate ground gas monitoring and safety measures should be in place during the works, as the potential presence of ground gases could pose a risk in any confined spaces of deep excavations.

10 REVISED CONCEPTUAL SITE MODEL

The Preliminary Conceptual Site Model (PCSM) presented in the Phase 1 Report (Ref.1) and discussed in *Section 3.0* of this report has been revised following the GQRA in *Section 7.0* above. The Revised Conceptual Site Model (CSM) is summarised in the table overleaf.

The CSM details the source-pathway-receptor linkages or potential pollutant linkages (PPL) that have been identified as relevant for the site. The GQRA details the associated level of risk relating to these potential pollutant linkages.

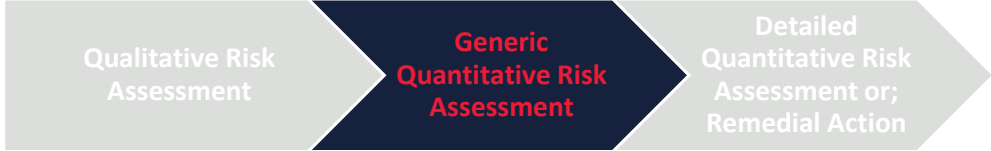
The CSM follows the framework outlined within CIRIA C552 (Ref. 17) which is summarised within *Appendix G*.

The 'risk rating' within the CSM refers to the risk that the source, pathway, receptor linkage or PPL is complete. Unless specifically stated it does not necessarily refer to an immediate risk and is intended to be used as a tool to assess the necessity for further assessment/investigation.

Risks presented by Mining are discussed and assessed within *Section 3*.

Risks presented by Unexploded Ordnance are discussed and assessed in *Section 2.6*.

Under current health and safety legislation, employers are required to carry out their own appropriate risk assessments and mitigation to protect themselves and their employees, other human receptors, and the environment from potential contamination. Such risks must be adequately mitigated by law, specifically the Construction Design Management (CDM) Regulations, 2015 (Ref. 18) which require that potential risks to human health and the environment from construction activities are appropriately identified and all necessary steps taken to eliminate / manage that risk. It has been assumed that any future construction works on site will be undertaken in compliance with these requirements. Reference should be given to the environmental testing results discussed within *Section 7.0* and presented within *Appendix C*.



- The table below represents the Second stage in the land quality risk assessment process; the Revised Conceptual Site Model following the Quantitative Risk Assessment.
- For a development site to be deemed 'suitable for use' the level of risk needs to be brought down to acceptable levels, i.e. low to very low risk. The purpose of each stage of risk assessment is ultimately to establish if there is a requirement for additional levels of assessment to be made to have sufficient confidence to support a risk characterisation or management decision, e.g., remedial action.

Conceptual Site Model			Qualitative Risk Assessment			Comments	Recommended Actions
Source	Pathway(s)	Receptor(s)	Consequence	Likelihood of Occurrence	Risk Rating		
Potential contamination within Made Ground Soils associated with: • Construction and demolition of structures on site, including Bury Union Workhouse and Fairfield General Hospital, including potential ACMs. • Potential for hydrocarbon contamination from fuel spills in the carparking area.	Direct contact and dermal uptake, soil and dust ingestion, dust & migration inhalation	End user of site Hospital Staff, Patients, General Public and Maintenance Workers	Medium Chronic health risk.	Unlikely	Low	No exceedances above commercial General Assessment Criteria were identified. 1 No. samples returned positive asbestos results for Amosite Insulation at concentrations of <0.001% w/w in soil. No areas of soft landscaping are included in the development proposals. The proposed developments building footprint will break the source-pathway-receptor linkage.	Construction workers to be provided with appropriate PPE and sanitary facilities. Construction contractors should have an Asbestos Management Plan in place to include appropriate health & safety and environmental precautions during construction. Should unexpected contamination be observed during enabling/construction works, works should be stopped with advice obtained from an appropriate specialist.
	Vertical and horizontal migration through the superficial deposits (soils).	Construction Workers		Unlikely	Low		
	Horizontal migration over and through the superficial deposits (soils).	Controlled Waters (groundwater) Secondary Undifferentiated Aquifer (superficial deposits) and Secondary A Aquifer (bedrock) The site is not recorded within a Source Protection Zone (SPZ).	Medium Pollution of sensitive groundwater resources.	Unlikely	Low	No gross contamination encountered during ground investigation. There are no potable water abstractions within 500m of the site..	No further action required
	Direct contact and dermal uptake, soil and dust ingestion, dust & migration inhalation	Controlled Waters (surface water) The nearest surface water features (Fishing Ponds) are located approximately 214m southeast of the site. There are no surface water abstractions recoded within 500m of the site.	Mild Pollution of non-sensitive water resources.	Low Likelihood	Low	No gross contamination encountered during ground investigation. In absence of a contamination source, the risk is low	No further action required
Uncontrolled deposition of Made Ground associated with construction on site and development adjacent to the site. Putrescible content in Made Ground or superficial deposits.	Vertical and horizontal migration through existing service corridors and Made Ground.	End users of site	Medium Chronic health risk.	Unlikely	Low	The BS8485:2015 Classification indicates the site is classified as CS1. No gas protection measures are required.	No further action required

11 SUMMARY OF POTENTIAL POLLUTANT LINKAGES

A **Low-risk** rating is identified to site end-users and to construction workers, from contamination in soils from direct contact, dermal uptake, soil and dust ingestion and inhalation with Made Ground soils. No exceedances of Commercial General Assessment Criteria were identified within soil during the ground investigation. Asbestos was encountered at low quantities (<0.001%), as such an asbestos management plan to be put in place during construction works due to presence of asbestos fibres in shallow Made Ground. In addition, now proposed soft landscaping is understood to be included as part of the development. Construction workers should be provided with appropriate PPE and sanitary facilities with respect to the environmental testing results enclosed herein.

A **Low-risk** rating is identified to controlled waters (Groundwater and Surface Waters) following the ground investigation accounting for no major sources of contamination identified at the site.

A **Low-risk** rating is identified from ground gas generating sources. The gas and flow rates identified during the investigation indicates the site is classified as CS1. No gas protection measures are required.

12 ENGINEERING ASSESSMENT AND RECOMMENDATIONS

12.1 Introduction

This section will assess the relevant geotechnical issues for the proposed redevelopment.

It should be noted that detail may change in the development of designs beyond the issue of this Phase 2 Report and the Construction Designer should satisfy themselves regarding the adequacy of their design and proposed approach to construction by reference to the on-going project design proposals, the site investigation information, and their own examination of the site.

The advice below assumes the construction of a single storey extension to the existing building.

12.2 Summary of Ground Conditions

The ground conditions encountered during the Curtins ground investigation generally comprised of Topsoil or Tarmac surface covering, overlying predominantly granular Made Ground deposits with localised cohesive Made Ground. The Made Ground is overlying Glacial Till deposits. Bedrock was confirmed in all borehole locations and comprised of the Woodhead Hill Rock Formation Sandstone.

No groundwater strikes were recorded in any exploratory hole locations during the ground investigation works. Subsequent groundwater level monitoring identified perched water from depths ranging between 1.19m and 1.98m bgl Made Ground, and 3.65m and 3.78m bgl in the Glacial Till. The groundwater table was not encountered during this ground investigation.

The characteristic geotechnical parameters recommended for use in the design based on the ground conditions encountered are discussed in *Section 5.0* and *Section 6.0*.

12.3 Foundation Design

The proposed foundation solution considers the proposal (single storey building), the ground and groundwater conditions and the anticipated structural loads. Proposed loads are not available at the time of writing however, it is anticipated that the loadings associated with the structure will be relatively low.

In consideration of shallow foundations, the Made Ground is not considered a suitable bearing stratum for foundations given variability in both the thickness and composition, alongside poor geotechnical properties.

The underlying superficial Glacial Till deposits have primarily been encountered as variable with low to very high strength cohesive material with SPT N values of between 1 and 50 reported.

It is assumed that shallow foundations will be placed on the Woodhead Rock Formation sandstone at depths ranging between 1.45m and 3.27m begl (138.83m and 137.92m AOD) in the yellow brown sandstone deposits of Woodhead Hill Rock Formation.

An estimate of the presumed bearing capacity of square pad foundations has been determined with reference to Eurocode 7, Annex G. Field descriptions of the solid bedrock formation include yellowish brown sandstone, with SPTS indicating a very dense material (SPT N >50). However, no information regarding the quality of the bedrock (TCR, SCR and RQD) or laboratory testing results to determine the compressive strength of the bedrock have been obtained.

In the absence of proposed loads an estimated preliminary safe bearing capacity of 200kPa can be attributed to the Woodhead Rock Formation (sandstone bedrock), for strip footings under the buildings perimeter and pads under columns. Upon provision of the loads a bearing capacity and settlement calculation can be undertaken.

12.4 Excavations

Below the proposed structure, the existing hardstanding will require breaking out as part the redevelopment; together with the underlying Made Ground. It may be possible to re-use the granular Made Ground (sub-base) as structural fill subject to acceptability testing in accordance with the Specification for Highways Works, Series 600 and subsequent placement (if acceptable) in accordance with an Earthworks Specification.

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Phase 2 Ground Investigation Report

Bury Emergency Department, Fairfield Hospital, Bury

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Based on observations on site, together with the results of in-situ and laboratory tests, it is considered that excavations to <1.20m bgl should stand unsupported in the short term at suitable batters. Side support for safety purposes should of course be provided to all excavations which appear unstable, and those >1.20m deep, in accordance with Health and Safety Regulations. Suitable side slope batters may be required. These must be designed by a suitably qualified temporary works contractor for any excavations.

Groundwater may be encountered as seepages in shallow excavations for foundations or utilities as perched water. Pump type pumping is likely to be a suitable dewatering technique should groundwater begin to accumulate.

All excavation temporary works shall be designed by a suitably qualified temporary works contractor for any excavations.

12.5 Floor Slab Construction

Given the presence of Made Ground material and low strength superficial deposits, a ground bearing floor slab is not deemed suitable. As such a suspended floor slab should be adopted.

12.6 Volume Change Potential

The cohesive Glacial Till present from 0.52m and 2.50m bgl (141.03m and 138.67m AOD) is considered to have a low volume change potential and therefore the advice in BRE Special Digest 240 (Ref 12) should be consulted with regards to minimum foundation depths in the vicinity of any existing, retained or proposed planting.

12.7 Chemical Attack on Buried Concrete

The site has been classified in accordance with BRE Special Digest 1(Ref. 14) and laboratory testing undertaken accordingly in *Section 7*. Based on the laboratory test results for Design Sulphate Class and an ACEC class, DS-1 and AC-1 for all strata.

13 CONCLUSION AND RECOMMENDATIONS

13.1 Geotechnical

In consideration of shallow foundations, the Made Ground is not considered a suitable bearing stratum for foundations given variability in both thickness and composition, alongside poor geotechnical properties. The underlying superficial Glacial Till deposits have primarily been encountered as variable with low to very high strength cohesive material with SPT N values between 1 and 50. It is assumed that shallow foundations will be placed on the Woodhead Rock Formation sandstone at depths ranging between 1.45m and 3.27m bgl (138.83m and 137.92m AOD) in the yellow brown sandstone deposits of Woodhead Hill Rock Formation.. In the absence of proposed loadings an estimated safe bearing capacity of 200kPa should be assumed until further information becomes available.

