



GROUND INVESTIGATION REPORT FOR MANCHESTER ART GALLERY, MANCHESTER

TE1764-TE-00-XX-RP-GE-001-V01

VERSION 1.0

22 FEBRUARY 2024

FINAL

Prepared for:

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Robertson North West

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EXECUTIVE SUMMARY

Introduction	Tier Environmental was commissioned by Roberston North West to undertake a ground investigation of Manchester Art Gallery. The purpose of the investigation was to determine the nature and extent of soil, bedrock and groundwater beneath the site for the purposes of environmental and geotechnical assessment.
Proposed land use	It is proposed that the site will be developed with a concrete slab; this is in order to improve existing storage capabilities.
Site location and surrounding land uses	The site is currently in use as part of the wider Manchester Art Gallery. The specific site area is situated within the basement without public access. The site is set within a mixed commercial and residential area of Manchester city centre. Information on https://hidden-manchester.org.uk/ indicates that the site is underlain by The Guardian Underground Telephone Exchange (GUTE) also known as 'Scheme 567' is a 1950s nuclear-hardened facility designed to safeguard cold war communications, although the precise depth to this feature remains unknown.
Site history	Earliest mapping from 1851 shows the site to comprise two buildings bisected by Back George Street with the Manchester Royal Institution to the west and The Athenaeum to the east. These buildings were joined in 2003 and the Athenaeum was incorporated into the Manchester Art Gallery. The surrounding site area comprises multiple buildings forming Manchester city centre with mixed residential and commercial use with no pertinent features or changes.
Potential contaminative features	On site Made Ground.
Mining and quarrying	The site is located within a coal mining area as defined by the Coal Authority. Further review of coal mining records does not show the site to be directly impacted by shallow coal mining. There is no evidence of further extractive industries pertaining to the site.
Previous investigations	The following reports/investigations have been carried out by Tier Environmental: • A Technical Note for Testing of Subsoil for New Floor Slab, Manchester Art Gallery (Ref: TE1764-TE-00-XX-TN-GE-001-V01, dated September 2023) • A Technical Note for Assessment of Ground Conditions for Erection of Temporary External Scaffolding, Manchester Art Gallery (Ref: TE1764-TE-00-XX-TN-GE-002-V02, dated September 2023)
Fieldwork	The fieldwork was carried out on the 4th January 2024. Also included within this report are the findings of a previous Tier Environmental investigation carried out on the 6th July 2023. Both works included: - Trial Pits - Hand dug pits - Dynamic Cone Penetrometer testing - Lightweight deflection testing
Laboratory testing	Samples of soil were submitted for analysis of a range of metal, other inorganic and organic components including asbestos. Testing was undertaken at an accredited laboratory.
Ground conditions	Ground conditions encountered were similar across the site area. The entire site area was covered by wooden floorboards, where pre cored areas had been marked out ahead of the site works. A sub floor void was seen below the wooden floorboards across site. This void ranged between 0.1, and 0.6m thick. Underlying this void was recorded Made Ground, with depths ranging from 0.30m and 1.6m bgl, described as brown gravelly sand and clay as well as gravel of brick and concrete with a medium proportion of ash. Locally to HDP101 a layer of concrete screed was recorded between 0.75m and 0.80m before going into the, as described, Made Ground. Underlying the Made Ground was superficial clay rich Till, with depths proven to 3.00m. Localised concrete obstructions were recorded in HDP103 and HDP104, at 1.60 and 0.70m respectively, with both resulting in the hand dug pits being terminated.
Foundations and floor slabs	Based on the results of Hand shear Vanes, Pocket Penetrometers, Dynamic Cone Penetrometer and light weight deflectometer, it is likely that a ground bearing slab may be suitable, but we would recommend the following: • Compacting the existing Made Ground with a wacker plate or similar to reduce settlements; • If ground levels are to be raised, the placement and compaction of Type 1 granular fill (or similar) to provide a more robust founding layer; and, • The masonry sleeper walls may require breaking down to prevent any hard spots that could result in unacceptable differential settlement and subsequent cracking of the floor slab. In addition, the installation of a geogrid to span across the broken-down sleeper walls may be prudent to again minimise any unacceptable differential settlements.
Sulphate class	It is considered that a Design Sulphate Class of DS-3 and ACEC Class AC-3 is appropriate for buried concrete at the site within Made Ground strata.



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Contamination – Human Health	Localised concentrations of lead have been recorded in access of the respective GAC for a commercial land user. The associated direct contact, dust inhalation and ingestion pathways will effectively be broken by the proposed ground bearing floor slab. As such, it is not considered that these concentrations represent a potential risk to the end user or adjacent site users. Asbestos testing has returned 2 No. positive results from samples obtained during the Tier Environmental investigation in July 2023: TP02 at 0.50m for Chrysotile and Amosite fibre bundles as well as bitumen-based asbestos containing material (ACM) and TP05 at 0.30m for Chrysotile fibre bundles. Both samples underwent subsequent quantification testing with both results recording <0.001% w/w i.e. at 'trace' levels which would normally be unlikely to trigger requirements during earthworks / construction works in accordance Control of Asbestos Regulations 2012; however, given that works will be conducted in an enclosed and dry environment, it is recommended that the Control of Asbestos Regulations 2012 is followed and that an asbestos management plan is produced ahead of the proposed works.
Gas protection	Following the completion of the proposed 4 No. ground gas monitoring visits, a Characteristic Situation 1 – Very Low Risk scenario has been identified. This is based upon the 'worst case' GSV of 0.0005l/hr alone, for which no ground gas protection measures are required.
Radon Requirements	Basic radon protection measures are not currently required for the proposed development on this site.
Further works	Based upon the results of asbestos testing for which 2 No. out of 9 No. obtained samples recorded positive identification of asbestos (Chrysotile and Amosite fibre bundles) a precautionary Asbestos Management Plan is recommended during construction works. This is considered precautionary as quantitative testing has placed the asbestos quantity at <0.001% w/w i.e. at 'trace' levels which would normally be unlikely to trigger requirements during earthworks / construction works in accordance Control of Asbestos Regulations 2012. However, due to the contained, inside nature of the development area it is considered that an increased risk is posed to construction workers.
Waste Soils Classification	Prehliminary waste materials classification and waste disposal route determination for samples obtained during the investigation in July 2023 have determined that the following samples, TP01 at 0.40m bgl and TP03 at 0.25 are non-hazardous but should be disposed of at a non-hazardous landfill due to Total Dissolved Solids and Sulphate as SO₄ in excess of inert landfill threshold. TP02 at 0.50m, due to the presence of asbestos, is unlikely to be accepted at an Inert waste landfill and therefore should be disposed of to a non-hazardous landfill with any visible ACMs would be segregated where possible and disposed of as hazardous waste. TP05 at 0.30m has been initially classified as Hazardous, due to Hexavalent Chromium being detected above the laboratory detection limit, subsequent WAC testing has determined that the material may require pre-treatment prior to disposal to a Hazardous landfill due to Loss on ignition in excess of the hazardous landfill threshold. Preliminary waste materials classification has determined that the samples obtained during the Tier Environmental investigation in January 2024 and TP04 (0.35m) from the investigation in July 2023, can be classed as non-hazardous
Materials re-use	Subject to volumetric cut and fill requirements all of Made Ground materials and all majority of natural soil materials and may be considered chemically suitable for potential re-use without remediation and in line with an appropriate end-of-waste protocol such as WRAP Quality Protocol for Aggregates from Inert Waste, U1 Exemption or a Materials Management Plan in accordance with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). Suitability for re-use would also be subject to confirmation of the geotechnical suitability depending on whether the materials are to be re-used in load bearing areas. This would need to be detailed in a supporting document. Please note that any previously landfilled or mining waste materials may not be appropriately subject to consideration under DoWCoP and may not be re-used under DoWCoP unless sufficient lines of evidence and agreement with the local Environment Agency Waste Team can be sought beforehand. In addition, Section 13.3 of this report includes statements with respect to re-use of excavated and stockpiled clean naturally occurring soils within the site and re-use on other sites. These statements are designed to provide a clear intention to reuse any clean, naturally occurring soils derived from future excavations at this site (which may also include temporary future stockpiling these materials).



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1. INTRODUCTION

Tier Environmental was commissioned by Robertson North West to undertake a Land Contamination Risk Management (LCRM) Preliminary Risk Assessment and Ground Investigation for an area of land referred to as Manchester Art Gallery, located at Mosley St, Manchester M2 3J (the "site").

The title of this report is in accordance with that described in the Land Contamination Risk Management guidance (available at <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>) which has superseded CLR 11:

Stage 1:

- LCRM Tier 1 Preliminary Risk Assessment Report
- LCRM Tier 2 Generic Quantitative Risk Assessment Report

1.1. Proposed Development

Under current proposals the development will comprise of a ground bearing concrete floor slab in order to increase storage potential within the basement of Manchester Art Gallery as presented in Appendix A. As such, in accordance with the '*Updated technical background to the CLEA model*' (Environment Agency, 2009) and '*Suitable 4 Use Levels*' (LQM / CIEH 2015) the proposed generic land use for this development is commercial / industrial.

1.2. Previous Reports

Tier Environmental have previously completed the following reports for the site:

- A Technical Note for Testing of Subsoil for New Floor Slab, Manchester Art Gallery (Ref: TE1764-TE-00-XX-TN-GE-001-V01, dated September 2023)
- A Technical Note for Assessment of Ground Conditions for Erection of Temporary External Scaffolding, Manchester Art Gallery (Ref: TE1764-TE-00-XX-TN-GE-002-V02, dated September 2023)

1.3. Objectives

Taking into account the proposed development of the site, the objectives of this appraisal were:

- To determine the historical and current land use.
- To establish the environmental setting of the site.
- To evaluate whether past mining or other extractive industries could have an influence on the site.
- To summarise previous pertinent reports;
- To determine current ground conditions.
- To determine the potential risks to human health and the wider environment.
- To provide a preliminary waste soils classification.
- To determine potential risks posed to the site from hazardous ground gases and / or vapours.
- Provide preliminary outline remedial measures to manage any identified risks.



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- To provide preliminary geotechnical parameters to inform floor slab and foundation recommendations.

1.4. Assumptions

The following assumptions are made in this report:

- It is assumed that ground levels will not change significantly from those described in this report or as shown on proposed development drawings. If this is not the case, then amendments to the recommendations made in this report may be required.
- The ground investigation has been designed with due consideration of known or suspected constraints (including underground services and access constraints).
- Any references to observations of suspected asbestos-containing materials are for information only and should be verified by a suitably qualified asbestos specialist and/or confirmed by laboratory analysis.
- The use of the term 'Topsoil' within this report is based on a visual identification only and that these materials have not been classified in accordance with BS3882:2015.
- The use of the terms 'shallow' and 'deep' within this report (from a geotechnical perspective) assume *typically* between ground level to circa 3.00m below ground level (bgl) for 'shallow' and greater than 3.00m bgl regarded as 'deep';
- The comments and opinions presented in this report are based on the findings of the desk study, review of third-party information, ground conditions encountered during intrusive investigation works performed by Tier Environmental and the results of tests carried out within one or more laboratories. There may be other conditions prevailing on the site which have not been revealed by this investigation and which have not been taken into account by this report.
- Responsibility cannot be accepted for any conditions not revealed by this investigation. Any diagram or opinion on the possible configuration of the findings is conjectural and given for guidance only. Confirmation of intermediate ground conditions should be undertaken if deemed necessary.

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2. SITE DETAILS AND DESCRIPTION

Table 2.1 Current Site Overview.

Site name	Manchester Art Gallery
Site address	Manchester Art Gallery, Mosley St, Manchester M2 3JL. A site location plan is included as Drawing No. TE1764-TE-00-XX-GE-DR-001-V01 within Appendix A.
National Grid Reference (NGR)	384073 398018
Approximate site area	0.29 ha
Site shape	The site is approximately rectangular in shape.
Current land use on the site	The site is currently in use as part of the wider Manchester Art Gallery. The specific site area is situated within the basement without public access.
Surrounding land uses	The site is set within a mixed commercial and residential area of Manchester city centre.
General topography and ground levels	The surrounding area is generally level.

An aerial photograph (from the Groundsure report) of the site and site boundary is shown below. Relevant site photographs are presented in Appendix F.



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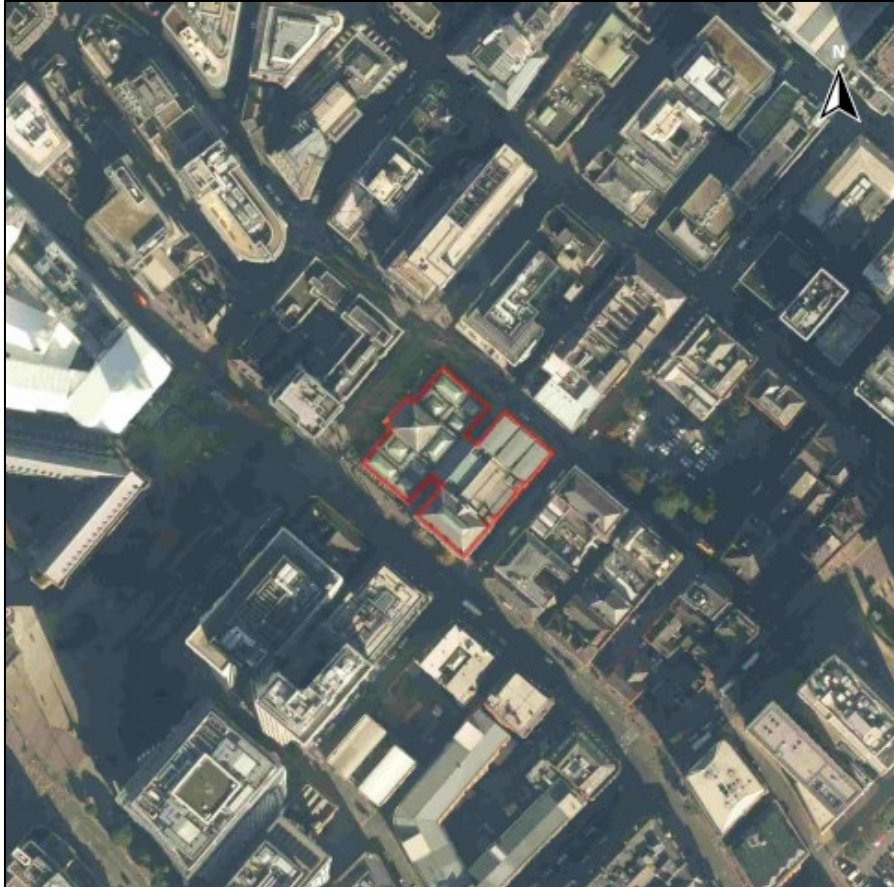
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Figure 2.1 Recent Aerial Photograph from Groundsure





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3. SITE HISTORY

3.1. Site History Review

Extracts of Ordnance Survey (OS) plans dated from earliest to most recent were reviewed. These were obtained as part of the Groundsure report for the site, which is presented in Appendix G.

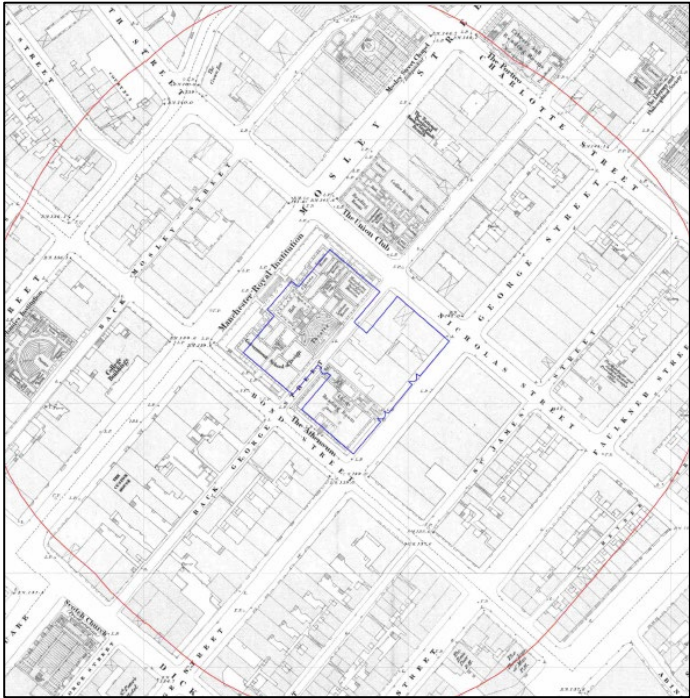
Table 3.1 below presents a summary of the main aspects of the site relevant to the current and proposed future end uses. It is not the intention of this report to describe in detail all of the changes that have occurred on or adjacent to the site, where these are not relevant to the land use.



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Table 3.1 Site History.

	On-site features	Off-site features
Pre-1900	 1851 1:1,056 The site is shown to comprise two buildings bisected by Back George Street with the Manchester Royal Institution to the west and The Athenaeum to the east.	- Site surrounds comprise of a number of buildings of Manchester city centre with mixed residential and commercial use. - By 1891 a tramline is shown along Moseley Street to the north west. - There are no nearby significant land uses.



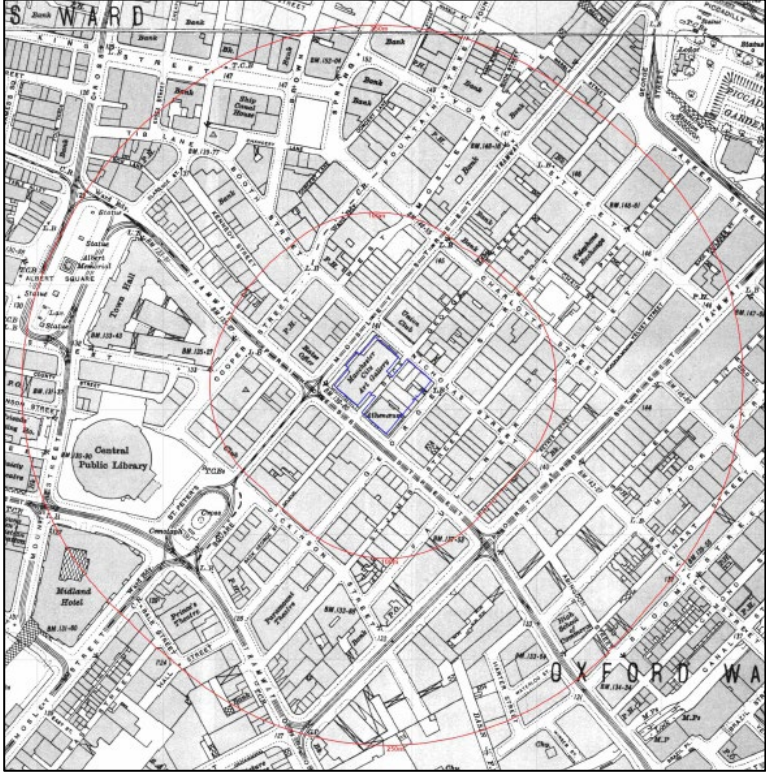
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	On-site features	Off-site features
1900 to 1939 (Pre-war period)	 1933 1:2,500	• No significant changes • By 1908 another tramline is evident along Princes Street. • By 1932 buildings circa 120m west of the site have been redeveloped into a circular building labelled as Central Public Library. • No other significant changes.



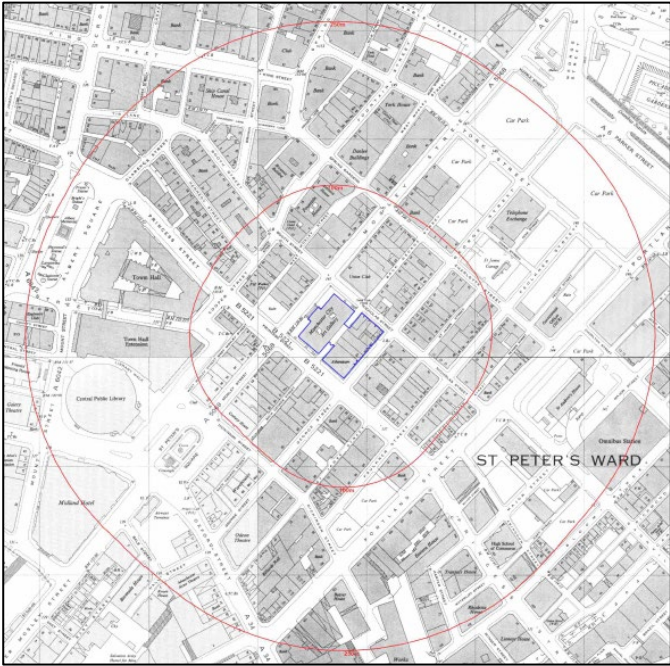
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	On-site features	Off-site features
1945-1980 (Post war period)	 1965 1:2,500	
	No significant changes	A number of plots surrounding the site are now empty or labelled as 'ruins'.



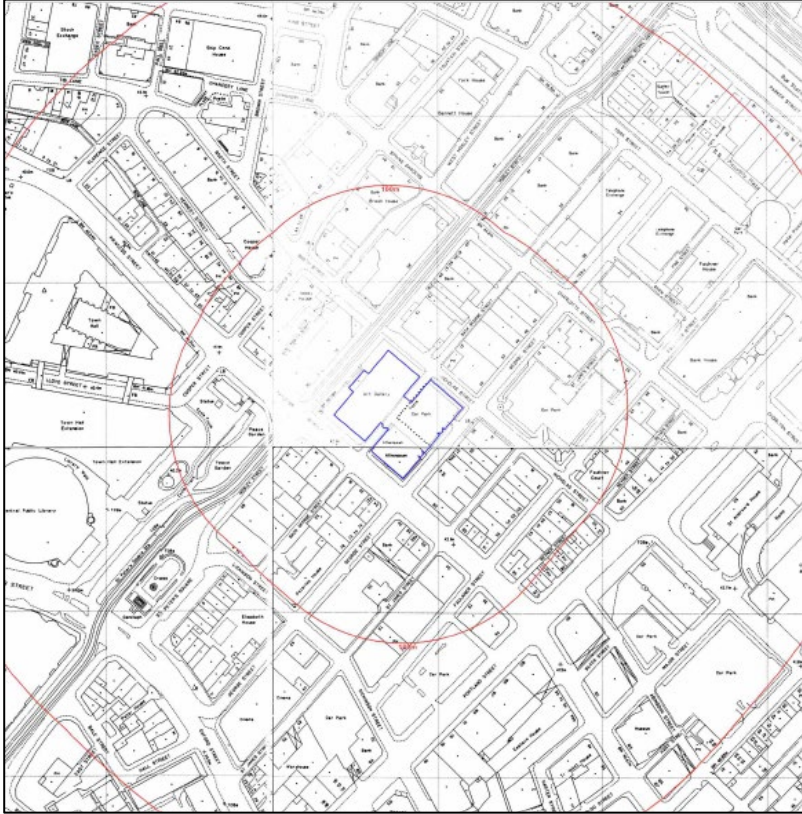
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	On-site features	Off-site features
1980 – 2000 (Late 20th century period)	 1995 1:1,250	
	By 1980 part of the eastern building is now a carpark, the Athenaeum remains in place.	No significant changes



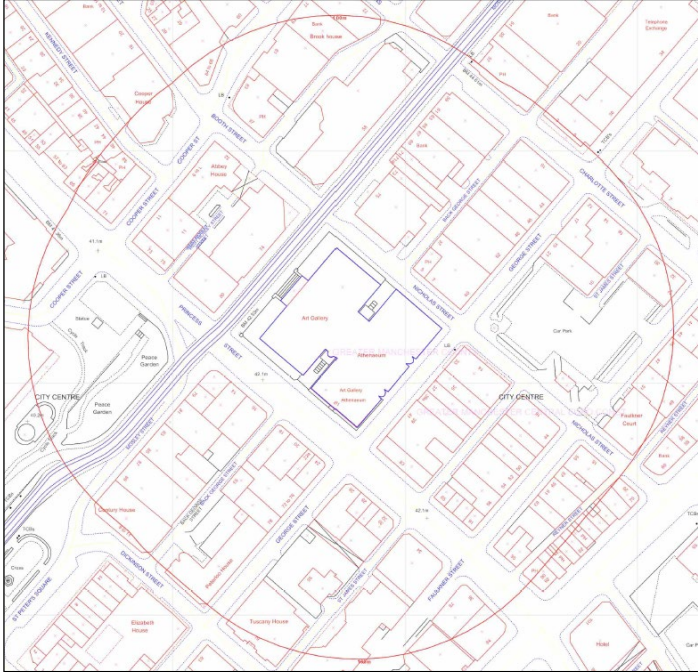
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	On-site features	Off-site features
2000 to 2020 (Modern day period)		• No significant changes
	• By 2003 the Athenaeum has expanded to cover the whole of the east of the site and the two buildings have been connected through Back George Street.	



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4. ENVIRONMENTAL SETTING

4.1. Geology

Table 4.1 Geological Summary.