A suspended floor slab should be adopted for the proposed development.

The preliminary design of buried concrete according to Table C2 of BRE Special Digest 1:2005 should be in accordance with Class DS-1.

13.2 Ground and Groundwater Contamination

A revised tabulated revised Conceptual Site Model has been derived following the findings on the Generic Quantitative Risk Assessment risk assessment and is presented in Section 9.0.

A **Low-risk** rating is identified to site end-users and to construction workers, from contamination in soils from direct contact, dermal uptake, soil and dust ingestion and inhalation with Made Ground soils. No exceedances of Commercial General Assessment Criteria were identified within soil during the ground investigation. Asbestos was encountered at low quantities (<0.001%), as such an asbestos management plan to be put in place during construction works due to presence of asbestos fibres in shallow Made Ground. In addition, now proposed soft landscaping is understood to be included as part of the development. Construction workers should be provided with appropriate PPE and sanitary facilities with respect to the environmental testing results enclosed herein.

A **Low** risk rating is identified from ground gas generating sources. The gas and flow rates identified during the investigation indicates the site is classified as CS1. No gas protection measures are required.

A **Low** risk rating is currently identified to controlled waters in relation to groundwater and surface water receptors, accounting for the limited sources of contamination encountered within site soils.

13.3 Recommendations

Based on the findings of the ground investigation, the following recommendations are made:

1. Construction workers to be provided with appropriate PPE and sanitary facilities with reference to environmental testing certificates appended herein.
2. Asbestos management plan to be put in place during construction works due to presence of asbestos fibres in shallow Made Ground.
3. Probing of mine shaft 383411-014 to determine the depth and the state of cap and any backfill of the treated disused mine shaft along with grouting of the feature to prevent any possible future collapse of the mine entry.

14 REFERENCES

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15 APPENDICES

Appendix A – Drawings

Appendix B – Exploratory Hole Logs

Appendix C – Chemical Laboratory Test Results

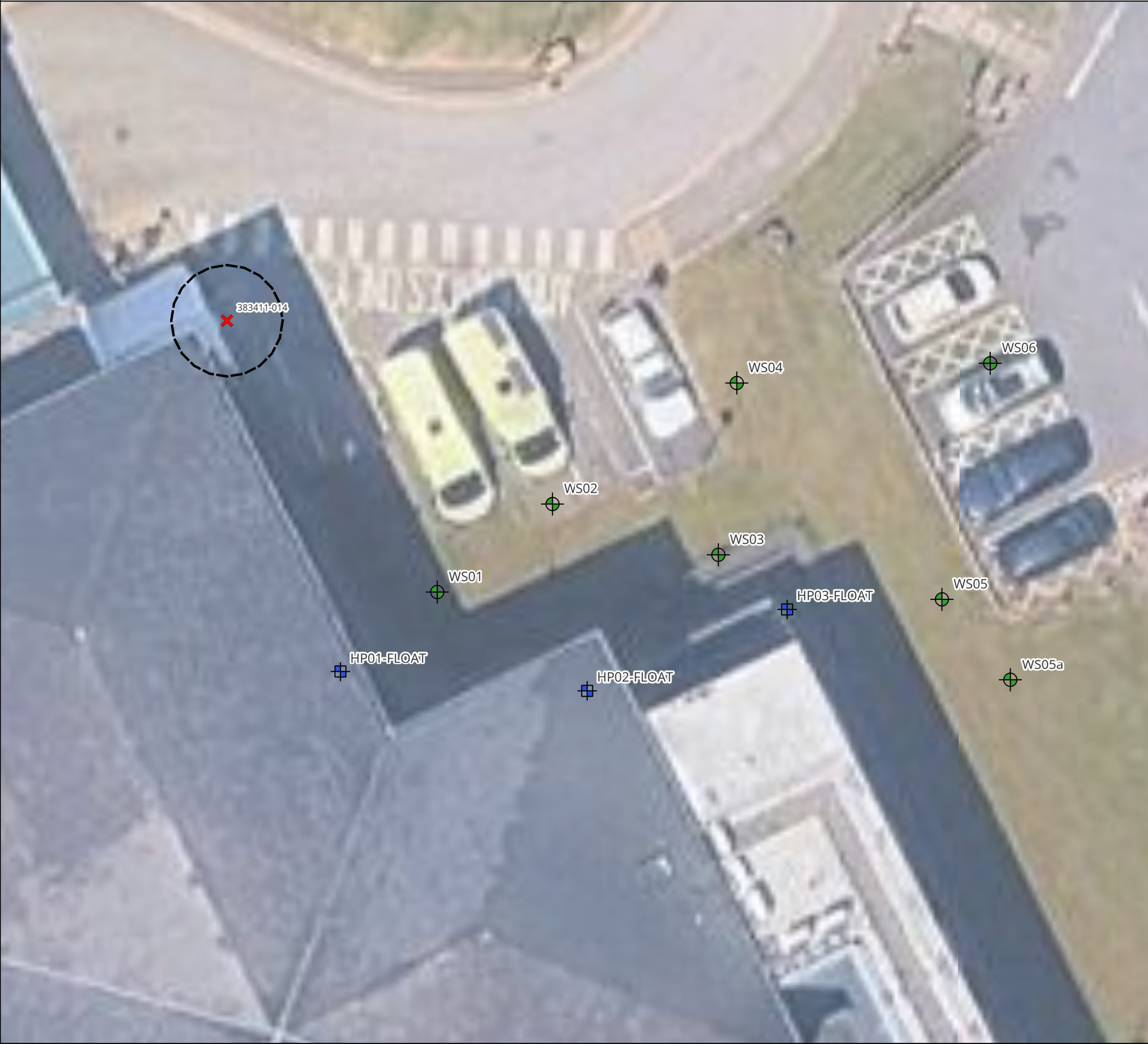
Appendix D – Geotechnical Laboratory Test Results

Appendix E – Ground Gas Monitoring Results

Appendix F – GAC Screening Thresholds

Appendix G – Risk Assessment Methodology

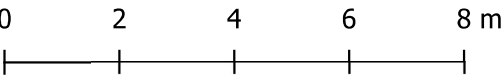
Appendix A – Drawings



Proposed Borehole Locations

- Hand Pit Location
- Window Sample Location
- Mine Shaft
- 2m Diameter

Ref.	x	y
383411-014	383199.5710000000	411627.4300000000



Curtins

Curtins Consulting Ltd
Merchant Exchange, 17-19 Whitworth Street West,
Manchester, M1 5WG
t: 0161 236 2394
e: manchester@curtins.com
www.curtins.com

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Status	INFORMATION			
Project:	Bury Emergency Department, Fairfield General Hospital			
Drg Title:	Mine Shaft Location and Exploratory Hole Location Plan			
Scale: See scale bar	Size: A3	Issue Date: 12/06/2025	Drawn: JL	Checked: NF
Drg No: 086745-CUR-XX-XX-D-GE-80002				Rev: P01

Appendix B – Exploratory Hole Logs

Curtins				Borehole Log				Borehole No. WS01 Sheet 1 of 1		
Project Name: Bury Emergency Department				Project No. 086745		Co-ords: 383207.16 - 411617.69		Hole Type Window Sampler		
Location: Fairfield Hospital						Level: 140.28 m		Scale 1:20		
Client: Ridge and Partners LLP						Dates: 05/07/2025 -		Logged By RT		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					0.34	139.94		TOPSOIL: Grass overlying black fine to coarse sand with frequent rootlets.	1	
								MADE GROUND: Grey slightly clayey, slightly gravelly fine to coarse sand with high cobble content. Gravel is fine to subrounded to subangular sandstone, mudstone, coal and brick.		
	0.80 - 0.90	ES								Very stiff brown and grey mottled very sandy, very gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular sandstone, mudstone and coal.
	1.20 - 1.45 1.20	D SPT	N=50 (3,7/50 for 260mm)	1.20	139.07			Very dense yellowish brown SANDSTONE.		
	1.50 - 1.60 1.60	D SPT	50 (25 for 115mm/50 for 155mm)	1.45 1.60	138.82 138.68			End of Borehole at 1.60 m		
									2	
									3	
									4	
Remarks: Service inspection pit hand excavated to 1.20m bgl. No groundwater encountered.										



Borehole Log

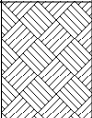
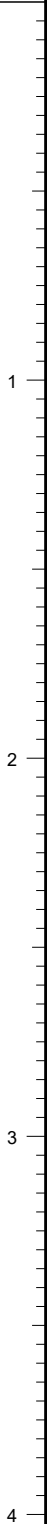
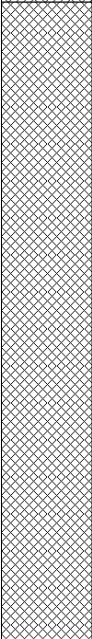
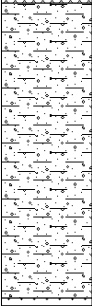
Borehole No.
WS02
Sheet 1 of 1

Project Name: Bury Emergency Department	Project No. 086745	Co-ords: 383211.30 - 411620.85	Hole Type Window Sampler
Location: Fairfield Hospital		Level: 140.37 m	Scale 1:20
Client: Ridge and Partners LLP		Dates: 05/07/2025 -	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.40 - 0.50	ES	40 (3,7/40 for 295mm)	0.10	140.27		MADE GROUND: Tarmac.	1		
					0.28	140.09		MADE GROUND: Light brown very sandy gravel of fine to coarse subangular limestone. Sand is fine to coarse. (HARDCORE).			
								MADE GROUND: Light brown very gravelly fine to coarse sand with high cobble content. Gravel is fine to coarse angular to subrounded brick, concrete, sandstone, siltstone, coal and slate. Cobbles are subangular sandstone.			
		1.20	SPT		1.00	139.37	MADE GROUND: Soft brown very sandy, very garvelly clay with high moderate cobble content. Sand is fine to coarse. Gravel is fine to coarse subangular to subrounded sandstone, limestone, brick and coal. Cobbles are subangular brick and sandstone.				
					1.40	138.97	MADE GROUND: Brownish grey very gravelly fine to coarse sand. Gravel is fine to coarse sunangular to subrounded sandstone and coal.				
		1.70 - 1.80	D		50 (25 for 125mm/50 for 85mm)	1.70	138.67			Very stiff brown and grey mottled very sandy, very gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular sandstone, mudstone and coal.	
		1.80 - 2.00	D			1.80	138.57				
		1.80	SPT								
						2.00	138.37		End of Borehole at 2.00 m		2
									4		

Remarks: Service inspection pit hand excavated to 1.20m bgl. No groundwater encountered.	
--	--

Project Name: Bury Emergency Department	Project No. 086745	Co-ords: 383217.29 - 411619.02	Hole Type Window Sampler
Location: Fairfield Hospital		Level: 140.74 m	Scale 1:20
Client: Ridge and Partners LLP		Dates: 05/08/2025 -	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50 - 0.60	ES		0.31	140.43		TOPSOIL: Grass overlying black fine to coarse sand with frequent rootlets.	
		1.20	SPT	N=1 (1,0/0,0,1,0)				MADE GROUND: Brown very gravelly fine to coarse sand with high cobble content and moderate boulder content. Gravel is fine to coarse subrounded to subangular brick, concrete, sandstone and siltstone. Cobbles are subangular brick, concrete and sandstone. Boulders are subangular sandstone.	
		2.00 - 2.45 2.00	D SPT	N=10 (2,3/2,3,2,3)	2.00	138.74		Stiff brown and grey mottled very sandy, very gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular sandstone, mudstone and coal.	
		2.60	SPT	50 (25 for 50mm/50 for 145mm)	2.78 2.80	137.96 137.94		Very dense yellowish brown SANDSTONE. End of Borehole at 2.80 m	

Remarks:
Service inspection pit hand excavated to 1.20m bgl. No groundwater encountered.