Maps and publications referenced	Groundsure and British Geological Survey (BGS) Map viewer and GeoIndex (Onshore)
Made ground / artificial ground	The site isn't shown to be located within an area of artificial ground according to the Groundsure report. Given the history of development on the site, the presence of Made Ground is anticipated. Previous investigations, undertaken by Tier Environmental, encountered granular Made Ground generally comprised brown to blackish brown, sandy, fine to coarse angular to subangular gravel of mixed natural and anthropogenic lithologies, with a high cobble content of angular sandstone and brick or brown, gravelly to very gravelly fine to coarse sand with gravel being fine to coarse, angular of mixed natural and anthropogenic lithologies. Cohesive Made Ground was also encountered, comprising soft to firm, dark brown to black, slightly gravelly to gravelly, occasionally very sandy clay. Gravel was fine to coarse, angular to subangular of mixed natural and anthropogenic lithologies. Superficial deposits of Till were encountered from minimum depths between 1.30m and a proven 3.20m bgl. Comprising soft to stiff, brown, slightly gravelly, slightly sandy clay. Sand was fine to medium, and gravel was fine to medium, angular to subrounded of mudstone, sandstone, and quartz.
Drift geology	Till (Clay)
Solid geology	Chester Pebble Beds Formation (Sandstone)
Dip of solid strata	Not determined.
Faults	On site (inferred) running northwest-southeast
Coal seams	None shown to outcrop or subcrop on or in the immediate vicinity of the site.

4.2. Mining and Quarrying

Table 4.2 Coal Mining Activities.

	Yes/No	Comments
Is the site in an area of potential shallow coal workings?	Yes	The site is located within a coal mining area as defined by the Coal Authority. Further review of coal mining records does not show the site to be directly impacted by shallow coal mining.
Is the site in a high risk development area?	No	
Are there any known shafts, adits, tips, lagoons, or opencast workings likely to affect the site?	No	
Is exploratory work required to investigate the potential risk from shallow mining or quarrying?	No	



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Table 4.3 Other Extractive Industries.

	Yes/No	Comments
Superficial drift deposits		
Evidence of extraction on or within 250 m of the site?	No	Source: Groundsure Report
Action required?	No	
Solid Strata		
Any evidence of mineral extraction on or within 250 m of the site?	No	Source: Groundsure Report
Action required?	No	

Other, undocumented mineral workings on or close to the site cannot be completely dismissed.

4.3. Hydrogeology

Table 4.4 Groundwater Occurrence and Abstraction.

	Presence/location	Comments
Environment Agency aquifer designation – Superficial Deposits	On site	Secondary Undifferentiated Aquifer
Environment Agency aquifer designation – Bedrock	On site	Principal Aquifer
Groundwater vulnerability	Superficial	Vulnerability: Low Aquifer type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge potential: Low
	Bedrock	Vulnerability: Low Aquifer type: Principal Flow mechanism: Well-connected fractures
Anticipated groundwater depth(s)	On site	Not determined
Direction of flow	On site	Not determined
Current licensed abstractions – potable	NR	Source: Groundsure Report
Current licensed abstractions – non-potable	740m NE	Dial House, Chapel Street Details: General cooling Start Date: 01/03/2007
Private wells	NR	Source: Groundsure Report
Source Protection Zones	NR	Source: Groundsure Report
Springs	NR	Source: Groundsure Report

NR - none recorded.

For definition of Source Protection Zones, see Appendix L.



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4.4. Hydrology

Table 4.5 Surface Water Features.

	Presence/location	Comments
Nearest surface water feature	NR	Source Groundsure
Other surface water features	NR	Source: Groundsure Report
Canals, ponds, lakes, etc.	NR	Source: Groundsure Report
Water Framework Directive (WFD) Surface Water Bodies	413m S	River Medlock Overall Rating: Moderate Chemical Rating: Fail Ecological Rating: Moderate
Licensed surface water abstractions	NR	Source: Groundsure Report
Surface run-off and site drainage	On site	The full nature and extent of underground drainage system is unknown at this stage.

NR - none recorded. Environment Agency GQA assessments: A = very good to E = poor

4.5. Flood Risk Summary

Table 4.6 below represents a summary of the flood risk data contained within the Groundsure report obtained for the site.

Table 4.6 Flood Risk Summary

	Presence/location	Comments
Risk of Flooding from Rivers and Sea (RoFRaS)	NR	Source: Groundsure Report
Historical Flood Events	NR	Source: Groundsure Report
Flood Defences	NR	Source: Groundsure Report
Areas Benefiting from Flood Defences	NR	Source: Groundsure Report
Flood Storage Areas	NR	Source: Groundsure Report
Records of Flood Zone 2	NR	Source: Groundsure Report
Records of Flood Zone 3	NR	Source: Groundsure Report
Surface water flooding	On site	Negligible
Groundwater flooding	Highest risk on site	Moderate

NR - none recorded.

4.6. Environmental Designations

Table 4.7 Summary of Environmental Designations.

	Presence/location	Comments
Sites of Special Scientific Interest (SSSI)	NR	Source: Groundsure Report



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	Presence/location	Comments
Conserved wetland sites (Ramsar sites)	NR	Source: Groundsure Report
Special Areas of Conservation (SAC)	NR	Source: Groundsure Report
Special Protection Areas (SPA)	NR	Source: Groundsure Report
National Nature Reserves (NNR)	NR	Source: Groundsure Report
Local Nature Reserves (LNR)	NR	Source: Groundsure Report
Designated Ancient Woodland	NR	Source: Groundsure Report
Biosphere Reserves	NR	Source: Groundsure Report
Forest Parks	NR	Source: Groundsure Report
Marine Conservation Zones	NR	Source: Groundsure Report
Green Belt	NR	Source: Groundsure Report
Proposed Ramsar sites	NR	Source: Groundsure Report
Possible Special Areas of Conservation (pSAC)	NR	Source: Groundsure Report
Potential Special Protection Areas (pSPA)	NR	Source: Groundsure Report
Nitrate Sensitive Areas	NR	Source: Groundsure Report
Nitrate Vulnerable Zones	NR	Source: Groundsure Report
SSSI Units	NR	Source: Groundsure Report

NR - none recorded.

4.7. Landfill and Waste Management Activity

Table 4.8 Waste Management Activities.

	Presence/location	Comments
Active or recent landfill	NR	Source: Groundsure Report
Historical landfill (BGS records)	NR	Source: Groundsure Report
Historical landfill (LA/mapping records)	NR	Source: Groundsure Report
Historical landfill (EA/NRW records)	NR	Source: Groundsure Report
Historical waste sites	NR	Source: Groundsure Report
Licensed waste sites	NR	Source: Groundsure Report
Waste exemptions	117m SW	New Build Construction Works Use of waste in construction, screening and blending of waste
	215m N	11 York Street Use of waste in construction, screening and blending of waste
	222m SW	Oxford House Sorted and de-naturing of controlled drugs for disposal



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	Presence/location	Comments
Evidence of other landfilling or potential infilling on or within 250m of site	NR	
Walkover evidence of fly-tipping on site?	On site	No
Is a landfill/ground gas risk assessment required?	Yes	Anticipated Made Ground across site in line with the site history.

NR - none recorded.

4.8. Local Industrial Land Uses

Other potentially contaminative activities are shown in Table 4.9 below with those features considered pertinent to the conceptual site model highlighted in **bold**. The entries relate to activities within *circa* 250 m of the site, with the exception of COMAH facilities where the assessment is extended to a distance of *circa* 500m from the site.

Table 4.9 Other Potentially Contaminative Processes in the Locality

	Location	Comments
Recent industrial land uses	51m S, 87m S	Electricity Substation
	63m SE, 174m E	Scrap Metal Merchants
	63m NE	Vehicle Repair, Testing and Servicing
	73m NE	Electrical Motors and Generators
	73m NE, 78m NE, 176m NE 246m NW	Medical Equipment and Pharmaceuticals
	73m NE	Workwear
	73m NE, 153m N, 155m S, 171m NE, 172m NE, 204m SW, 228m NW, 232m SW, 246m NW	Industrial/Civil Engineers
	84m SW	Tram, Metro and Light Railway Infrastructure
	109m E, 153m N, 246m NW	Published Goods
	126m NW	Food and Beverage Industry Machinery
	153m N, 156m NE	Special Purpose Machinery
	153m N	Air and Water Filtration
	175m E	Distribution and Haulage
	179m E	Colour, Chemicals and Water Softeners
	196m E	Telecommunications Equipment
	104m SW	Pest Control
	204m SW	Office Equipment
	206m SW	Cooling and refrigeration
	219m NE	Vehicle Hire
	220m NE	Waste Collection and Disposal
	243m S	Sand, Gravel and Clay Extraction and Merchants
Current or recent petrol stations	NR	Source: Groundsure Report
Electricity cables	NR	Source: Groundsure Report
Gas pipelines	NR	Source: Groundsure Report



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	Location	Comments
Tunnels	On site	Information on https://hidden-manchester.org.uk/ indicates that the site is underlain by The Guardian Underground Telephone Exchange (GUTE) also known as 'Scheme 567' is a 1950s nuclear-hardened facility designed to safeguard cold war communications, although the precise depth to this feature remains unknown.
Sites determined as Contaminated Land	NR	Source: Groundsure Report
Control of Major Accident Hazards (COMAH)	NR	Source: Groundsure Report
Regulated explosive sites	NR	Source: Groundsure Report
Hazardous substance storage/usage	NR	Source: Groundsure Report
Historical licensed industrial activities (IPC)	NR	Source: Groundsure Report
Licensed industrial activities (Part A(1))	NR	Source: Groundsure Report
Licensed pollutant release (Part A(2)/B)	214m SW	The Laundry Shop, Peter House Process: Dry Cleaning Comment: No Enforcement
Radioactive Substance Authorisations	NR	Source: Groundsure Report
Licensed Discharges to controlled waters	NR	Source: Groundsure Report
Pollutant release to surface waters (Red List)	NR	Source: Groundsure Report
Pollutant release to public sewer	NR	Source: Groundsure Report
List 1 Dangerous Substances	NR	Source: Groundsure Report
List 2 Dangerous Substances	NR	Source: Groundsure Report
Pollution Incidents (EA/NRW)	NR	Source: Groundsure Report
Pollution inventory substances	NR	Source: Groundsure Report
Pollution inventory waste transfers	NR	Source: Groundsure Report
Pollution inventory radioactive waste	NR	Source: Groundsure Report

NR - none recorded.

COMAH – Control of Major Accident Hazards (regulations); NIHHS – Notification of Installations Handling Hazardous Substances (regulations)

4.9. Radon Risk

Table 4.10 Radon Risk Status.

	Comments
Estimated properties affected	Less than 1% of properties above the Action Level.
Radon Protection Measures required?	No basic radon protection measures are required.



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5. PREVIOUS INVESTIGATION FINDINGS

Tier Environmental have previously completed the following reports for the site:

- A Technical Note for Testing of Subsoil for New Floor Slab, Manchester Art Gallery (Ref: TE1764-TE-00-XX-TN-GE-001-V01, dated September 2023)
- A Technical Note for Assessment of Ground Conditions for Erection of Temporary External Scaffolding, Manchester Art Gallery (Ref: TE1764-TE-00-XX-TN-GE-002-V02, dated September 2023)

Table 5.1 Report Review Summary

Background	Tier Environmental were instructed by Robertson North West to complete sampling of the subsoil for waste characterisation and disposal route determination, in addition to assessing the soil strengths for a new floor slab.
Fieldwork	Fieldworks took place on 6th July 2023 supervised by a suitability qualified Geoenvironmental Engineer from Tier Environmental., and comprised the following: • 5 No. Dynamic Cone Penetrometer Tests • 1 No. Light Weight Deflectometer Test • 5 No. soil samples from pre excavated trial holes
Floor Slab Conclusions	• Due to very limited access restrictions, light weight deflectometer (LWD) testing was completed in only 1 No. location on the exposed Made Ground surface, where access was suitable for the 300mm diameter plate. Values of S/V (degree of compaction) and E_{vd} (dynamic modulus of deformation) have been calculated by proprietary software provide by Zorn, the equipment manufacturer. Values of CBR and E_{v2} (static deflection modulus) are derived from correlations also provide by Zorn. Dynamic Cone Penetrometer tests were completed from the base of each trial hole to provide CBR values however due to the limited access for the LWD kit, correlation was not possible in this instance. • Results from the LWD testing can be correlated to bearing capacity by using the recorded deformation. • A measured average deformation of 1.364mm was recorded for an applied pressure of 100kN/m². It is anticipated that the proposed floor slab will not impart a greater load than circa 15kN/m² and as such any additional loading to the sleeper walls is unlikely to result in additional settlement beyond tolerable limits.
Recommendations	Based on this single result, it would appear that a ground bearing slab may be suitable, but we would recommend the following: • Further widespread testing (including DCPs, hand augering and shear vanes) given the likely variability in the Made Ground. This could be completed once the wooden flooring is removed. • Compacting the existing Made Ground with a wacker plate or similar to reduce settlements; • If ground levels are to be raised, the placement and compaction of Type 1 granular fill (or similar) to provide a more robust founding layer; and, • The masonry sleeper walls may require breaking down to prevent any hard spots that could result in unacceptable differential settlement and subsequent cracking of the floor slab. In addition, the installation of a geogrid to span across the broken-down sleeper walls may be prudent to again minimise any unacceptable differential settlements.
Preliminary Waste Characterisation	Of 5No. samples tested; the majority of samples were determined to be non-hazardous with the exception of P05 at 0.30m which was hazardous for chromate compounds. WAC testing determined this sample may require pre-treatment prior to disposal to a Hazardous landfill due to Loss on ignition in excess of the hazardous landfill threshold. The results of further WAC testing concluded the samples at TP01 at 0.40m bgl and TP03 at 0.25m bgl should be disposed of to a Non-hazardous landfill due to Total Dissolved Solids and Sulphate as SO₄ in excess of inert landfill threshold. Of the 5 No. samples submitted for asbestos screening, 2 No, returned positive for chrysotile and amosite fibre bundles at <0.001% w/w and ACM Bitumen products at <0.001% w/w.