Curtins				Borehole Log				Borehole No. WS04 Sheet 1 of 1		
Project Name: Bury Emergency Department				Project No. 086745		Co-ords: 383217.95 - 411625.19		Hole Type Window Sampler		
Location: Fairfield Hospital						Level: 141.19 m		Scale 1:20		
Client: Ridge and Partners LLP						Dates: 05/08/2025 -		Logged By RT		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.30 - 0.40	ES		0.31	140.88		TOPSOIL: Grass overlying black fine to coarse sand with frequent rootlets.	1	
		1.20 - 1.45 1.20	D SPT	N=14 (2,2/3,3,4,4)	1.20	139.99		MADE GROUND: Brown very gravelly fine to coarse sand with high cobble content. Gravel is fine to coarse subrounded to subangular brick, concrete, sandstone and siltstone. Cobbles are subangular brick, concrete and sandstone.		
		2.00 - 2.45 2.00	D SPT	N=10 (2,2/2,2,3,3)					Stiff brown and grey mottled very sandy, very gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular sandstone, mudstone and coal.	2
		3.00	SPT	N=21 (11 for 79mm/8,6,6,1)						
		3.40 - 3.60	D		3.27	137.92		Very dense yellowish brown SANDSTONE.	3	
		3.60	SPT	50 (25 for 30mm/50 for 10mm)	3.60	137.59		End of Borehole at 3.60 m		
Remarks: Service inspection pit hand excavated to 1.20m bgl. No groundwater encountered.										4
AGS										



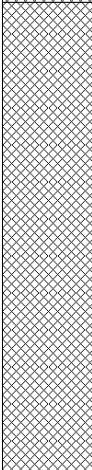
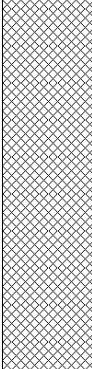
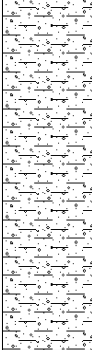
Borehole Log

Borehole No.
WS05
Sheet 1 of 2

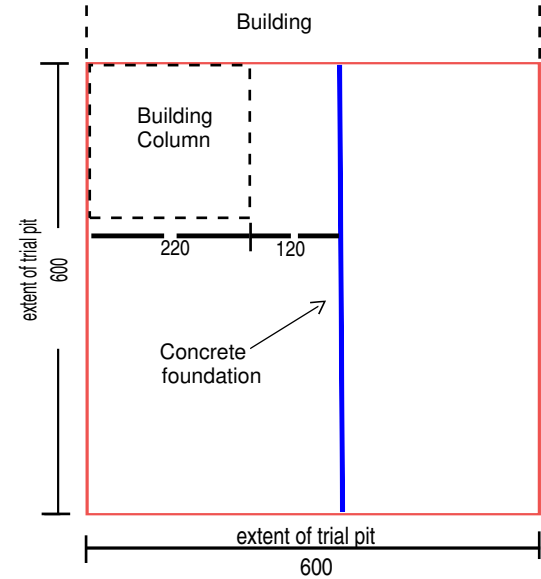
Project Name: Bury Emergency Department	Project No. 086745	Co-ords: 383227.78 - 411614.51	Hole Type Window Sampler
Location: Fairfield Hospital		Level: 142.00 m	Scale 1:20
Client: Ridge and Partners LLP		Dates: 05/08/2025 -	Logged By RT

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.32	141.68		TOPSOIL: Grass overlying black fine to coarse sand with frequent rootlets.	1
		0.70 - 0.80	ES					MADE GROUND: Brown very gravelly, very clayey fine to coarse sand with high cobble content. Gravel is fine to coarse subrounded to angular brick, concrete, sandstone, ceramics and coal. Cobbles are subangular brick and sandstone.	
		1.20 - 1.45 1.20	D SPT	N=1 (1,1/0,0,1,0)	1.10	140.90		Firm brown and grey mottled very sandy, very gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular sandstone, mudstone and coal.	2
		2.00 - 2.45 2.00	D SPT	N=6 (1,1/1,1,2,2)				From 2.60m to 3.40m bgl clay is very stiff.	
		3.00 - 3.45 3.00	D SPT	N=17 (2,3/4,4,4,5)					
		3.50 - 4.00	B		3.40	138.60		Medium dense black very gravelly fine to coarse SAND. Gravel is fine to coarse subangular coal.	3
		4.00	SPT	N=9 (3,3/3,2,2,2)					4

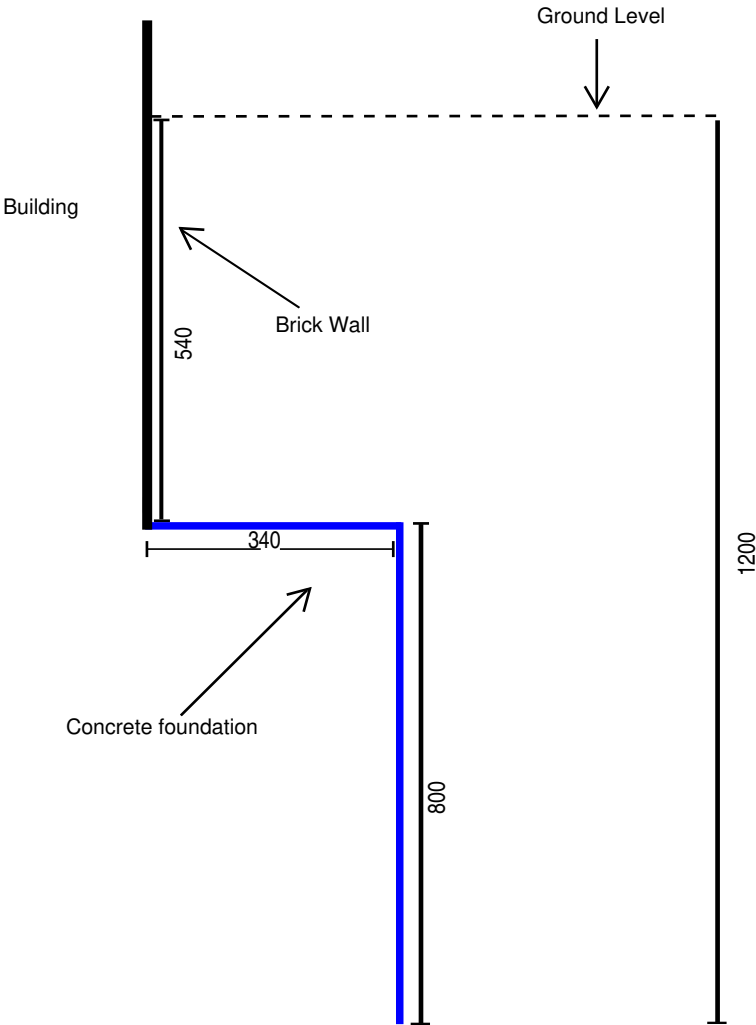
Remarks: Service inspection pit hand excavated to 1.20m bgl. No groundwater encountered.	
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Curtins					Borehole Log				Borehole No. WS06 Sheet 1 of 1		
Project Name: Bury Emergency Department					Project No. 086745		Co-ords: 383227.06 - 411625.90			Hole Type Window Sampler	
Location: Fairfield Hospital							Level: 142.15 m			Scale 1:20	
Client: Ridge and Partners LLP							Dates: 05/07/2025 -			Logged By RT	
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.30 - 0.40	ES		0.10	142.04		MADE GROUND: Tarmac.			
					0.21	141.94		MADE GROUND: Light brown very sandy gravel of fine to coarse subangular limestone. Sand is fine to coarse. (HARDCORE). MADE GROUND: Light brown very gravelly fine to coarse sand with high cobble content. Gravel is fine to coarse angular to subrounded brick, concrete, sandstone, siltstone, coal, plastic and ceramics. Cobbles are subangular concrete with 5mm steel reinforcement and brick.			
		1.20	SPT	N=16 (3,5/4,4,4,4)				Limited recovery between 1.45m to 2.00m bgl due to cobble pushing.		1	
		2.00	SPT	N=14 (3,2/2,2,3,7)						2	
					2.43	139.72		MADE GROUND: Black very gravelly fine to coarse sand. Gravel is fine to coarse subangular coal.			
					2.50	139.65		Firm brown very sandy, very gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular sandstone and coal.			
		3.00 - 3.45	D SPT	N=23 (3,3/3,4,8,8)						3	
		3.00									
					3.45	138.70		End of Borehole at 3.45 m		4	
Remarks: Service inspection pit hand excavated to 1.20m bgl. No groundwater encountered.											

HP01
Plan View



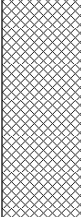
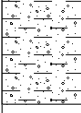
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Cross Section



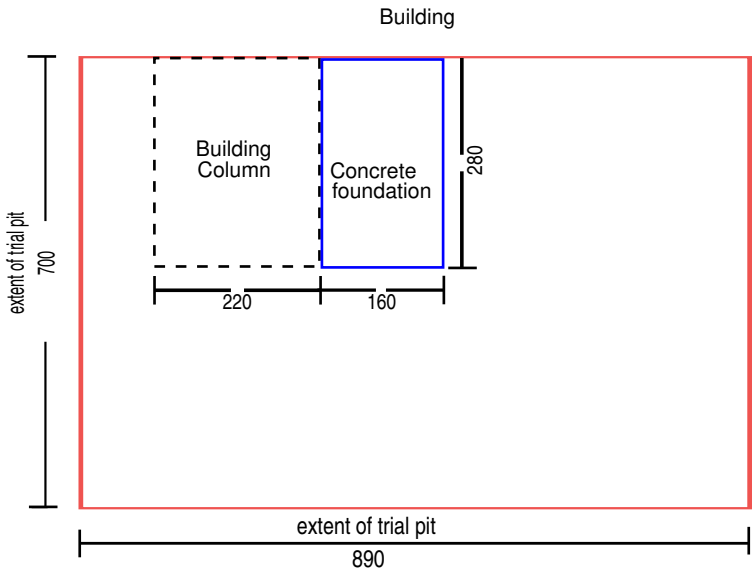
Cross-sections to be read in conjunction with the foundation pit log and photographic log.

All measurements in mm unless stated otherwise.