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Table 5.2 Report Review Summary

Background	Tier Environmental were instructed by Robertson North West to complete testing of the subsoil to determine a bearing for proposed scaffolding bases.
Fieldwork	Fieldworks took place on 31st August and 1st September 2023 supervised by a suitability qualified Geoenvironmental Engineer from Tier Environmental, and comprised the following: 3 No. window sample boreholes by means of a demountable rig to depths of 4.45-5.45m bgl, to determine shallow ground conditions and enable in-situ Standard Penetrometer Testing and geotechnical samples; - A series of Schmidt hammer tests within areas of sandstone plinths.
Ground conditions	- Sandstone paving slabs were present at the surface of all window sample locations to maximum depths between 0.07m and 0.09m bgl. - Made Ground was encountered beneath the sandstone slabs in all locations to maximum depths between 1.30m bgl and 3.20m bgl, comprising both granular and cohesive soils. - Granular Made Ground generally comprised brown to blackish brown, sandy, fine to coarse angular to subangular gravel of mixed natural and anthropogenic lithologies, with a high cobble content of angular sandstone and brick OR brown, gravelly to very gravelly fine to coarse sand with gravel being fine to coarse, angular of mixed natural and anthropogenic lithologies. - Cohesive Made Ground comprised soft to firm, dark brown to black, slightly gravelly to gravelly, occasionally very sandy clay. Gravel was fine to coarse, angular to subangular of mixed natural and anthropogenic lithologies. - Superficial deposits of Till were encountered in all locations from minimum depths between 1.30m to 3.20m bgl to the base of the boreholes comprising soft to stiff, brown, slightly gravelly, slightly sandy clay. Sand was fine to medium, and gravel was fine to medium, angular to subrounded of mudstone, sandstone, and quartz.
Foundations and floor slab recommendations	In total, 3 No. Atterberg Limit Tests were performed on samples of identified cohesive Made Ground soil. All samples returned results which confirm that the material is clay. Standard Penetration Tests were conducted in all boreholes with SPT N values within the Made Ground strata ranging from N=2 to N=6, and SPT N values within the Till stratum ranging from N=2 to N=39. SPT results at 1.20m bgl across the site recorded N=2-4 indicating generally very soft or very loose Made Ground soils. Based on the above it is likely these shallow Made Ground soils could provide 15kN/m², however given the low strength and variable nature of these soils, spreader plates would be required to mitigate against punching shear should scaffold bases be placed directly onto shallow Made Ground soils. It is understood therefore that proposed scaffolding will likely be emplaced on existing flagstones. Suitable spreader plates should still be utilised to distribute the load to minimise damage to these listed slabs should any of the Made Ground settle.
Ground Gas Potential	Total Organic Carbon testing was conducted on WS02 at 1.20m bgl and WS03 at 3.00m bgl. WS02 at 1.20m bgl has an organic matter content of 2.3%, and WS03 at 3.00m bgl has an organic matter content of 3.6%, which translate to a total organic matter content of 1.35% and 2.09%.



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6. PRELIMINARY CONCEPTUAL SITE MODEL

Based on the information provided in the previous sections of this report a combined preliminary conceptual site model and conceptual exposure model has been developed for the proposed future land use. This summarises the understanding of surface and sub-surface features, the potential contaminant sources, transport pathways and receptors. In assessing the likely contaminants of concern present at the site, reference has also been made to Defra and Environment Agency supporting documentation. A preliminary qualitative risk assessment has also been made of the likelihood of the linkage operating and its potential significance in accordance with CIRIA C552.

The potential pollutant linkages identified and the qualitative risk assessment for these are presented in Table 6.1 below. The terms used in the preliminary qualitative risk assessment are defined in Appendix J.

6.1. Uncertainties

The following uncertainties exist in the preliminary conceptual model:

- The presence of any features unrecorded by the historic maps.
- Any unrecorded geological features.
- Any unrecorded pollution events during the site's history.



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Table 6.1 Preliminary Assessment of Potential Pollutant Linkages (Continued on Next Page).

Justification / Comments
• The site is situated within the basement of the existing Manchester Art Gallery. Under current proposals the site is to be developed with a ground bearing concrete floor slab in order to increase storage area. • Earliest mapping from 1851 shows the site to comprise two buildings bisected by Back George Street with the Manchester Royal Institution to the west and The Athenaeum to the east. These buildings were joined in 2003 and the Athenaeum was incorporated into the Manchester Art Gallery. The surrounding site area comprises multiple buildings forming Manchester city centre with mixed residential and commercial use with no pertinent features or changes. Information on https://hidden-manchester.org.uk/ indicates that the site is underlain by The Guardian Underground Telephone Exchange (GUTE) also known as 'Scheme 567' is a 1950s nuclear-hardened facility designed to safeguard cold war communications, although the precise depth to this feature remains unknown. • The site is not shown to be in an area of artificial/Made Ground but given the site history, the presence of Made Ground is expected. The site is shown to be underlain by superficial deposits of Devensian Till (Secondary Undifferentiated) with underlying bedrock of the Chester Pebble Beds Formation – Sandstone (Principal Aquifer). • The site is not situated within a source protection zone and there are no potable or non-potable water abstractions within 250m of site. There are no nearby surface water features. • There are no recorded nearby historic or active landfills. The residual radon is <1% of properties being affected, for which no protection measures are required. • It is anticipated that any contamination will be from on-site Made Ground. • The site is not located within an ecologically sensitive area.



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Source	Potential Contaminants of Concern	Pathway	Receptor	Consequence	Probability	Qualitative Risk Assessment
'Anticipated widespread Made Ground'	Metals PAHs pH Hexavalent chromium	Direct contact, dust inhalation and ingestion	Future site users (commercial)	Medium	Unlikely	Low Risk
			Adjacent site users (commercial)	Medium	Unlikely	Low Risk
			Construction, site investigation, demolition and future maintenance workers	Medium	Unlikely	Low Risk
		Migration of mobile contaminants from Made Ground soils to adjacent sites along services and conduits	Adjacent site users (commercial)	Medium	Unlikely	Low Risk
		Migration via water pipes	Future site users (commercial)	Medium	Unlikely	Low Risk
		Lateral and/or vertical migration of mobile contaminants.	Aquifer 1 - Secondary (Undifferentiated) Aquifer associated with Devensian Till, superficial deposits.	Medium	Low Likelihood	Moderate / Low Risk
			Aquifer 2 - Principal Aquifer associated with the Chester Formation – Sandstone, Bedrock.	Severe	Unlikely	Moderate / Low Risk
	Naphthalene (a semi-volatile PAH) TPH / BTEX / MTBE VOCs / SVOCs Phenols	Vapour inhalation, direct contact, dust inhalation and ingestion	Future site users (commercial)	Medium	Unlikely	Low Risk
			Adjacent site users (commercial)	Medium	Unlikely	Low Risk
			Construction, site investigation, demolition and future maintenance workers	Medium	Unlikely	Low Risk
		Migration of mobile contaminants from Made Ground soils to adjacent sites along services and conduits	Adjacent site users (commercial)	Medium	Unlikely	Low Risk
		Migration via water pipes	Future site users (commercial)	Medium	Unlikely	Low Risk
		Lateral and/or vertical migration of mobile contaminants.	Aquifer 1 - Secondary (Undifferentiated) Aquifer associated with Devensian Till, superficial deposits.	Medium	Low Likelihood	Moderate / Low Risk
			Aquifer 2 - Principal Aquifer associated with bedrock of the Chester Formation – Sandstone.	Severe	Unlikely	Moderate / Low Risk
	Asbestos	(Dust migration and) dust inhalation	Future site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Adjacent site users (commercial)	Severe	Low Likelihood	Moderate Risk
			Construction, site investigation, demolition and future maintenance workers	Severe	Low Likelihood	Moderate Risk
Made Ground located beneath the site.	Hazardous ground gasses (methane, carbon dioxide, hydrogen sulphide, carbon monoxide and depleted oxygen)	Inhalation (indoor and outdoor)	Future site users (commercial)	Medium	Unlikely	Low Risk
			Adjacent site users (commercial)	Medium	Unlikely	Low Risk
			Construction, site investigation, demolition and future maintenance workers	Medium	Unlikely	Low Risk
		Migration of hazardous ground gases from beneath the site to adjacent sites along services or other preferential conduits	Adjacent site users (commercial)	Medium	Unlikely	Low Risk
		Migration of ground gas / explosion	Buildings and services	Severe	Unlikely	Moderate / Low Risk

For definition of the terms used in the qualitative risk assessment, please see Appendix J.



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7. FIELDWORK

The information contained in this report is limited to areas of land accessible during the ground investigation within the site boundary, as indicated on the site plan, presented in Appendix A as Drawing No. TE1764-TE-XX-GE-DR-001-V01.

Tier Environmental scoped the intrusive ground investigation using guidance presented in:

- BS 10175:2011+A2:2017;
- Land Contamination Risk Management (LCRM) - <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>;
- BS 5930:2015+A1:2020;
- BS EN 1997:2004 and 2007.

Tier Environmental's standard strata description criteria are compliant with the above guidance.

7.1. Scope of Ground Investigation

The ground investigation was conducted on the 4th January 2024 and was supervised by a suitably qualified Tier Environmental engineer. Table 7.1 below provides a summary of the exploratory holes completed and rationale. Exploratory hole locations are presented on Drawing No. TE1764-TE-XX-GE-DR-002-V01 (July 2023) and TE1764-TE-XX-GE-DR-005-V01 (January 2024)

This part of the ground investigation followed a previous Tier Environmental investigation at the Manchester Art Gallery site on behalf of Roberston North West. The previous investigation comprised of chemical sampling and in-situ testing of subsoil within the area of proposed reduced dig and new floor slab. This investigation took place on the 6th July 2023. For the purpose of this report, the respective chemical and geotechnical results have been included in any conclusions.

Table 7.1 Scope of Ground Investigation and Rationale

Exploratory Hole Type	Exploratory Hole Reference	Exploratory Hole Depths (m bgl)	Rationale
Hand Augured Boreholes	HDP101 to HDP105	0.75m to 3.00m	To confirm the shallow ground conditions across the site, conduct <i>in situ</i> geotechnical tests (Pocket Penetrometer), facilitate soil sampling geoenvironmental parameters and installation of gas/groundwater monitoring wells.

The following constraints were identified during the ground investigation works:

- Constrained to areas of previously removed floorboards, undertaken by the client.

Table 7.2 Scope of Monitoring Installations

Exploratory Hole Location	Strata Targeted	Slotted Response Zone (m bgl)	Rationale
HDP101	Made Ground and Till	0.50m to 3.00m	Targeting shallow ground gas Made Ground source



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Exploratory Hole Location	Strata Targeted	Slotted Response Zone (m bgl)	Rationale
HDP102	Till	1.00m to 2.00m	Targeting shallow ground gas source
HDP105	Made Ground and Till	0.50m to 1.00m	Targeting shallow ground gas Made Ground source

Depths and accurate descriptions of strata and groundwater observations made during investigation works, together with details of the samples recovered, are presented on the Engineer's exploratory hole records in Appendix B.

7.2. Geoenvironmental Testing

Sampling and QA/QC protocols are presented in Appendix N. Tier Environmental's schedule of chemical laboratory testing is presented in Table 7.3.. The testing was carried out by Element Materials Technology, a UKAS and MCerts (where appropriate for soils analysis) accredited laboratory.