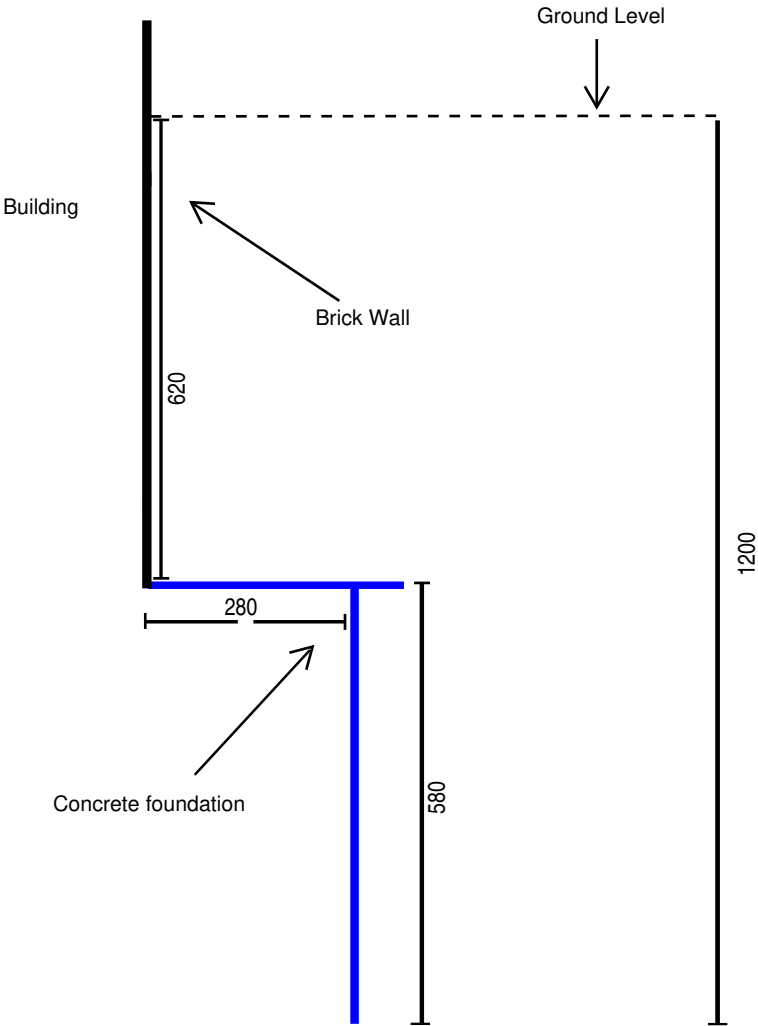
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Status:				
INFORMATION				
Project:				
Bury Emergency Department				
Drg Title:				
Foundation Hand Pit Drawings				
Scale:	Size:	First Issue:	Drawn:	Checked:
Scale Bar	A3	26/06/2025	RT	JL
Drg No:				Rev:
086745-CUR-XX-XX-D-GE-80003				P01
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				Trial Pit Log			Trialpit No HP02 Sheet 1 of 1		
Project Name: Bury Emergency Department				Project No. 086745		Co-ords: 383212.57 - 411614.12 Level: 141.60		Date 05/08/2025	
Location: Fairfield Hospital				Dimensions (m): Depth 1.20			Scale 1:20		
Client: Ridge and Partners LLP							Logged RT		
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
				0.10	141.50		MADE GROUND: Reddish brown GRAVEL of medium to coarse rounded to subrounded flint.		
				0.70	140.90			MADE GROUND: Brown very gravelly fine to coarse sand with high cobble content. Gravel is fine to coarse subrounded to subangular brick, concrete, sandstone and siltstone. Cobbles are subangular brick, concrete and sandstone.	
						Yellowish brown very clayey, very gravelly fine to coarse SAND. Gravel is fine to coarse subangular sandstone.			
						Stiff brown and grey mottled very sandy, very gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular sandstone, mudstone and coal.			
				1.20	140.40		End of pit at 1.20 m		
1 2 3 4									
Remarks: Hand excavated to 1.20m bgl. No groundwater encountered.									
Stability:									

HP02
Plan View



HP02
Cross Section



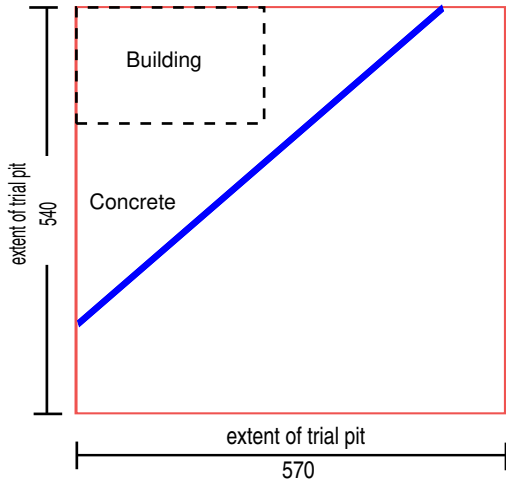
Cross-sections to be read in conjunction with the foundation pit log and photographic log.

All measurements in mm unless stated otherwise.

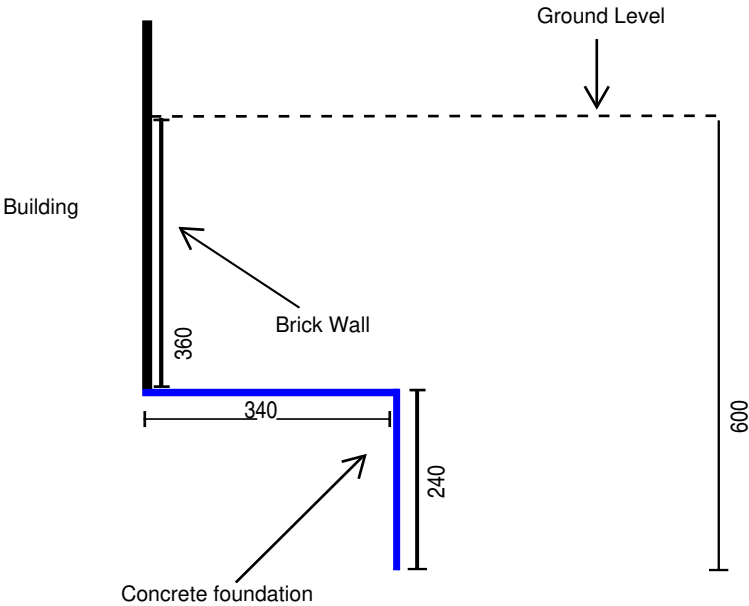
Rev:	Description:	Date:	By:	Chkd:
 Curtins Consulting Ltd, Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG t: 0161 236 2394 e: manchester@curtins.com www.curtins.com Structures - Civils - Environmental - Infrastructure - Transport Planning - Sustainability - Expert Advisory Services Birmingham - Bristol - Cardiff - Douglas - Edinburgh - Kendal - Leeds - Liverpool - London - Manchester - Nottingham				
Status:				
INFORMATION				
Project:				
Bury Emergency Department				
Drg Title:				
Foundation Hand Pit Drawings				
Scale:	Size:	First Issue:	Drawn:	Checked:
Scale Bar	A3	26/06/2025	RT	JL
Drg No:				Rev:
086745-CUR-XX-XX-D-GE-80003				P01
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				Trial Pit Log			Trialpit No HP03 Sheet 1 of 1		
Project Name: Bury Emergency Department				Project No. 086745		Co-ords: 383219.76 - 411617.06 Level: 141.55		Date 05/08/2025	
Location: Fairfield Hospital				Dimensions (m): Depth 0.64			Scale 1:20		Logged RT
Client: Ridge and Partners LLP									
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
				0.10	141.45		MADE GROUND: Reddish brown GRAVEL of medium to coarse rounded to subrounded flint.		
				0.52	141.03		MADE GROUND: Brown very gravelly fine to coarse sand with high cobble content and moderate boulder content. Gravel is fine to coarse subrounded to subangular brick, concrete, sandstone and siltstone. Cobbles are subangular brick, concrete and sandstone.		
							Firm brown very sandy, very gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse subrounded to subangular sandstone, mudstone and coal.		
						0.64	140.91		End of pit at 0.64 m
Remarks: Hand excavated to 0.64m bgl. No groundwater encountered.									
Stability:									

HP03
Plan View



HP03
Cross Section



Cross-sections to be read in conjunction with the foundation pit log and photographic log.

All measurements in mm unless stated otherwise.

Rev:	Description:	Date:	By:	Chkd:
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Curtins

Curtins Consulting Ltd,
Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
t: 0161 236 2394
e: manchester@curtins.com
www.curtins.com

Structures - Civils - Environmental - Infrastructure - Transport Planning - Sustainability - Expert Advisory Services
Birmingham - Bristol - Cardiff - Douglas - Edinburgh - Kendal - Leeds - Liverpool - London - Manchester - Nottingham

Status:
INFORMATION

Project:
Bury Emergency Department

Drg Title:
Foundation Hand Pit Drawings

Scale:	Size:	First Issue:	Drawn:	Checked:
Scale Bar	A3	26/06/2025	RT	JL
Drg No:	086745-CUR-XX-XX-D-GE-80003			Rev:
				P01

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Appendix C – Chemical Laboratory Test Results

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 25/04849/1

Amendments: Request for Additional Analysis

Envirolab Job Number: 25/04849
Issue Number: 2

Date: 20 June, 2025

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: EBMA/Jonathan Lord/Russell Taylor
Project Name: Bury Hospital
Project Ref: B086745
Order No: 26266
Date Samples Received: 09/05/25
Date Instructions Received: 12/05/25
Date Analysis Completed: 20/06/25

Approved by:

A handwritten signature in black ink, appearing to read "Gemma Berrisford".

Gemma Berrisford
Deputy Client Services Supervisor

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/1	25/04849/2	25/04849/3	25/04849/4	25/04849/5	25/04849/6	25/04849/7	Units	Limit of Detection	Method ref
Client Sample No							D1			
Client Sample ID	WS06	WS02	WS01	WS05	WS04	WS03	WS01			
Depth to Top	0.3	0.4	0.8	0.7	0.3	0.5	1.2			
Depth To Bottom	0.4	0.5	0.9	0.8	0.4	0.6	1.45			
Date Sampled	07-May-25	07-May-25	07-May-25	08-May-25	08-May-25	08-May-25	07-May-25			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - D			
Sample Matrix Code	6AB	4AB	6ABE	6ABE	6ABDE	6ABE	5A			
% Moisture at <40C _A	8.0	6.5	9.2	12.4	9.8	8.0	-	% w/w	0.1	A-T-044
% Stones >10mm _A	<0.1	38.6	37.3	<0.1	<0.1	25.9	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	10.35	8.59	8.14	7.68	7.87	7.91	-	pH	0.01	A-T-031s
pH BRE _D ^{M#}	-	-	-	-	-	-	8.07	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.02	<0.01	0.02	<0.01	0.02	0.01	-	g/l	0.01	A-T-026s
Sulphate BRE (water sol 2:1) _D ^{M#}	-	-	-	-	-	-	43	mg/l	10	A-T-026s
Cyanide (total) _A ^{M#}	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	mg/kg	0.2	A-T-050s
Organic Matter _D ^{M#}	1.02	0.23	0.58	4.05	2.21	2.01	-	% w/w	0.14	A-T-032s
Arsenic _D ^{M#}	5	<1	2	4	5	3	-	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	mg/kg	1	A-T-024s
Copper _D ^{M#}	19	6	14	23	23	17	-	mg/kg	1	A-T-024s
Chromium _D ^{M#}	12	8	9	15	16	12	-	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-040s
Lead _D ^{M#}	68	5	19	79	43	31	-	mg/kg	1	A-T-024s
Mercury _D	0.17	<0.17	<0.17	<0.17	<0.17	<0.17	-	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	12	10	11	16	18	14	-	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-024s
Zinc _D ^{M#}	67	25	38	49	69	52	-	mg/kg	1	A-T-024s
(1.02) Item 2.4 4 Point Liquid & Plastic Limit by Cone Penetrometer _A [#]	-	-	-	-	-	-	Appended			Subcon IFA
(1.01) Item 1a Moisture Content of Soil (Oven Dried Method) _A [#]	-	-	-	-	-	-	Appended			Subcon IFA

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/1	25/04849/2	25/04849/3	25/04849/4	25/04849/5	25/04849/6	25/04849/7	Units	Limit of Detection	Method ref
Client Sample No							D1			
Client Sample ID	WS06	WS02	WS01	WS05	WS04	WS03	WS01			
Depth to Top	0.3	0.4	0.8	0.7	0.3	0.5	1.2			
Depth To Bottom	0.4	0.5	0.9	0.8	0.4	0.6	1.45			
Date Sampled	07-May-25	07-May-25	07-May-25	08-May-25	08-May-25	08-May-25	07-May-25			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - D			
Sample Matrix Code	6AB	4AB	6ABE	6ABE	6ABDE	6ABE	5A			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	Amosite	NAD	NAD	NAD	NAD	NAD	-			A-T-045
Asbestos Matrix (visual) ₀	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope) ₀	Insulation	-	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? ₀	N/A	N/A	N/A	N/A	N/A	N/A	-			A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) ₀	<0.001	-	-	-	-	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/1	25/04849/2	25/04849/3	25/04849/4	25/04849/5	25/04849/6	25/04849/7	Units	Limit of Detection	Method ref
Client Sample No							D1			
Client Sample ID	WS06	WS02	WS01	WS05	WS04	WS03	WS01			
Depth to Top	0.3	0.4	0.8	0.7	0.3	0.5	1.2			
Depth To Bottom	0.4	0.5	0.9	0.8	0.4	0.6	1.45			
Date Sampled	07-May-25	07-May-25	07-May-25	08-May-25	08-May-25	08-May-25	07-May-25			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - D			
Sample Matrix Code	6AB	4AB	6ABE	6ABE	6ABDE	6ABE	5A			
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	<0.01	0.03	<0.01	<0.01	0.02	-	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	0.01	<0.01	0.02	<0.01	-	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.03	<0.02	0.06	<0.02	0.02	0.04	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.23	<0.04	0.21	<0.04	0.13	0.16	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.29	<0.04	0.23	0.05	0.20	0.19	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.34 ^U	<0.05 ^U	0.28 ^U	0.07 ^U	0.27 ^U	0.24 ^U	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.29	<0.05	0.15	<0.05	0.23	0.13	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.12	<0.07	0.10	<0.07	0.10	0.10	-	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.33	<0.06	0.28	<0.06	0.18	0.22	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.42	<0.08	0.51	<0.08	0.23	0.40	-	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	<0.01	0.03	<0.01	<0.01	0.02	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.24	<0.03	0.15	0.03	0.20	0.11	-	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.12	<0.03	0.27	0.03	0.10	0.17	-	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.41	<0.07	0.50	0.09	0.24	0.39	-	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	2.82	<0.08	2.81	0.27	1.92	2.19	-	mg/kg	0.01	A-T-019s

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/1	25/04849/2	25/04849/3	25/04849/4	25/04849/5	25/04849/6	25/04849/7	Units	Limit of Detection	Method ref
Client Sample No							D1			
Client Sample ID	WS06	WS02	WS01	WS05	WS04	WS03	WS01			
Depth to Top	0.3	0.4	0.8	0.7	0.3	0.5	1.2			
Depth To Bottom	0.4	0.5	0.9	0.8	0.4	0.6	1.45			
Date Sampled	07-May-25	07-May-25	07-May-25	08-May-25	08-May-25	08-May-25	07-May-25			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - D			
Sample Matrix Code	6AB	4AB	6ABE	6ABE	6ABDE	6ABE	5A			
TPH CWG with Clean Up										
Ali >C5-C6 _A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1	<1	1	<1	2	<1	-	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	2	<1	1	<1	2	<1	-	mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	73	14	4	2	11	2	-	mg/kg	1	A-T-055s
Total Aliphatics _A	75	14	8	2	16	2	-	mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-055s
Aro >C10-C12 _A	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-055s
Aro >C12-C16 _A	2	<1	1	<1	2	<1	-	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	5	<1	3	<1	4	2	-	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	45	12	12	3	16	7	-	mg/kg	1	A-T-055s
Total Aromatics _A	53	13	17	3	22	10	-	mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	128	28	25	6	38	13	-	mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/8	25/04849/9	25/04849/10	25/04849/11	25/04849/12	25/04849/13	25/04849/14	Units	Limit of Detection	Method ref
Client Sample No	D2	D1	D2	D1	D1	D2	D3			
Client Sample ID	WS01	WS02	WS02	WS03	WS04	WS04	WS04			
Depth to Top	1.5	1.7	1.8	2	1.20	2.00	3.40			
Depth To Bottom	1.6	1.8	2	2.45	1.45	2.45	3.60			
Date Sampled	07-May-25	07-May-25	07-May-25	08-May-25	08-May-25	08-May-25	08-May-25			
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D			
Sample Matrix Code			1AE	5AE	3AE					
% Stones >10mm _A	-	-	<0.1	<0.1	<0.1	-	-	% w/w	0.1	A-T-044
pH BRE _D ^{M#}	-	-	7.18	6.16	6.62	-	-	pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1) _D ^{M#}	-	-	28	25	27	-	-	mg/l	10	A-T-026s
(1.02) Item 2.4 4 Point Liquid & Plastic Limit by Cone Penetrometer _A [#]	Appended	Appended	-	Appended	-	Appended	Appended			Subcon IFA
(1.01) Item 1a Moisture Content of Soil (Oven Dried Method) _A [#]	Appended	Appended	-	Appended	-	Appended	Appended			Subcon IFA

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/15	25/04849/16	25/04849/17	25/04849/18	25/04849/19			Units	Limit of Detection	Method ref
Client Sample No	D1	D2	D3	D1	B1					
Client Sample ID	WS05	WS05	WS05	WS06	WS05					
Depth to Top	1.20	2.00	3.00	3.00	3.50					
Depth To Bottom	1.45	2.45	3.45	3.45	4.00					
Date Sampled	08-May-25	08-May-25	08-May-25	07-May-25	08-May-25					
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - B					
Sample Matrix Code	5AE	5AE			4AE					
% Stones >10mm _A	<0.1	<0.1	-	-	<0.1			% w/w	0.1	A-T-044
pH BRE _D ^{M#}	6.99	6.70	-	-	7.59			pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1) _D ^{M#}	16	15	-	-	14			mg/l	10	A-T-026s
(1.02) Item 2.4 4 Point Liquid & Plastic Limit by Cone Penetrometer _A [#]	-	Appended	Appended	Appended	-					Subcon IFA
(1.01) Item 1a Moisture Content of Soil (Oven Dried Method) _A [#]	-	Appended	Appended	Appended	-					Subcon IFA
IFA PHYS (1.10d) Item 12a & 15a PSD with sedimentation Hydrometer BSEN 17892 _A	-	-	-	-	Appended					Subcon IFA

Report Notes

General

- This report shall not be reproduced, except in full, without written approval from Envirolab.
- The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
- The results reported herein relate only to the material supplied to the laboratory.
- The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
- Analytical results reflect the quality of the sample at the time of analysis only.
- Opinions and Interpretations expressed are outside our scope of accreditation.
- A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
- If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
- Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript “#”	Accredited to ISO 17025
Superscript “M”	Accredited to MCertS
Superscript “U”	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript “A”	Analysis performed on as-received Sample
Subscript “D”	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript “D” on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript “A”	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis

“Trace Asbestos Identified” will be reported if there is not enough present to verify the type.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs
Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.					

Soil Chemical Analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as “% stones >10mm”.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any “D” subscripts.

TPH by method A-T-007:

For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.

Results “with Clean up” indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:

EPH CWG results have humics mathematically subtracted through instrument calculation.

Where these humic substances have been identified in any IDs from “TPH CWG with clean up” please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG	Project No:	25/04849
Project:	Bury Hospital	Date Received:	12/05/2025 (am)
Clients Project No:	B086745	Cool Box Temperatures (°C):	15.2 - 16.2

NO DEVIATIONS IDENTIFIED with respect to sampling dates or containers received.

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples $5 \pm 3^{\circ}\text{C}$), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	25/04849/1	25/04849/2	25/04849/3	25/04849/4	25/04849/5	25/04849/6	25/04849/7	25/04849/8	25/04849/9	25/04849/10	25/04849/11	25/04849/12
Client Sample No							D1	D2	D1	D2	D1	D1
Client Sample ID/Depth	WS06 0.3-0.4m	WS02 0.4-0.5m	WS01 0.8-0.9m	WS05 0.7-0.8m	WS04 0.3-0.4m	WS03 0.5-0.6m	WS01 1.2-1.45m	WS01 1.5-1.6m	WS02 1.7-1.8m	WS02 1.8-2m	WS03 2-2.45m	WS04 1.20-1.45m
Date Sampled	07/05/25	07/05/25	07/05/25	08/05/25	08/05/25	08/05/25	07/05/25	07/05/25	07/05/25	07/05/25	08/05/25	08/05/25
A-T-019s	14/05/2025	14/05/2025	14/05/2025	14/05/2025	14/05/2025	14/05/2025						
A-T-022s	14/05/2025	14/05/2025	14/05/2025	14/05/2025	14/05/2025	14/05/2025						
A-T-024s	16/05/2025	16/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						
A-T-026s	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	23/05/2025			23/05/2025	23/05/2025	23/05/2025
A-T-027s	16/05/2025	16/05/2025	16/05/2025	16/05/2025	16/05/2025	16/05/2025						
A-T-031s	16/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	23/05/2025			23/05/2025	23/05/2025	23/05/2025
A-T-032s	14/05/2025	16/05/2025	16/05/2025	16/05/2025	16/05/2025	16/05/2025						
A-T-040s	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						
A-T-042sTCN	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						
A-T-044	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	22/05/2025			22/05/2025	22/05/2025	22/05/2025
A-T-045	13/05/2025	13/05/2025	13/05/2025	13/05/2025	13/05/2025	13/05/2025						
A-T-050s	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						
A-T-054	29/05/2025											
A-T-055s	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						
Calc-As Recd	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						

Lab Sample ID	25/04849/13	25/04849/14	25/04849/15	25/04849/16	25/04849/17	25/04849/18	25/04849/19
Client Sample No	D2	D3	D1	D2	D3	D1	B1
Client Sample ID/Depth	WS04 2.00-2.45m	WS04 3.40-3.60m	WS05 1.20-1.45m	WS05 2.00-2.45m	WS05 3.00-3.45m	WS06 3.00-3.45m	WS05 3.50-4.00m
Date Sampled	08/05/25	08/05/25	08/05/25	08/05/25	08/05/25	07/05/25	08/05/25
A-T-019s							
A-T-022s							
A-T-024s							
A-T-026s			23/05/2025	23/05/2025			23/05/2025
A-T-027s							
A-T-031s			27/05/2025	27/05/2025			27/05/2025
A-T-032s							
A-T-040s							
A-T-042sTCN							
A-T-044			22/05/2025	22/05/2025			22/05/2025
A-T-045							
A-T-050s							
A-T-054							
A-T-055s							
Calc-As Recd							

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

End of Report

Appendix D – Geotechnical Laboratory Test Results

Envirolab
Envirolab Ltd
Housesteads
Off Stockport Road
Hattersley
SK14 3QU
F.A.O.