Human Health and Preliminary Waste Classification Laboratory Testing

Based upon the conclusions of the preliminary risk assessment, Tier Environmental scheduled chemical laboratory testing on selected soil samples. The purpose of the testing was to:

- Determine the concentration and spatial distribution of potential contaminants of concern in the Made Ground;
- Determine the chemical composition and properties of the shallow natural soils;
- Undertake a *preliminary* soils waste classification and waste disposal route determination.

Table 7.3 Schedule of Chemical Testing for Human Health Risk Assessment and Preliminary Waste Soils Assessment (Including the previous investigation undertaken in July 2023)

Laboratory analysis	Made Ground POPULATION 1
Tier Environmental soil suite*	9
Asbestos screen	9
Speciated TPH / BTEX / MTBE	7
VOCs / SVOCs	2
Total, free and complex cyanides	
Waste Acceptance Criteria (WAC)	3

*For definition of Tier Environmental analytical suites, please see Appendix N. NA - not applicable.



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8. GROUND CONDITIONS

The following section provides a summary of the ground conditions encountered during the ground investigation including strata profile, obstructions and visual / olfactory evidence of contamination. Exploratory hole logs are provided in Appendix B.

Photographs of ground investigation works are provided in Appendix F.

8.1. Strata Descriptions

Made Ground – Wooden Flooring

Wooden Flooring (lifted prior to site works)	
Locations encountered	HDP101 to 105
Depths encountered from top of stratum (range)	Ground level to 0.45m bgl
Depths encountered to base of stratum (range)	0.10m to 0.45m bgl
Thickness (range)	0.10m to 0.45m
Spatial location on site	Entire site area

Made Ground – VOID

Locations encountered	HDP101 to 105
Depths encountered from top of stratum (range)	0.10 to 0.45m bgl
Depths encountered to base of stratum (range)	0.30 to 0.75m bgl
Thickness (range)	0.10 to 0.60m
Spatial location on site	Entire site area
General description	Sub-floor void

Made Ground – MG1

Locations encountered	HDP101 to 105
Depths encountered from top of stratum (range)	0.30 to 0.80m bgl
Depths encountered to base of stratum (range)	0.60 to 1.60m bgl
Thickness (range)	0.20 to 1.05m
Spatial location on site	Entire site area
General description	Dark brown gravelly Sand and Clay. Gravel of brick and concrete with a medium proportion of ash.



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Made Ground – MG2

Locations encountered	HDP101
Depth encountered from top of stratum	0.75m bgl
Depth encountered to base of stratum	0.80m bgl
Thickness	0.05m
Spatial location on site	Western corner
General description	Concrete screed

Drift Deposits – DD1

Cohesive Till	
Locations encountered	HDP101, 102 and 105
Depths encountered from top of stratum (range)	0.60 to 1.00m bgl
Depths encountered to base of stratum (range)	2.1 to 3.0m bgl
Thickness (range)	1.5 to 2.0m
Spatial location on site	Widespread across site
General description	Dark brown gravelly, sandy Clay

8.2. Obstructions

The following potential obstructions were encountered during the ground investigation works.

Table 8.1 Obstructions Summary Table

Exploratory Hole Location	Location on Site	Depths recorded from (m bgl)	Depth of Base of Feature (m bgl)	General description and comments
HDP103	Central	1.60 – 1.70	N/A	Hand dug pit terminated on suspected concrete cobbles. Base not proven.
HDP104	Northeast	0.65 – 0.75	N/A	Hand dug pit terminated on suspected concrete cobbles. Base not proven.

8.3. Visual and Olfactory Evidence of Contamination

No visual and/or olfactory evidence of contamination was noted during the Tier Environmental investigation.

8.4. Groundwater Observations During Fieldwork

No groundwater observations were recorded during the fieldworks.



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8.5. Groundwater Monitoring

No groundwater observations were made during any of the 4 No. groundwater monitoring visits.



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9. PRELIMINARY GEOTECHNICAL ASSESSMENT

9.1. Determination of pH and Water-Soluble Sulphate

Consideration of Chloride and Nitrate

In accordance with BRE SD1 for ground suspected of containing mineral acids of industrial origin, a determination must be made as to whether Chloride (Cl) and Nitrate (NO₃) need to be analysed. In the event that they do, and elevated concentrations of Cl and NO₃ are reported, this may indicate that hydrochloric and nitric acids (HCl and HNO₃) are present. The effect of these acids on concrete is likely to be similar to that of sulfuric acid; so, for classification purposes, their chemically equivalent sulphate concentration should be calculated and added to any actual soluble sulphate present (as SO₄ mg/l) in the respective samples: SO₄ equivalent of Cl = Cl x 1.35 mg/l SO₄ equivalent of NO₃ = NO₃ x 0.77 mg/l.

Firstly, a determination has been made as to whether a significant number of reported pH values are lower than pH 5.5. If they are, then amounts of chloride and nitrate (NO₃) should also be determined (in mg/l) in addition to sulphate content.

The conclusion of this assessment is that a significant number of pH values are not lower than pH 5.5 and so no further consideration of Chloride (Cl) and Nitrate (NO₃) needs to be conducted.

Design Sulphate Classification

Representative samples of the soils encountered during the Tier Environmental ground investigations, were tested to determine their pH and concentrations of water-soluble sulphate (SO₄²⁻). The results are presented in Appendix C and summarised in Table 9.1 below. It is assumed that the site is a 'brownfield' site, and the groundwater is 'mobile' in accordance with BRE SD1.

The conclusion of the assessment is that a DS-3 and ACEC Class AC-3 is appropriate for buried concrete design purposes, with due consideration of the sub-sections above (which include consideration of chloride, nitrate, magnesium and potential for sulphide bearing (e.g. pyritic) ground).

Whilst no evidence of gross hydrocarbon contamination has been observed at the site, it is a concrete specialist should review the TPH results and ground conditions summary within this report to ensure appropriate concrete design against retardation / degradation due to hydrocarbons.

Table 9.1 Results of Soil pH Testing and Water-Soluble Sulphate Determination

Exploratory Hole Location	Depth (m bgl)	pH	Water-soluble sulphate (mg/l)	Design sulphate class	ACEC sulphate class
MADE GROUND					
TP01	0.40	8.05	1419.9	Total No. of samples is <10, so the average of highest two results rounded to the nearest 100mg/l are used as the Characteristic Value: =1800mg/l = DS-3	Total No. of samples is >5 so the mean of lowest 20% results is used as the Characteristic Value: = 7.69 = AC-3
TP02	0.50	8.00	891		
TP03	0.25	7.70	1357.1		
TP04	0.35	7.68	1425.4		
TP05	0.30	8.31	2157.2		
HDP101	0.50	8.66	51.3		
HDP102	0.80	8.75	95.8		
HDP103	0.75	7.84	1465.3		
HDP105	0.50	7.93	1465.2		

ACEC - Aggressive Chemical Environment for Concrete (see BRE, 2005).



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9.2. Geotechnical Parameters

Shear Strength Parameters

Hand Shear Vane (HSV) testing was used, in situ, on the clay rich Till deposits, during the investigation in January 2024. The testing obtains an undrained shear strength value. The results are summarised in the table below.

Location ID	Depth (m bgl)	Residual result (kPa)
HDP101	1.0	62
	1.5	82
	2.2	88
HDP102	2.8	90
	1.25	50
	1.71	82
HDP103	2.21	64
	2.25	104
	1.0	54
HDP105	1.5	58
	1.0	84
	1.5	105

Additionally, pocket penetrometer (PP) testing was used in 2 No. locations during the investigation in July 2023. The results can be used to obtain an equivalent undrained shear strength using the formula:

$$\text{Equivalent } C_u = (X * \text{Kg/cm}^2 \times 98.1 \text{ kPa}) / 2$$

*Where X is pocket penetrometer results in cm²

A summary of these results can be seen in xxx below.

Table 9.2 Summary of Pocket Penetrometer results

Location	Material Type	Depth (m bgl)	Average Pocket Penetrometer Value (across 3 No. readings) (cm ²)	Equivalent shear strength C_u (kPa)
TP01	Clay rich Till	0.75	2.83	138
TP02	Clay rich Till	0.75	3.73	183

The test results show a reasonable variation but also some general increase with depth. Results ranged from 50kPa to 183kPa, indicative of medium to very high strength soils.



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9.3. Floors

Across the two site investigations, a number of in situ geotechnical testing methods were used in order to aid floor/slab design.

Dynamic Cone Penetrometer (DCP) testing has taken place across both set of site works. Equivalent CBR% values have been determined at approximate depth levels. Full results have been included in Appendix D and are summarised in Table 9.3. It must be noted that these are only an initial CBR value and should not be counted upon for final designs.

Table 9.3 Summary of Dynamic Cone Penetrometer testing and equivalent CBRs%

Location	Depth (mm bgl)	Approximate equivalent CBR%
Tier Environmental Investigation, dated 6th July 2023		
Test 01	~500	21
	Base	44
Test 02	~750	7
	Base	5909
Test 03	~750	15
	Base	38
Test 04	~500	102
	Base	9070
Test 05	~250	3
	~500	3
	Base	154
Tier Environmental Investigation, dated 4th January 2024		
DCP101 at HDP101	~250	15.90
	~500	6.78
	Base	6.80
DCP102 at HDP102	~250	23.85
	~500	9.62
	Base	8.15
DCP103 at HDP103	~250	5.33
	~500	12.06
	Base	3.18
DCP104 at HDP104	~250	16.22
	Base	3294
DCP105 at HDP105	~250	5.59
	~500	40.78
	Base	25.57

In addition to the DCPs, during the Tier Environmental investigation in July 2023, a light weight deflectometer (LWD) test was completed in 1 No. location due to very limited access restrictions on the exposed Made Ground surface, where access was suitable for the 300mm diameter plate. Values of S/V (degree of compaction) and E_{vd} (dynamic modulus of deformation) have been calculated by proprietary software provide by Zorn, the equipment manufacturer. Values of CBR and E_{v2} (static deflection modulus) are derived from correlations also provide by Zorn.



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Results from the LWD testing can be correlated to bearing capacity by using the recorded deformation.

A measured average deformation of 1.364mm was recorded for an applied pressure of 100kN/m². It is anticipated that the proposed floor slab will not impart a greater load than circa 15kN/m² and as such any additional loading to the sleeper walls is unlikely to result in additional settlement beyond tolerable limits.

Based on this result, as well the HSV/PP/DCP obtained results, it would appear that a ground bearing slab may be suitable, but we would recommend the following:

- Compacting the existing Made Ground with a wacker plate or similar to reduce settlements;
- If ground levels are to be raised, the placement and compaction of Type 1 granular fill (or similar) to provide a more robust founding layer; and,
- The masonry sleeper walls may require breaking down to prevent any hard spots that could result in unacceptable differential settlement and subsequent cracking of the floor slab. In addition, the installation of a geogrid to span across the broken-down sleeper walls may be prudent to again minimise any unacceptable differential settlements.

9.4. Groundworks, Excavation Stability and Groundwater Dewatering

In our opinion, there should be no particular difficulties in excavating the strata indicated in the boreholes utilising an appropriate and suitably sized mechanical excavator. Excavations into existing Made Ground and the underlying natural soils should be assumed to be unstable. No man entry into unsupported excavations should be allowed without an appropriate risk assessment. Reference to CIRIA report 097 (1983) should be made to establish suitable means of support or battering of excavation sides.

It is recommended that all excavations to greater than 1.20 metres depth, or for shallower excavations where groundwater is encountered above this level are closely supported, especially where man entry is required. Alternatively, where space permits, the excavations might be battered back to an appropriate angle. Should groundwater seepages occur, and water accumulate in shallow excavations it should be able to be removed by pumping from a filtered sump. However, groundwater control by more robust means, such as well pointing, may be required locally.



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10. HUMAN HEALTH RISK ASSESSMENT

Results of chemical analysis are presented in full in Appendix C

10.1. Data Interpretation Approach

The analytical data obtained were reviewed for completeness and consistency. The data for each sample type was then compiled, screened against the Generic Assessment Criteria (GACs) for a commercial land use and those potential contaminants of concern which were found to exceed the GACs were then subjected to detailed analysis as described below.

Previously, it was possible for results from soil (and leachate) samples to be subject to statistical assessment in accordance with a 2008 guidance document (CL:AIRE / CIEH Guidance on Comparing Soil Contamination Data with a Critical Concentration). This guidance has now been withdrawn and replaced with the following document:

- Professional Guidance: Comparing Soil Contamination Data with a Critical Concentration (CL:AIRE 2020)

The purpose behind statistical assessment is ultimately to determine whether concentrations of contaminants are at levels that present potential risk to the future site users (and the wider environment if the statistical assessment is conducted on leachate test results).