Supplemental Test Report - 2282508 / 2

Site: B086745
Job Number: 2282508
Originating Client: Envirolab
Originating Reference: 25/04849
Date Sampled: 07/05/2025
Date Scheduled: 22/05/2025
Date Testing Started: 23/05/2025
Date Testing Finished: 20/06/2025

Previous Reports		Amendments	Date Issued
1	Final		02/06/2025

Amendments: Various tests added

Authorised By:



Tim Robinson
Quality Supervisor

Report Issue Date: 20/06/2025

Site: B086745

Job Number: 2282508

Client: Envirolab

Page: 2

**Determination of Moisture Content, Liquid Limit and Plastic Limit
and Derivation of Plasticity and Liquidity Index**

Borehole / Trial Pit	Depth (m)	Sample	Natural Moisture Content %	Natural - Stones removed by hand Sieved - Washed on 425 µm sieve			Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Class	Description / Remarks
				Natural / Sieved	Percentage Passing %	Moisture Content %						
WS01	1.20	D1	9.6	Sieved	40	16		11*				Brown gravelly, clayey, very sandy SILT
WS01	1.50	D2	8.2	Sieved	44	12	25	17	8	-0.60	CL	Brown clayey, gravelly, very sandy SILT
WS02	1.70	D1	9.2	Sieved	70	11	32	18	14	-0.50	CL	Brown gravelly, sandy, silty CLAY
WS03	2.00	D1	17	Natural	94	18	29	16	13	0.13	CL	Brown slightly gravelly, slightly sandy, silty CLAY
WS04	2.00	D2	17	Natural	96	17	28	15	13	0.19	CL	Brown slightly gravelly, slightly sandy, silty CLAY
WS04	3.40	D3	13	Sieved	22	41	26	16	10	2.54	CL	Brown sandy, silty, very gravelly CLAY
WS05	2.00	D2	20	Natural	97	20	33	15	18	0.30	CL	Brown slightly gravelly, slightly sandy, silty CLAY
WS05	3.00	D3	20	Natural	96	21	25	16	9	0.52	CL	Brown slightly gravelly, slightly sandy, silty CLAY
WS06	3.00	D1	18	Natural	96	19	32	15	17	0.21	CL	Brown slightly gravelly, slightly sandy, silty CLAY

Method of Preparation: BS 1377 : Part 1 : 1990 : Clause 7 Preparation of disturbed samples for testing
BS 1377 : Part 1 : 2016 : Clause 8.4.3 Preparation of samples for plasticity tests
BS 1377 : Part 2 : 1990 : Clause 4.2 Preparation of samples for plastic limit tests

Method of Test: BS 1377 : Part 2 : 1990 : Clause 3.2 Determination of moisture content
BS 1377 : Part 2 : 1990 : Clause 4.3 or 4.4 Determination of the liquid limit
BS 1377 : Part 2 : 1990 : Clause 5.3 Determination of the plastic limit and plasticity index
*Insufficient sample. Plastic Limit tested only.

Results reported relate only to the samples tested.

Site: B086745

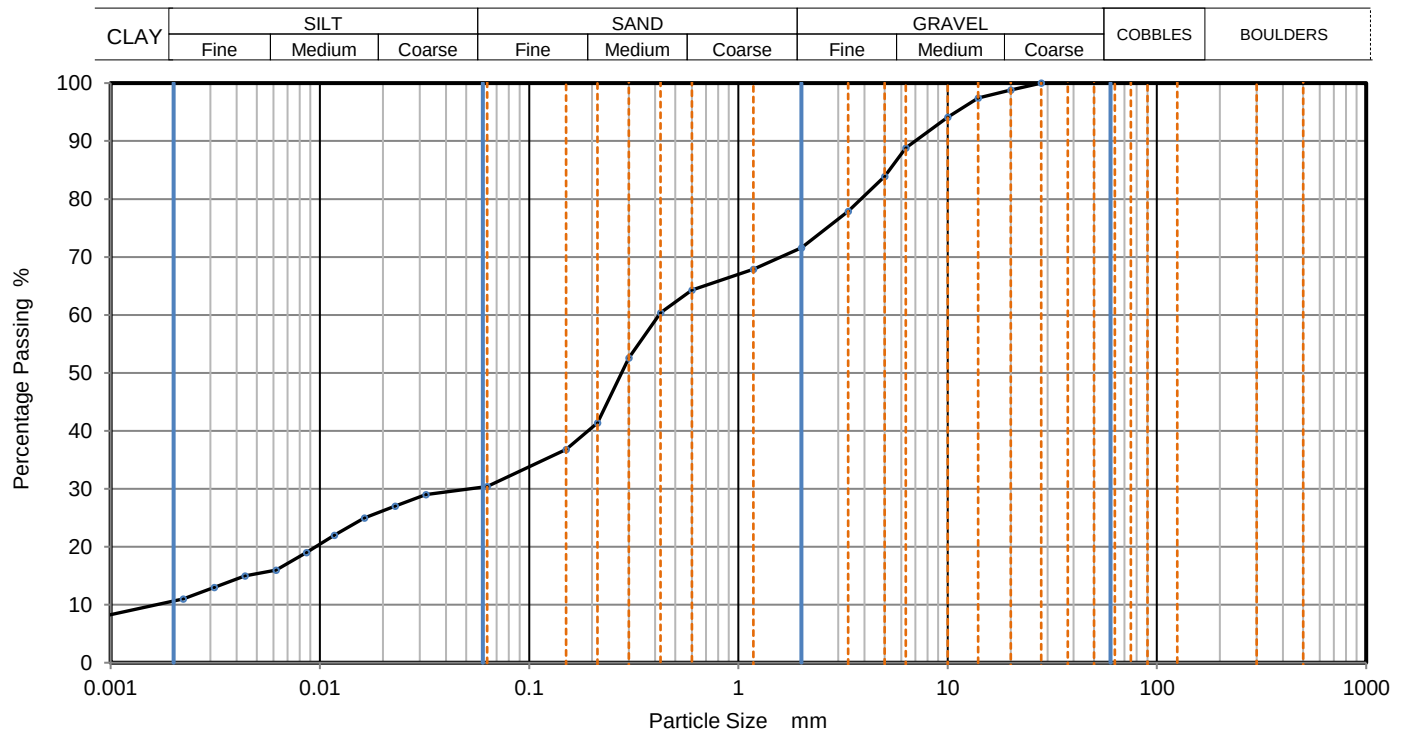
Job Number: 2282508

Client: Envirolab

Page: 3

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Borehole / Trial Pit	Depth (m)	Sample	Testing Type	Description
WS06	3.50	B1	Wet Sieve + Hydrometer	Brown gravelly, silty, very sandy CLAY



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0321	29
		0.0229	27
		0.0163	25
		0.0117	22
		0.0086	19
		0.0062	16
		0.0044	15
		0.0031	13
28	100	0.0022	11
20	99	0.0009	8
14	97		
10	94		
6.3	89		
5	84		
3.35	78		
2	72		
1.18	68	Particle density (assumed) 2.65 Mg/m ³	
0.6	64		
0.425	60		
0.3	53		
0.212	41		
0.15	37		
0.063	30		

Dry Mass of sample, g
2401

Sample Proportions	% dry mass
Very coarse	0
Gravel	28
Sand	41
Silt	20
Clay	11

Grading Analysis		
D100	mm	28
D60	mm	0.417
D30	mm	0.0543
D10	mm	0.0016
Uniformity Coefficient		260
Curvature Coefficient		4.4

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Method of Preparation: BS 1377:Part 1:1990, clause 7.3 Initial preparation
BS 1377:Part 1:1990, clause 7.4.5 Preparation of particle size tests

Method of Test: BS1377:Part 2:1990, clause 9.2 Determination of particle size distribution by wet sieving method
BS1377:Part 2:1990, clause 9.5 Determination of sedimentation by hydrometer method



Supplemental Test Report - 2282508 / 2

Site: B086745

Job Number: 2282508

Originating Client: Envirolab

All opinions and interpretations contained within this report are outside of our Scope of Accreditation.

This test report shall not be reproduced, except in full and only with the written permission of Ian Farmer Associates Ltd.

Samples will be retained for 28 days from date of issue of the final test report before being disposed of, unless we receive written instruction to the contrary.

Report End

Report Issue Date: 20/06/2025

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 25/04849/1

Amendments: Request for Additional Analysis

Envirolab Job Number: 25/04849
Issue Number: 2

Date: 20 June, 2025

Client: Curtins Consulting (Manchester)
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: EBMA/Jonathan Lord/Russell Taylor
Project Name: Bury Hospital
Project Ref: B086745
Order No: 26266
Date Samples Received: 09/05/25
Date Instructions Received: 12/05/25
Date Analysis Completed: 20/06/25

Approved by:

A handwritten signature in black ink, appearing to read "Gemma Berrisford".

Gemma Berrisford
Deputy Client Services Supervisor

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/1	25/04849/2	25/04849/3	25/04849/4	25/04849/5	25/04849/6	25/04849/7	Units	Limit of Detection	Method ref
Client Sample No							D1			
Client Sample ID	WS06	WS02	WS01	WS05	WS04	WS03	WS01			
Depth to Top	0.3	0.4	0.8	0.7	0.3	0.5	1.2			
Depth To Bottom	0.4	0.5	0.9	0.8	0.4	0.6	1.45			
Date Sampled	07-May-25	07-May-25	07-May-25	08-May-25	08-May-25	08-May-25	07-May-25			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - D			
Sample Matrix Code	6AB	4AB	6ABE	6ABE	6ABDE	6ABE	5A			
% Moisture at <40C _A	8.0	6.5	9.2	12.4	9.8	8.0	-	% w/w	0.1	A-T-044
% Stones >10mm _A	<0.1	38.6	37.3	<0.1	<0.1	25.9	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	10.35	8.59	8.14	7.68	7.87	7.91	-	pH	0.01	A-T-031s
pH BRE _D ^{M#}	-	-	-	-	-	-	8.07	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.02	<0.01	0.02	<0.01	0.02	0.01	-	g/l	0.01	A-T-026s
Sulphate BRE (water sol 2:1) _D ^{M#}	-	-	-	-	-	-	43	mg/l	10	A-T-026s
Cyanide (total) _A ^{M#}	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	-	mg/kg	0.2	A-T-050s
Organic Matter _D ^{M#}	1.02	0.23	0.58	4.05	2.21	2.01	-	% w/w	0.14	A-T-032s
Arsenic _D ^{M#}	5	<1	2	4	5	3	-	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	mg/kg	1	A-T-024s
Copper _D ^{M#}	19	6	14	23	23	17	-	mg/kg	1	A-T-024s
Chromium _D ^{M#}	12	8	9	15	16	12	-	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-040s
Lead _D ^{M#}	68	5	19	79	43	31	-	mg/kg	1	A-T-024s
Mercury _D	0.17	<0.17	<0.17	<0.17	<0.17	<0.17	-	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	12	10	11	16	18	14	-	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-024s
Zinc _D ^{M#}	67	25	38	49	69	52	-	mg/kg	1	A-T-024s
(1.02) Item 2.4 4 Point Liquid & Plastic Limit by Cone Penetrometer _A [#]	-	-	-	-	-	-	Appended			Subcon IFA
(1.01) Item 1a Moisture Content of Soil (Oven Dried Method) _A [#]	-	-	-	-	-	-	Appended			Subcon IFA

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/1	25/04849/2	25/04849/3	25/04849/4	25/04849/5	25/04849/6	25/04849/7	Units	Limit of Detection	Method ref
Client Sample No							D1			
Client Sample ID	WS06	WS02	WS01	WS05	WS04	WS03	WS01			
Depth to Top	0.3	0.4	0.8	0.7	0.3	0.5	1.2			
Depth To Bottom	0.4	0.5	0.9	0.8	0.4	0.6	1.45			
Date Sampled	07-May-25	07-May-25	07-May-25	08-May-25	08-May-25	08-May-25	07-May-25			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - D			
Sample Matrix Code	6AB	4AB	6ABE	6ABE	6ABDE	6ABE	5A			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	Amosite	NAD	NAD	NAD	NAD	NAD	-			A-T-045
Asbestos Matrix (visual) _D	-	-	-	-	-	-	-			A-T-045
Asbestos Matrix (microscope) _D	Insulation	-	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A	N/A	N/A	N/A	-			A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing) _D	<0.001	-	-	-	-	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/1	25/04849/2	25/04849/3	25/04849/4	25/04849/5	25/04849/6	25/04849/7	Units	Limit of Detection	Method ref
Client Sample No							D1			
Client Sample ID	WS06	WS02	WS01	WS05	WS04	WS03	WS01			
Depth to Top	0.3	0.4	0.8	0.7	0.3	0.5	1.2			
Depth To Bottom	0.4	0.5	0.9	0.8	0.4	0.6	1.45			
Date Sampled	07-May-25	07-May-25	07-May-25	08-May-25	08-May-25	08-May-25	07-May-25			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - D			
Sample Matrix Code	6AB	4AB	6ABE	6ABE	6ABDE	6ABE	5A			
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	<0.01	0.03	<0.01	<0.01	0.02	-	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	0.01	<0.01	0.02	<0.01	-	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	0.03	<0.02	0.06	<0.02	0.02	0.04	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	0.23	<0.04	0.21	<0.04	0.13	0.16	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.29	<0.04	0.23	0.05	0.20	0.19	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.34 ^U	<0.05 ^U	0.28 ^U	0.07 ^U	0.27 ^U	0.24 ^U	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	0.29	<0.05	0.15	<0.05	0.23	0.13	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	0.12	<0.07	0.10	<0.07	0.10	0.10	-	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	0.33	<0.06	0.28	<0.06	0.18	0.22	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	0.42	<0.08	0.51	<0.08	0.23	0.40	-	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	<0.01	0.03	<0.01	<0.01	0.02	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.24	<0.03	0.15	0.03	0.20	0.11	-	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.12	<0.03	0.27	0.03	0.10	0.17	-	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	0.41	<0.07	0.50	0.09	0.24	0.39	-	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	2.82	<0.08	2.81	0.27	1.92	2.19	-	mg/kg	0.01	A-T-019s

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/1	25/04849/2	25/04849/3	25/04849/4	25/04849/5	25/04849/6	25/04849/7	Units	Limit of Detection	Method ref
Client Sample No							D1			
Client Sample ID	WS06	WS02	WS01	WS05	WS04	WS03	WS01			
Depth to Top	0.3	0.4	0.8	0.7	0.3	0.5	1.2			
Depth To Bottom	0.4	0.5	0.9	0.8	0.4	0.6	1.45			
Date Sampled	07-May-25	07-May-25	07-May-25	08-May-25	08-May-25	08-May-25	07-May-25			
Sample Type	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - ES	SOIL - D			
Sample Matrix Code	6AB	4AB	6ABE	6ABE	6ABDE	6ABE	5A			
TPH CWG with Clean Up										
Ali >C5-C6 _A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1	<1	1	<1	2	<1	-	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	2	<1	1	<1	2	<1	-	mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	73	14	4	2	11	2	-	mg/kg	1	A-T-055s
Total Aliphatics _A	75	14	8	2	16	2	-	mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-055s
Aro >C10-C12 _A	<1	<1	<1	<1	<1	<1	-	mg/kg	1	A-T-055s
Aro >C12-C16 _A	2	<1	1	<1	2	<1	-	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	5	<1	3	<1	4	2	-	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	45	12	12	3	16	7	-	mg/kg	1	A-T-055s
Total Aromatics _A	53	13	17	3	22	10	-	mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	128	28	25	6	38	13	-	mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	mg/kg	0.01	A-T-022s

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/8	25/04849/9	25/04849/10	25/04849/11	25/04849/12	25/04849/13	25/04849/14	Units	Limit of Detection	Method ref
Client Sample No	D2	D1	D2	D1	D1	D2	D3			
Client Sample ID	WS01	WS02	WS02	WS03	WS04	WS04	WS04			
Depth to Top	1.5	1.7	1.8	2	1.20	2.00	3.40			
Depth To Bottom	1.6	1.8	2	2.45	1.45	2.45	3.60			
Date Sampled	07-May-25	07-May-25	07-May-25	08-May-25	08-May-25	08-May-25	08-May-25			
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - D			
Sample Matrix Code			1AE	5AE	3AE					
% Stones >10mm _A	-	-	<0.1	<0.1	<0.1	-	-	% w/w	0.1	A-T-044
pH BRE _D ^{M#}	-	-	7.18	6.16	6.62	-	-	pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1) _D ^{M#}	-	-	28	25	27	-	-	mg/l	10	A-T-026s
(1.02) Item 2.4 4 Point Liquid & Plastic Limit by Cone Penetrometer _A [#]	Appended	Appended	-	Appended	-	Appended	Appended			Subcon IFA
(1.01) Item 1a Moisture Content of Soil (Oven Dried Method) _A [#]	Appended	Appended	-	Appended	-	Appended	Appended			Subcon IFA

Envirolab Job Number: 25/04849

Client Project Name: Bury Hospital

Client Project Ref: B086745

Lab Sample ID	25/04849/15	25/04849/16	25/04849/17	25/04849/18	25/04849/19			Units	Limit of Detection	Method ref
Client Sample No	D1	D2	D3	D1	B1					
Client Sample ID	WS05	WS05	WS05	WS06	WS05					
Depth to Top	1.20	2.00	3.00	3.00	3.50					
Depth To Bottom	1.45	2.45	3.45	3.45	4.00					
Date Sampled	08-May-25	08-May-25	08-May-25	07-May-25	08-May-25					
Sample Type	SOIL - D	SOIL - D	SOIL - D	SOIL - D	SOIL - B					
Sample Matrix Code	5AE	5AE			4AE					
% Stones >10mm _A	<0.1	<0.1	-	-	<0.1			% w/w	0.1	A-T-044
pH BRE _D ^{M#}	6.99	6.70	-	-	7.59			pH	0.01	A-T-031s
Sulphate BRE (water sol 2:1) _D ^{M#}	16	15	-	-	14			mg/l	10	A-T-026s
(1.02) Item 2.4 4 Point Liquid & Plastic Limit by Cone Penetrometer _A [#]	-	Appended	Appended	Appended	-					Subcon IFA
(1.01) Item 1a Moisture Content of Soil (Oven Dried Method) _A [#]	-	Appended	Appended	Appended	-					Subcon IFA
IFA PHYS (1.10d) Item 12a & 15a PSD with sedimentation Hydrometer BSEN 17892 _A	-	-	-	-	Appended					Subcon IFA

Report Notes

General

- This report shall not be reproduced, except in full, without written approval from Envirolab.
- The client Sample No, Client Sample ID, Depth to top, Depth to Bottom and Date Sampled are all provided by the client and can affect the validity of results.
- The results reported herein relate only to the material supplied to the laboratory.
- The residue of any samples contained within this report, and any received within the same delivery, will be disposed of **four weeks** after the initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of **six months** after the initial Asbestos testing is completed.
- Analytical results reflect the quality of the sample at the time of analysis only.
- Opinions and Interpretations expressed are outside our scope of accreditation.
- A deviating sample report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.
- If a sample is outside of the calibration range or affected by interferences then it may need diluting. This will result in the limit of detection (LOD) being raised.
- Subcontracted Analysis: Please see the appended report for any deviations, current LODs and accreditation status of the test.

Key

Superscript “#”	Accredited to ISO 17025
Superscript “M”	Accredited to MCertS
Superscript “U”	Individual result not accredited
None of the above symbols	Analysis unaccredited
Subscript “A”	Analysis performed on as-received Sample
Subscript “D”	Analysis performed on the dried sample, crushed to pass 2mm sieve.
Subscript “D” on Asbestos	Analysis performed on a dried aliquot of sample provided.
Subscript “A”	Analysis has dependant options against results. Details appear in the comments of your Sample receipt
IS	Insufficient Sample for analysis
US	Unsuitable Sample for analysis
NDP	No Determination Possible
NAD	No Asbestos Detected
Trace	Asbestos found not suitable for Gravimetric Quantification – not enough to accurately weigh.
N/A	Not applicable

Asbestos

Identification: Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis

“Trace Asbestos Identified” will be reported if there is not enough present to verify the type.

Assigned Matrix Codes

1	SAND	6	CLAY/LOAM	A	Contains Stones
2	LOAM	7	OTHER	B	Contains Construction Rubble
3	CLAY	8	Asbestos Bulk (Only Asbestos ID accredited)	C	Contains visible hydrocarbons
4	LOAM/SAND	9	Incinerator Ash (some Metals accredited)	D	Contains glass / metal
5	SAND/CLAY			E	Contains roots / twigs

Note: 7,8,9 matrices are not covered by our ISO 17025 or MCertS accreditation, unless stated above.

Soil Chemical Analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as “% stones >10mm”.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any “D” subscripts.

TPH by method A-T-007:

For waters, free and visible oils are excluded from the sample used for analysis, so the reported result represents the dissolved phase only.

Results “with Clean up” indicates samples cleaned up with Silica during extraction.

EPH CWG (method A-T-055) from TPH CWG:

EPH CWG results have humics mathematically subtracted through instrument calculation.

Where these humic substances have been identified in any IDs from “TPH CWG with clean up” please note that the concentration is **NOT** included in the quantified results but present in the ID for information.

Electrical Conductivity of water by method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Please contact your client manager if you require any further information.

Envirolab Deviating Samples Report

Hattersley Science & Technology Park, Stockport Road, Hattersley, SK14 3QU
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client:	Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG	Project No:	25/04849
Project:	Bury Hospital	Date Received:	12/05/2025 (am)
Clients Project No:	B086745	Cool Box Temperatures (°C):	15.2 - 16.2

NO DEVIATIONS IDENTIFIED with respect to sampling dates or containers received.