The new guidance places even greater emphasis and reliance on the desk study being carried out first, appropriately detailed sampling strategies, collection and testing of samples for contamination and use of appropriate screening criteria.

The guidance requires an increased number of criteria to be met before a robust statistical assessment can be conducted and introduces the principle of the Central Limit Theorem (CLT); a key tool of statistics that is used in the comparison of confidence intervals with the critical concentration. A common 'rule of thumb' is that the CLT will apply provided your sample size is between 20 and 50.

On this basis, Tier Environmental considers that statistical assessment in accordance with the CL:AIRE 2020 guidance may not be applied in this instance given that the number of samples obtained is below 20 No. for any given identified soil population.

Due consideration of the ground conditions, distinct identifiable populations of soil and proposed development layout has been undertaken and, where appropriate, laboratory results associated with discrete populations or 'hotspots' have been assessed separately.

10.2. Selection of Generic Assessment Criteria (GAC)

In short, for the majority of the contaminants of concern, LQM/CIEH Suitable 4 Use Levels (S4ULs) published in 2015 have been adopted as GACs for a commercial land use; however, further details on the hierarchical approach for the selection of the GACs used as screening criteria for this assessment is provided in Appendix K.

These values are considered as appropriate screening criteria as they incorporate updated assumption exposures derived for the production of C4SLs but within the context of deriving screening criteria above which assessment of the risks or remedial action may be needed (i.e. within the context of the planning regime rather than Part 2A context for which C4SLs were derived).

For those potential contaminants of concern where the selected GAC is dependent on Soil Organic Matter content (SOM), an assumed SOM of 1% has been selected based on the reported Total Organic Carbon (TOC) concentrations (which have been converted to SOM by dividing by a conversion



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factor of 0.58). It should be noted; however, that for any soil samples where the TOC may be artificially driven by the presence of petroleum hydrocarbons, that these TOC results have been removed from the data set when determining an appropriate characteristic SOM. For this purpose, Tier Environmental have notionally considered that any TOC results from soil samples where the measured total TPH concentration exceeds 500mg/kg should be removed.

10.3. Human Health Risk Assessment

Measured concentrations of the following contaminants of concern have been reported in excess of the respective GACs:



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Table 10.1 Measured Concentrations of Potential Contaminants of Concern Reported in Excess of the Respective GACs

Contaminant of Concern	Exploratory Hole Location	Depth (m bgl)	Soil Population	Units	Measured Concentration	GAC	Comments
Metals							
Lead	TP05	0.30	MG1	mg/kg	3774	2330	Spatially within the eastern corner of site.



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Localised Impacts

Measured localised concentrations of Lead have been reported in excess of the GAC protective of human health for a commercial/industrial land use. Tier Environmental have reviewed the exploratory hole logs to confirm that the soil type at this location is a Made Ground, described as a sand with a gravel of concrete, brick and sandstone. In line with the proposed development the location where the lead exceedance has occurred will be situated beneath a concrete slab. It is thus considered that this will ultimately mitigate any risk the lead exceedance could otherwise pose via the direct contact, dust inhalation or ingestion pathways.

Measured Potential Contaminant of Concern Concentrations without Publicly Available GACs

Table 10.2 summarises the measured concentrations of potential contaminants of concern have been reported in excess of the laboratory method detection limit for which there are no current publicly available GACs and provides qualitative commentary / discussion as to whether they may represent a potential risk to human health with due consideration of the Conceptual Site Model.



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Table 10.2 Measured Concentrations of Potential Contaminants of Concern Reported in Excess of the Laboratory Method Detection Limit

Contaminant of Concern	Exploratory Hole Location	Depth (m bgl)	Soil Population	Units	Measured Concentration	Comments
PAHs						
Coronene	TP01	0.40	MG1	mg/kg	0.05	No publicly available GAC for coronene. However, the available GACs for PAHs act as marker compounds for the remaining PAHs (including coronene). As such, it is not considered that the reported concentration of coronene present a potential risk to the end user.
	TP03	0.25	MG1		0.07	
	TP05	0.30	MG1		0.47	
VOCs/SVOCs						
1,3,5-Trimethylbenzene	HDP101	0.50	MG1	mg/kg	0.011	No publicly available UK-based GAC available. However, assessment of risk from VOC has been made against publicly available GAC. As such, it is not considered that the reported concentrations of 1,3,5-Trimethylbenzene represent a potential risk to the end-user).
2-Methylnaphthalene	HDP101	0.50	MG1		1.307	No publicly available UK-based GAC available. However, assessment of risk from PAHs (including naphthalene) has been made against publicly available GAC. As such, it is not considered that the reported concentrations of PAHs (including 2- Methylphthalene represent a potential risk to the end-user).
Carbazole	HDP101	0.50	MG1		0.156	
Dibenzofuran #	HDP101	0.50	MG1		0.348	



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Asbestos

Asbestos can be present in soil as fragments of bulk Asbestos Containing Materials (ACMs) (e.g. asbestos cement sheeting) and also as discrete asbestos fibres within the soil matrix. This investigation has carried out assessments to determine whether both bulk fragments and / or fibres are present in the soil at the site. The asbestos assessment commenced on site with inspection of the Made Ground by our suitably qualified supervising engineer for the presence of bulk ACMs.

During both sets of fieldwork, no suspected ACMs were identified.

Of the 9 No. of Made Ground samples submitted for asbestos screening, across both sets of field works, 2 No. were reported to contain asbestos; these were from the previous investigation undertaken in July 2023. Those positive identifications are summarised in Table 10.3, below.

Table 10.3 Summary of Asbestos Assessment

Exploratory Hole Location	Depth (m bgl)	Location on Site Description	Soil Population	Asbestos Type	Quantification (% w/w)
Asbestos in Soil Samples					
TP02	0.50	East	MG1	Chrysotile and Amosite fibre bundles as well as bitumen-based asbestos containing material (ACM)	<0.001
TP05	0.30	Northeast	MG1	Chrysotile fibre bundles	<0.001

10.4. Utilities

It is recommended that the results of the chemical testing and details of the proposed remedial works are provided to the appropriate utility companies to determine the necessity for service protection.

10.5. Construction and Maintenance Workers

Contamination may pose a short-term (acute) or long-term (chronic) risk to workers during construction and maintenance. The potential risks must be specifically assessed as part of the health and safety evaluation for the works to be performed in accordance with prevailing legislation. Site practices must conform to the specific legislative requirements and follow appropriate guidance (e.g., HSE, 1991; CIRIA, 1996).

On the basis of the results obtained, the following potential exposure risks to construction and maintenance workers have been highlighted:

- Localised elevated levels of lead within the Made Ground
- Localised Asbestos within the Made Ground

Whilst asbestos has been reported during the ground investigation works, the measured concentrations have been reported <0.001% w/w i.e. at 'trace' levels which are unlikely to trigger requirements during earthworks / construction works in accordance Control of Asbestos Regulations 2012. However, in the event that previously unidentified asbestos is identified during future earthworks / construction works at concentrations above



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0.001% w/w (i.e. above 'trace' levels), the Control of Asbestos Regulations 2012 should be adhered to. A summary of complying with CAR: risk assessments, licensing and training is therefore provided in Appendix P.



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11. GROUND GAS RISK ASSESSMENT

11.1. Introduction

The ground gas risk assessment has been undertaken in accordance with the following guidance:

- BS 8485:2015+A1:2019;
- CIRIA C665, 2007;
- Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide Are Present, NHBC, 2007;
- A Pragmatic Approach to Ground Gas Risk Assessment RB17. CL:AIRE, 2012; and,
- Ground Gas Monitoring and 'Worst-Case' Conditions TB17, CL:AIRE, 2018

The ground gas risk assessment has been conducted with full consideration of the viable sources, pathways and receptors included within the Preliminary Conceptual Site Model presented in Section 6.

Ground gas monitoring was conducted in conjunction with groundwater monitoring (and sampling); however, it should be noted during the gas monitoring was conducted first, prior to any groundwater monitoring / sampling works. The monitoring well locations and construction were designed with due consideration of the proposed development layout and preliminary conceptual site model. Further information pertaining to monitoring wells is provided in Table 7.2.

11.2. Ground Gas Monitoring Results

The full ground gas monitoring results from the installations are presented in Appendix E and summarised below:



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Table 11.1 Ground Gas Monitoring Results Summary – 4 No. Visits of Proposed Monitoring Programme of 4 No. Visits

Strata targeted by response zone	Monitoring well reference	Maximum peak CH ₄ (%v/v)	Maximum steady state CH ₄ (%v/v)	Maximum peak CO ₂ (%v/v)	Maximum steady state CO ₂ (%v/v)	Lowest O ₂ recorded (%v/v)	Maximum peak gas flow rate (l/h)	Maximum steady state gas flow (l/h)
MG and DD1	HDP01	0.1	0.1	0.4	0.4	20.3	0.1	0.1
DD1	HDP02	0.1	0.1	0.4	0.4	19.8	0.1	0.1
MG and DD1	HDP05	0.1	0.1	0.5	0.5	19.7	0.1	0.1

Bold = maximum value reported across all visits.



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11.3. Ground Gas Risk Assessment

Table 11.2 and Table 11.3 demonstrate how, in accordance with CIRIA C665, the periods and frequency of monitoring have been selected for the site.

Table 11.2 From Table 5.5a CIRIA C665 - Typical/idealised periods of monitoring (after Wilson et al, 2005)

		Generation Potential of the Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of development	Low (commercial)	1 month	2 months	3 months	6 months	12 months
	Moderate (flats)	2 months	3 months	6 months	12 months	24 months
	High (residential with gardens)	3 months ¹	6 months	6 months	12 months ¹	24 months

Notes:

1 NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).

2 There is no industry consent over "high", "medium" or "low" generation potential of source.

Table 11.3 From Table 5.5b CIRIA C665 - Typical/idealised frequency of monitoring (after Wilson et al, 2005)

		Generation Potential of the Source				
		Very Low	Low	Moderate	High	Very High
Sensitivity of development	Low (commercial)	4	6	6	12	12
	Moderate (flats)	6	6	9	12	24
	High (residential with gardens)	6 ¹	9	12	24 ¹	24

Notes:

1 NHBC guidance also recommends this period of monitoring (Boyle and Witherington, 2007).

2 There is no industry consent over "high", "medium" or "low" generation potential of source.

The total atmospheric pressure range of the ground gas monitoring data included in this report was between 968 mbar and 1017 mbar. This range covers moderate low (<1000 mbar) to high (>1015 mbar) atmospheric pressures. Monitoring events included periods of stable pressure trends.



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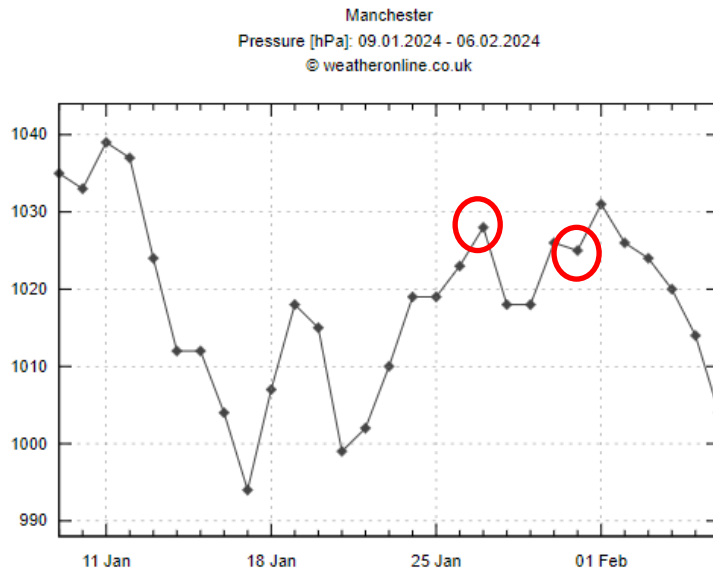
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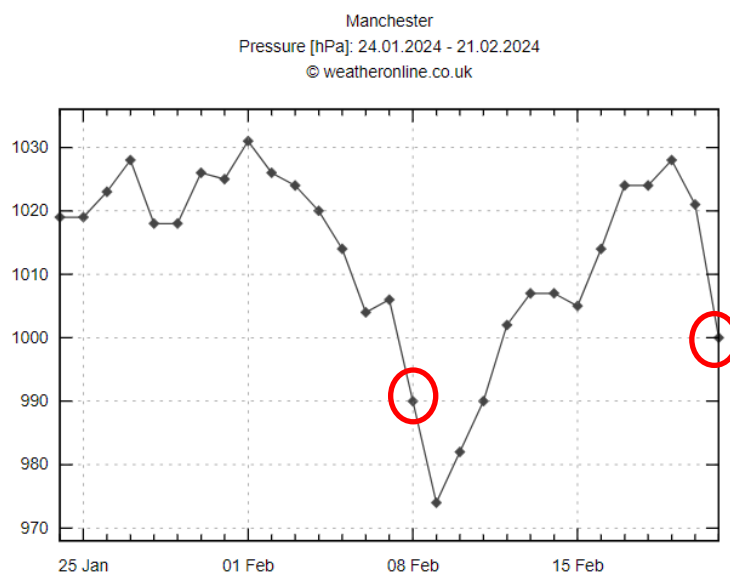
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Visit 1 & 2 – 23.01.24 and 30.01.24



Visit 3 & 4 – 08.02.24 and 22.02.24



Consideration of Groundwater Effects

An assessment has been made to determine whether groundwater levels beneath the site lie at a shallow depth at, or above, the plain section of the monitoring well or within cohesive strata. In those instances where shallow groundwater is located within the plain section of the monitoring well pipe or within cohesive strata this can result in 'groundwater pumping' or a 'piston effect' where the measured peak (and in some cases steady) flow rates reported at these monitoring well locations are significantly (and artificially) influenced by the pressures formed in the void above the groundwater in the plain section of the pipe or within the pipework installed within cohesive strata, as opposed to being truly representative of the



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ground gas flow rates. In such instances, this scenario can create 'artificial' negative and /or relatively high peak positive readings depending on whether the groundwater levels have increased or decreased in between monitoring events or since installation of the monitoring wells.