Note: If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3 (for water samples $5 \pm 3^{\circ}\text{C}$), ISO 18400-105:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

Envirolab Analysis Dates

Lab Sample ID	25/04849/1	25/04849/2	25/04849/3	25/04849/4	25/04849/5	25/04849/6	25/04849/7	25/04849/8	25/04849/9	25/04849/10	25/04849/11	25/04849/12
Client Sample No							D1	D2	D1	D2	D1	D1
Client Sample ID/Depth	WS06 0.3-0.4m	WS02 0.4-0.5m	WS01 0.8-0.9m	WS05 0.7-0.8m	WS04 0.3-0.4m	WS03 0.5-0.6m	WS01 1.2-1.45m	WS01 1.5-1.6m	WS02 1.7-1.8m	WS02 1.8-2m	WS03 2-2.45m	WS04 1.20-1.45m
Date Sampled	07/05/25	07/05/25	07/05/25	08/05/25	08/05/25	08/05/25	07/05/25	07/05/25	07/05/25	07/05/25	08/05/25	08/05/25
A-T-019s	14/05/2025	14/05/2025	14/05/2025	14/05/2025	14/05/2025	14/05/2025						
A-T-022s	14/05/2025	14/05/2025	14/05/2025	14/05/2025	14/05/2025	14/05/2025						
A-T-024s	16/05/2025	16/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						
A-T-026s	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	23/05/2025			23/05/2025	23/05/2025	23/05/2025
A-T-027s	16/05/2025	16/05/2025	16/05/2025	16/05/2025	16/05/2025	16/05/2025						
A-T-031s	16/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	23/05/2025			23/05/2025	23/05/2025	23/05/2025
A-T-032s	14/05/2025	16/05/2025	16/05/2025	16/05/2025	16/05/2025	16/05/2025						
A-T-040s	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						
A-T-042sTCN	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						
A-T-044	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	22/05/2025			22/05/2025	22/05/2025	22/05/2025
A-T-045	13/05/2025	13/05/2025	13/05/2025	13/05/2025	13/05/2025	13/05/2025						
A-T-050s	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						
A-T-054	29/05/2025											
A-T-055s	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						
Calc-As Recd	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025	15/05/2025						

Lab Sample ID	25/04849/13	25/04849/14	25/04849/15	25/04849/16	25/04849/17	25/04849/18	25/04849/19
Client Sample No	D2	D3	D1	D2	D3	D1	B1
Client Sample ID/Depth	WS04 2.00-2.45m	WS04 3.40-3.60m	WS05 1.20-1.45m	WS05 2.00-2.45m	WS05 3.00-3.45m	WS06 3.00-3.45m	WS05 3.50-4.00m
Date Sampled	08/05/25	08/05/25	08/05/25	08/05/25	08/05/25	07/05/25	08/05/25
A-T-019s							
A-T-022s							
A-T-024s							
A-T-026s			23/05/2025	23/05/2025			23/05/2025
A-T-027s							
A-T-031s			27/05/2025	27/05/2025			27/05/2025
A-T-032s							
A-T-040s							
A-T-042sTCN							
A-T-044			22/05/2025	22/05/2025			22/05/2025
A-T-045							
A-T-050s							
A-T-054							
A-T-055s							
Calc-As Recd							

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

End of Report

Appendix E – Ground Gas Monitoring Results

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG

Tel: 0161 236 2394

Fax: 0161 228 7902

Curtins**GAS MONITORING LOG SHEET**

Project: Bury ED Phase 2 **Date:** 30/05/2025
Job Number: B086745 **Visit:** 1
Client: Ridge abd Partners LLP **Weather:** Overcast
Barometric State: Steady **Ground Conditions:** Wet

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl m AOD		Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS							
WS01	998	0.0	0.0	0.1	0.0	1.2	1.2	18.5	0	0	Dry	-	1.37	
WS04	998	0.0	0.0	0.0	0.0	1.3	1.3	19.6	0	0	Dry	-	3.19	
WS05	998	0.0	0.0	0.0	0.0	1.2	1.0	19.9	0	0	3.78	138.22	4.17	
WS06	997	0.0	0.0	0.0	0.0	0.4	0.4	20.4	0	0	1.98	140.17	2.20	
MAX		0.0	0.0	0.1	0.0	1.3	1.3	20.4	0	0				

Notes**Logged by****JP***1% gas volume = 10,000 ppm**Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.**All other gases recorded at 'steady state' unless otherwise stated*

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG

Tel: 0161 236 2394

Fax: 0161 228 7902

Curtins**GAS MONITORING LOG SHEET**

Project: Bury ED Phase 2 **Date:** 19/06/2025
Job Number: B086745 **Visit:** 2
Client: Ridge abd Partners LLP **Weather:** Sunny
Barometric State: Steady **Ground Conditions:** Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl m AOD		Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS							
WS01	1010	0.0	0.0	0.0	0.0	2.1	2.1	20.50	0	0	Dry	-	1.39	
WS04	1009	0.0	0.0	0.0	0.0	1.8	1.8	19.00	0	0	Dry	-	3.18	
WS05	1010	0.0	0.0	0.0	0.0	0.8	0.7	20.20	0	0	3.66	138.34	4.17	
WS06	1010	0.0	0.0	0.0	0.0	0.1	0.1	20.10	0	0	1.98	140.17	2.19	
MAX		0.0	0.0	0.0	0.0	2.1	2.1	20.5	0	0				

Notes**Logged by****RT**

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG

Tel: 0161 236 2394

Fax: 0161 228 7902

Curtins**GAS MONITORING LOG SHEET**

Project: Bury ED Phase 2 **Date:** 24/06/2025
Job Number: B086745 **Visit:** 3
Client: Ridge abd Partners LLP **Weather:** Overcast
Barometric State: Steady **Ground Conditions:** Wet

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl m AOD		Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS							
WS01	990	0.0	0.0	0.0	0.0	2.4	2.4	18.6	0	0	1.19	139.09	1.36	
WS04	990	0.0	0.0	0.0	0.0	2.0	2.0	18.7	0	0	Dry	-	2.16	
WS05	990	0.0	0.0	0.0	0.0	1.3	1.1	19.6	0	0	3.65	138.35	4.19	
WS06	-	-	-	-	-	-	-	-	-	-	1.97	140.18	2.20	1, 2
MAX		0.0	0.0	0.0	0.0	2.4	2.4	19.6	0	0				

Notes**Logged by****RBJ**

1 Borehole Cap Flooded.

2 When bung lifted rainwater poured into borehole, therefore water level may not be representative.

1% gas volume = 10,000 ppm

Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.

All other gases recorded at 'steady state' unless otherwise stated

Curtins

Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG

Tel: 0161 236 2394

Fax: 0161 228 7902

Curtins**GAS MONITORING LOG SHEET**

Project: Bury ED Phase 2 **Date:** 07/07/2025
Job Number: B086745 **Visit:** 4
Client: Ridge abd Partners LLP **Weather:** Sunny
Barometric State: Rising **Ground Conditions:** Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl m AOD		Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS							
WS01	1010	0.0	0.0	0.0	0.0	1.4	1.4	19.1	0	0	Dry	-	1.36	
WS04	1010	0.0	0.0	0.0	0.0	1.6	1.6	19.9	0	0	Dry	-	3.20	
WS05	1010	0.0	0.0	0.0	0.0	0.4	0.4	20.6	0	0	3.66	138.34	4.17	
WS06	1010	0.0	0.0	0.0	0.0	0.2	0.2	20.8	0	0	Dry	-	2.19	
MAX		0.0	0.0	0.0	0.0	1.6	1.6	20.8	0	0				

Notes**Logged by****RT***1% gas volume = 10,000 ppm**Flow rate, methane and carbon dioxide reported as 'maximum' (max) and 'steady state' (SS) readings.**All other gases recorded at 'steady state' unless otherwise stated*

Appendix F - GAC Screening Thresholds

Appendix G – Risk Assessment Rationale

The site-specific risk assessment, presented in this report, follows the principle of establishing whether there is a viable linkage between a contaminant source to a potential receptor, via an exposure pathway.

The risk assessment corresponds with the total site area and incorporates both descriptive (qualitative) and, where available, numerical (quantitative) lines of evidence.

Risk assessment is the process of collating known information on a hazard or set of hazards to estimate actual or potential risk to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem, or future construction materials. Receptors can be connected to the source by one or several exposure pathways such as direct contact for example. Risks are managed by isolating the receptor or intercepting the exposure pathway or by isolating or removing the hazard.

Without the three essential components of a source, pathway, and receptor there can be no risk. Therefore, the presence of contaminant source on a site does not necessarily mean there is a risk.

The risk assessment considers the likelihood of a particular event taking place (accounting for the presence of the source and receptor and the viability of the exposure pathway) in conjunction with the severity of the potential consequence (accounting for the potential severity of the hazard and the sensitivity of the receptor).

In the risk assessment the consequence of the hazard has been classified as severe, medium, mild, or minor and the probability (likelihood) of the circumstances occurring classified as high likelihood or low likelihood or unlikely.

The consequences and probabilities are subsequently cross correlated to give a qualitative estimation of the risk using Department of the Environment risk classifications as detailed in the table below and as referenced in CIRIA C552.

		Consequence			
		Severe	Medium	Mild	Minor
Probability (Likelihood)	High Likelihood	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

In accordance with DoE guidance, the following categorisation of **consequence** has been developed.

Classification	Definition	Examples
Severe	Short-term (acute) risk to human health likely to result in “significant harm” as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to an ecosystem or organisation forming part of such ecosystem.	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health. Pollution of sensitive water resources. A significant change in an ecosystem or organism forming part of such ecosystem.	Concentration of a contaminant from site exceeds the generic or site-specific assessment criteria. Leaching of contaminants from a site to a Principal or Secondary A aquifer. Death of a species within a designated nature reserve. Lesser toxic and asphyxiate effects
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures, and services. Damage to sensitive buildings/structures/services or the environment.	Pollution of non-classified groundwater (Inc. Secondary B aquifers). Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc). Easily repairable effects of damage to buildings, structures, and services.	The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete.

In accordance with DoE guidance, the following categorisation of **probability** has been developed.

Classification	Definition
High Likelihood	There is a pollution linkage and an event that either 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	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the shorter term.
Unlikely	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur even in the very long term.

In accordance with DoE guidance, the following categorisation of **risk** has been developed.

Classification	Definition
Very High Risk	There is a <i>high probability</i> that <i>severe harm</i> could arise to a designated receptor from an identified hazard at the site without appropriate further action.
High Risk	<i>Harm is likely to arise</i> to a designated receptor from an identified hazard at the site without appropriate further action.
Moderate Risk	<i>It is possible</i> that without appropriate further action <i>harm could arise</i> to a designated receptor. It is relatively <i>unlikely</i> that any such harm would be <i>severe</i> , and if any harm were to occur it is <i>more likely</i> that such harm would be <i>relatively mild</i> .
Low Risk	<i>It is possible</i> that <i>harm could arise</i> to a designated receptor from an identified hazard. It is <i>likely</i> that, at worst, if any harm was realised any effects would be <i>mild</i> .
Negligible Risk	The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor.

The term 'risk' in this instance refers to the risk that the source, pathway, receptor linkage for a given source of contamination is complete. It does not refer to immediate risk to individuals or features present on the site from potential contaminants and is intended to be used as a tool to assess the necessity of further investigation.