The results of gas monitoring have indicated the following instances where groundwater pumping is likely to have influenced the measured ground gas flow rates such that they may be reasonably discounted from the Gas Screening Value (GSV) calculation:

The results of the ground gas monitoring have been assessed in accordance with the criteria specified for this site, which were derived as described in Appendix M.

Initial 'Worst-Case' GSV Calculation – Carbon Dioxide and Methane

An initial conservative assessment has been made by calculating a 'worst-case' Gas Screening Value (GSV) for the site by using:

- the maximum reported methane or carbon dioxide concentration (whichever is highest) from any monitoring well and during any ground gas monitoring visit; and,
- the remaining maximum peak positive flow rate (after any negative flow rates or 'artificially' high flow rates have been discounted as described above) from any monitoring well and during any ground gas monitoring visit.

Table 11.4 Initial Worst-Case GSV Calculation

Ground Gas	Maximum Reported Peak Concentration (% v/v)				
		Selected Concentration used in GSV Calculation (% v/v)		Maximum Appropriately Selected Gas Flow Rate (l/hr)	'Worst case' GSV (l/hr)
Methane (CH ₄)	<0.1	0.5	X	<0.1	= 0.0005
Carbon dioxide (CO ₂)	0.5				

CIRIA C665 provides two separate methods to 'characterise' a site that firstly requires the assessor to distinguish between two fundamental development 'situations':

- Situation A** - Any development other than Situation B (e.g. factories, shops, commercial, warehouses, schools, cinemas, sports centres, stadiums, high rise housing, housing with basements, etc) for which the **Modified Wilson and Card 'Characteristic Situation' classification system** is applied; and,
- Situation B** - Low rise building with minimum ventilated under floor void (min 150 mm) for which the **NHBC Traffic light classification system** is applied.

In this instance, as the site (Manchester Art Gallery) development is the construction of a ground bearing concrete slab, it shall be regarded as a 'Situation A' scenario for the purposes of the ground gas risk assessment.

Table 11.4 demonstrates that the site is placed in a Characteristic Situation 1 - very low risk scenario on the basis of the 'worst case' GSV alone.



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CIRIA C665 indicates that in the event that the reported methane concentrations are '*typically*' >1% v/v and/or the reported carbon dioxide concentrations are '*typically*' >5% then consideration should be made to increase the determination of the site to a Characteristic Situation 2 – Low Risk scenario.

In this instance, as no maximum peak or steady methane or carbon dioxide concentrations have been reported in excess of 1% v/v or 5% v/v respectively, the site can be reasonably classified as a Characteristic Situation 1 – Very Low Risk scenario for which no basic ground gas protection measures are required.

Carbon Monoxide and Hydrogen Sulphide

There is no current UK risk assessment guidance available for carbon monoxide and hydrogen sulphide derived from ground gases.

No measured concentrations of carbon monoxide have been reported in excess of the instrument's detection limit. As such, there is no evidence to suggest that the site presents a potential risk to future land users from either carbon monoxide or hydrogen sulphide.

A maximum peak hydrogen sulphide concentration of 2 ppm has been reported which is below the workplace long term exposure limit (30ppm) and the workplace short term exposure limit (200ppm) published by the Health and Safety Executive (EH40/2005 Workplace Exposure Limits) and below the WHO long term (24 hours) indoor exposure guideline value (5.68 ppm).

Considerations for Construction and Maintenance Workers

During engineering and construction activities, the ground gas data indicate that the following aspects are to be considered during the preparation of relevant site H&S plans, method statements and related documents, and appropriate working methods adopted:

- **Carbon dioxide concentrations in ground gas:** The measured CO₂ concentrations in ground gas reported are elevated relative to background levels and could present an asphyxiation risk in excavations and other confined spaces. The Health & Safety Executive has published information defining safe occupational exposure levels for CO₂ and the latest guidance must be consulted to determine whether the ground gas regime necessitates specific precautions during site works.

11.4. Radon Gas

Less than 1% properties affected for which no radon protection measures are required.



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12. REVISED CONCEPTUAL SITE MODEL AND GENERIC QUANTITATIVE RISK ASSESSMENT OF POLLUTANT LINKAGES

The preliminary combined conceptual site model and conceptual exposure model, developed from the desk study information and presented in Section 6, has been revised in light of the ground investigation and the chemical analysis results presented above in Table 12.1, below.

A revised qualitative risk assessment has also been made of the likelihood of the linkage operating and its potential significance in accordance with CIRIA C552.



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Table 12.1 Revised Assessment of Potential Pollutant Linkages (Continued on Next Page).

Justification / Comments
- Ground conditions encountered were similar across the site area. The entire site area was covered by wooden floorboards, where pre cored areas had been marked out ahead of the site works. A sub floor void was seen below the wooden floorboards across site. This void ranged between 0.1, and 0.6m thick. Underlying this void was recorded Made Ground, with depths ranging from 0.30m and 1.6m bgl, described as brown gravelly sand and clay as well as gravel of brick and concrete with a medium proportion of ash. Locally to HDP101 a layer of concrete screed was recorded between 0.75m and 0.80m before going into the, as described, Made Ground. Underlying the Made Ground was superficial clay rich Till, with depths proven to 3.00m. Localised concrete obstructions were recorded in HDP103 and HDP104, at 1.60 and 0.70m respectively, with both resulting in the hand dug pits being terminated. - No groundwater has been encountered either during the investigation or in subsequent monitoring visits. This will be updated on completion of all 4 No. proposed monitoring visits. - Localised concentrations of lead have been recorded in access of the respective GAC for a commercial land user. - Asbestos testing has returned 2 No. positive results from samples obtained during the Tier Environmental investigation in July 2023: TP02 at 0.50m for Chrysotile and Amosite fibre bundles as well as bitumen-based asbestos containing material (ACM) and TP05 at 0.30m for Chrysotile fibre bundles. Both samples underwent subsequent quantification testing with both results recording <0.001% w/w i.e. at 'trace' levels which are unlikely to trigger requirements during earthworks / construction works in accordance Control of Asbestos Regulations 2012 - Following the completion of the proposed 4 No. ground gas monitoring visits, a Characteristic Situation 1 – Very Low Risk scenario has been identified. This is based upon the 'worst case' GSV of 0.0005l/hr alone, for which no ground gas protection measures are required.



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Source	Potential Contaminants of Concern	Pathway	Receptor	Consequence	Probability	Qualitative Risk Assessment
'Measured concentrations of lead associated with Made Ground in the northeast of the site reported in excess of the respective GACs protective of human health for a commercial land user.'	Lead	Direct contact, dust inhalation and ingestion	Future site users (commercial)	Medium	Unlikely	Pathways will be broken by the slab development
			Adjacent site users (commercial)	Medium	Unlikely	
			Construction, site investigation, demolition and future maintenance workers	Medium	Low Likelihood	Moderate / Low Risk
		Migration of mobile contaminants from Made Ground soils to adjacent sites along services and conduits	Adjacent site users (commercial)	Medium	Unlikely	Pathways will be broken by the slab development
	Asbestos	(Dust migration and) dust inhalation	Future site users (commercial)	Severe	Unlikely	Pathways will be broken by the slab development
			Adjacent site users (commercial)	Severe	Unlikely	
			Construction, site investigation, demolition and future maintenance workers	Severe	Low Likelihood	Moderate Risk



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13. PRELIMINARY WASTE MATERIALS CLASSIFICATION AND WASTE DISPOSAL ROUTE DETERMINATION

13.1. Introduction

If the site is to be redeveloped and materials are disposed off site, the material exported from the site to Landfill should be hauled by a register waste carrier in accordance with Duty of Care Regulations 1991 and the Hazardous Waste Regulations 2005.

There will be requirement for the waste producer to provide appropriate Waste Acceptance Criteria (WAC) testing of the Soils for disposal to ensure that the soils are appropriately classified and that the landfill is licensed to receive such soils. Mixing of hazardous and non-hazardous waste is not permitted. For any hazardous wastes, a consignment note shall be completed, signed, and retained by all parties involved. The consignment note shall state the volume of waste, a physical description of the material and statement of its chemical composition. The waste consignment notes shall be kept by the contractor for a period of at least two years. For non-hazardous wastes, a Waste Transfer Note (WTN) shall be completed. The WTN should be signed and a copy should be kept by the contractor for a period of at least two years. Finally, consignment notes and WTNs shall be shown to an enforcement officer from the local council or the Environment Agency, if asked.

Approach to Assessing Hazard Properties

Flammability and Oxidisability

For any samples flagged as possessing hazardous properties flammability and oxidisability, for which there are no thresholds, Tier Environmental has used professional judgment and on-site observations to decide whether the waste soil, as a whole, is likely to be flammable or oxidising. It should be noted that flammability/oxidisability alone are unlikely to result in a hazardous classification for waste soil.

Worst Case Metal Compounds

The choice of an appropriate worst case metal compound in soil has been made on the basis of the available lines of evidence. For example, if laboratory chemical analysis has demonstrated that no measured concentrations of hexavalent chromium have been reported in excess of the laboratory method detection limit, there it would be regarded as evidence of an absence of a soil source of hexavalent chromium. In such an instance, the worst-case metal chromates may be replaced in favour of the next worst case metal compound.

pH

For samples that have been determined as hazardous based on pH alone and cement/concrete has been identified in the sample, Tier Environmental may assume that the high pH was due to the crushing process in the laboratory and is not representative of the waste as a whole. If further detailed determination of this is required, then Tier Environmental recommend that such assessment is carried out on these results in a manner described in the AGS Waste Classification for Soils – A Practitioners' Guide (dated 2019):

- Consideration of the acid/alkali reserve to be conducted (as described in WM3 Appendix C4 and C8).
- If large enough, the cement/concrete fraction may be separated manually before testing. Waste concrete from construction and demolition which doesn't contain hazardous substances is non-hazardous (LoW code 17-01-01).
- If cement/concrete has been identified in the sample, a second analysis may be conducted on an 'as received' sample, avoiding the need for crushing before testing. The high pH is typically associated with the finer fractions of cement. If the 'as received' sample has an



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acceptable pH, this provides additional confidence that the high pH was due to the crushing process and is not representative of the waste as a whole.

Asbestos

With respect to asbestos, if the waste contains fibres that are free and dispersed then the waste will be hazardous if the waste as a whole contains 0.1% w/w or more asbestos in accordance with WM3. If the waste contains any identifiable pieces of suspected asbestos containing material (i.e. any particle of a size that can be identified as potentially being asbestos by a competent person if examined by the naked eye), then these pieces must be assessed separately. The waste is hazardous if the concentration of asbestos in the piece of asbestos containing material is 0.1% w/w or more. The waste shall then be regarded as a mixed waste and classified accordingly.

The following codes will then be assigned to the asbestos waste as appropriate:

- 17 06 05* Construction material containing asbestos.
- 17 06 01* Insulation material containing asbestos.

17 06 05* would normally be used in preference to 17 06 01* for the asbestos in asbestos contaminated soil and stones in accordance with WM3.

Tier Environmental Geoenvironmental engineers hold up to date UKATA Asbestos Awareness training certificates in order to demonstrate 'competence' that is required as described in WM3.

Flammable Liquid Waste

Tier Environmental consider that such a hazard property would apply if free phase product has been reported in the sample. As such, in those instances where materials are classified as hazardous based on this alone and no free phase product is encountered, it is considered that the materials may be regarded as being non-hazardous. Please note that the table below includes a column to show whether free phase product has been encountered within the sample location.

13.2. Preliminary Waste Materials Classification and Waste Disposal Route Determination

Tier Environmental have assessed the chemical results in terms of basic waste characterisation of materials on site. This provides a preliminary assessment of whether a material is potentially non-hazardous or hazardous waste. In addition, Waste Acceptance Criteria (WAC) testing has been carried out on selected samples with a determination made as to the appropriate waste disposal route in each case.

The results of this preliminary assessment are summarised in the following table.

Natural Soils / Bedrock

Representative samples of natural soils haven't been obtained during the investigation.

It is likely that any natural soils (that are not impacted by any known contamination from shallow Made Ground, or unexpected contamination) would be suitable for disposal to an inert waste landfill. It is recommended that the landfill is approached to confirm this position prior to off-site disposal. Otherwise, additional testing will be required to confirm the waste disposal route for natural soils beneath the site.



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Table 13.1 Preliminary Materials Waste Classification and Waste Disposal Route Determination

Exploratory Hole Location	Sample Depth (m bgl)	Simplified Description of the Sample	Basic Waste Characterisation Result	If 'Potentially Hazardous': Is it Possible to Demonstrate the Material is Non-Hazardous?	If the material is Hazardous – What is the Driver for Hazardous Waste Classification?	Asbestos Presence, Type and Quantification	WAC Sample Available?	Soil Waste Disposal Route Determination
Tier Investigation, July 2023								
TP01	0.40	Made Ground: Light brown gravelly Sand.	'Potentially hazardous' but can be downgraded to non-hazardous (see next column for details).	Yes. Driven by 'HP 3(i): Flammable "flammable liquid waste"' (hazard statement: Flam. Liq. 3; H226 "Flammable liquid and vapour.>"). However, Tier Environmental consider that such a hazard property would apply if free phase product has been reported in the sample. As no free phase product was encountered, it is considered that the materials above may be regarded as being non-hazardous.	N/A	None detected	Yes	Non-hazardous landfill due to Total Dissolved Solids and Sulphate as SO4 in excess of inert landfill threshold.
TP02	0.50	Made Ground: Dark grey sandy Gravel			N/A	<0.001% w/w chrysotile and amosite fibre bundles <0.001% w/w ACM Bitumen Products	No	No WAC sample obtained. Any visible ACMs would need to be segregated where possible and disposed of as hazardous waste. Due to the presence of asbestos, it is unlikely the materials would be accepted at an Inert waste landfill and therefore should be disposed of to a non-hazardous landfill
TP03	0.25	Made Ground: Dark grey sandy Gravel			NA	None detected	Yes	Non-hazardous landfill due to Total Dissolved Solids and Sulphate as SO4 in excess of inert landfill threshold.
TP04	0.35	Made Ground: Dark grey sandy Gravel			NA	None detected	No	No WAC sample obtained.
TP05	0.30	Made Ground: Light brown gravelly Sand.	Hazardous – Hexavalent Chromium has been detected above the laboratory detection limit	NA	Chromate compounds	<0.001% w/w chrysotile fibre bundles	Yes	May require pre-treatment prior to disposal to a Hazardous landfill due to Loss on ignition in excess of the hazardous landfill threshold
Tier Investigation, January 2024								
HDP101	0.90	Made Ground: Black and Dark brown, slightly sandy to very sandy Gravel.	'Potentially hazardous' but can be downgraded to non-hazardous (see next column for details).	Yes. Driven by 'HP 3(i): Flammable "flammable liquid waste"' (hazard statement: Flam. Liq. 3; H226 "Flammable liquid and vapour.>"). However, Tier Environmental consider that such a hazard property would apply if free phase product has been reported in the sample. As no free phase product was encountered, it is considered that the materials above may be regarded as being non-hazardous.	N/A	No asbestos detected	No	No WAC sample obtained.
HDP102	0.80	Made Ground: Dark brown, slight gravelly to very gravelly Sand.	Non- Hazardous	N/A	N/A	No asbestos detected	No	
HDP103	0.75	Made Ground: Brown, sandy to very sandy Gravel.	Non- Hazardous	N/A	N/A	No asbestos detected	No	
HDP105	0.50	Made Ground: Dark and light brown and black gravelly Sand.	'Potentially hazardous' but can be downgraded to non-hazardous (see next column for details).	Yes. Driven by 'HP 3(i): Flammable "flammable liquid waste"' (hazard statement: Flam. Liq. 3; H226 "Flammable liquid and vapour.>"). However, Tier Environmental consider that such a hazard property would apply if free phase product has been reported in the sample. As no free phase product was encountered, it is considered that the materials above may be regarded as being non-hazardous.	N/A	No asbestos detected	No	



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13.3. Materials Re-Use

Subject to volumetric fill requirements and a future assessment of suitability of re-use (both chemically and geotechnically), some materials may be considered for potential re-use in line with an appropriate end-of-waste protocol such as WRAP Quality Protocol for Aggregates from Inert Waste, U1 Exemption or a Materials Management Plan in accordance with the CL:AIRE Definition of Waste Code of Practice (DoWCoP). Please note that any previously landfilled or mining waste materials may not be appropriately subject to consideration under DoWCoP and may not be re-used under DoWCoP unless sufficient lines of evidence and agreement with the local Environment Agency Waste Team can be sought beforehand.

Re-Use of Excavated and Stockpiled Clean Naturally Occurring Soils on Other Sites

In addition, Tier Environmental are aware that CL:AIRE is classing stockpiled clean, naturally occurring soils as waste, unless their final destination is identified in a Materials Management Plan, before they are excavated. However, Tier Environmental consider that any clean naturally occurring soils arising from enabling works, earthworks or construction activities would be regarded as an asset and the default assumption for this site (prior to excavation and stockpiling) is not the intention to discard these materials where they may be reasonably re-used on this, or another, development site. Stockpiling is a recognised, recommended means of safely storing soils. Whilst there may be advantages to leaving soils in-situ, stripping topsoil and subsoil prior to earthworks is a routine construction activity. Tier Environmental consider that it is not unreasonable to state that in the event that the developer owns another site where the construction phase is ongoing, soils can be transferred between their sites as an owned product and never become waste.

The above paragraph above is therefore considered a clear intention to reuse any clean, naturally occurring soils derived from excavations at this site (which may also include temporary stockpiling these materials). It is considered; however, that in addition to this the following must be adhered to:

- Reuse does need to occur within a 'reasonable' timeframe (12 No. months); and,
- If soils are transferred to a third party (another developer), there needs to be some contractual agreement in place, as in this situation it is important to have something in place confirming that surplus soils are required by the third party.

Re-Use of Excavated and Stockpiled Clean Naturally Occurring Soils Within The Site They Are Excavated From

Further to the above, where soils are naturally occurring, uncontaminated and re-used on the site they are excavated from, they fall outside of the Waste Framework Directive (WFD) i.e. they will not be classified as a waste. Currently the CL:AIRE Definition of Waste Code of Practice states the following which appears to support this position: *"If the material is waste an Environmental Permit will be required to lawfully deposit or re-use it unless the material is "uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated", which is excluded from waste regulation by the Waste Framework Directive (2008)."*



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14.CONCLUSIONS AND RECOMMENDATIONS

14.1. Conclusions

- Ground conditions encountered were similar across the site area. The entire site area was covered by wooden floorboards, where pre cored areas had been marked out ahead of the site works. A sub floor void was seen below the wooden floorboards across site. This void ranged between 0.1, and 0.6m thick. Underlying this void was recorded Made Ground, with depths ranging from 0.30m and 1.6m bgl, described as brown gravelly sand and clay as well as gravel of brick and concrete with a medium proportion of ash. Locally to HDP101 a layer of concrete screed was recorded between 0.75m and 0.80m before going into the, as described, Made Ground. Underlying the Made Ground was superficial clay rich Till, with depths proven to 3.00m. Localised concrete obstructions were recorded in HDP103 and HDP104, at 1.60 and 0.70m respectively, with both resulting in the hand dug pits being terminated.
- No groundwater has been encountered either during the investigation or in subsequent monitoring visits. This will be updated on completion of all 4 No. proposed monitoring visits.
- Localised concentrations of lead have been recorded in access of the respective GAC for a commercial land user. The associated direct contact, dust inhalation and ingestion pathways will effectively be broken by the proposed ground bearing floor slab. As such, it is not considered that these concentrations represent a potential risk to the end user or adjacent site users.
- Asbestos testing has returned 2 No. positive results from samples obtained during the Tier Environmental investigation in July 2023: TP02 at 0.50m for Chrysotile and Amosite fibre bundles as well as bitumen-based asbestos containing material (ACM) and TP05 at 0.30m for Chrysotile fibre bundles. Both samples underwent subsequent quantification testing with both results recording <0.001% w/w i.e. at 'trace' levels which would normally be unlikely to trigger requirements during earthworks / construction works in accordance Control of Asbestos Regulations 2012; however, given that works will be conducted in an enclosed and dry environment, it is recommended that the Control of Asbestos Regulations 2012 is followed and that an asbestos management plan is produced ahead of the proposed works.
- Following the completion of the proposed 4 No. ground gas monitoring visits, a Characteristic Situation 1 – Very Low Risk scenario has been identified. This is based upon the 'worst case' GSV of 0.0005l/hr alone, for which no ground gas protection measures are required.
- Based on the results of Hand shear Vanes, Pocket Penetrometers, Dynamic Cone Penetrometer and light weight deflectometer, it is likely that a ground bearing slab may be suitable, but we would recommend the following:
 - Compacting the existing Made Ground with a wacker plate or similar to reduce settlements;
 - If ground levels are to be raised, the placement and compaction of Type 1 granular fill (or similar) to provide a more robust founding layer; and,
 - The masonry sleeper walls may require breaking down to prevent any hard spots that could result in unacceptable differential settlement and subsequent cracking of the floor slab. In addition, the installation of a geogrid to span across the broken-down sleeper walls may be prudent to again minimise any unacceptable differential settlements.
- Preliminary waste materials classification and waste disposal route determination for samples obtained during the investigation in July 2023 have determined that the following samples, TP01 at 0.40m bgl and TP03 at 0.25 are non-hazardous but should be disposed of at a non-hazardous landfill due to Total Dissolved Solids and Sulphate as SO₄ in excess of inert landfill threshold. TP02 at 0.50m, due to the presence of asbestos, is unlikely to be accepted at an Inert waste landfill and therefore should be disposed of to a non-hazardous landfill with any visible ACMs segregated where possible and disposed of as hazardous waste. TP05 at 0.30m has been initially classified as Hazardous, due to Hexavalent Chromium being detected above the laboratory detection limit, subsequent WAC testing has determined that the material may require pre-treatment prior to disposal to a Hazardous landfill due to Loss on ignition in excess of the hazardous landfill threshold. Preliminary waste materials classification has determined that the samples obtained during the Tier Environmental investigation in January 2024 and TP04 (0.35m) from the investigation in July 2023, can be classed as non-hazardous



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14.2. Recommendations

- Based upon the results of asbestos testing for which 2 No. out of 9 No. obtained samples recorded positive identification of asbestos (Chrysotile and Amosite fibre bundles) a precautionary Asbestos Management Plan is recommended during construction works. This is considered precautionary as quantitative testing has placed the asbestos quantity at <0.001% w/w i.e. at 'trace' levels which are normally unlikely to trigger requirements during earthworks / construction works in accordance Control of Asbestos Regulations 2012. However, due to the contained, inside nature of the development area it is considered that an increased risk is posed to construction workers.
- A ground bearing slab is recommended with the following considerations:
 - Compacting the existing Made Ground with a wacker plate or similar to reduce settlements;
 - If ground levels are to be raised, the placement and compaction of Type 1 granular fill (or similar) to provide a more robust founding layer; and,
 - The masonry sleeper walls may require breaking down to prevent any hard spots that could result in unacceptable differential settlement and subsequent cracking of the floor slab. In addition, the installation of a geogrid to span across the broken-down sleeper walls may be prudent to again minimise any unacceptable differential settlements.



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15.REGULATORY APPROVALS

The conclusions and recommendations presented above are considered reasonable based on the findings of the site investigation. However, these cannot be guaranteed to gain regulatory approval and, therefore, the report should be passed to the appropriate regulatory authorities and/or other organisations for their comment and approval prior to undertaking any works on site.

It is recommended that conditions placed on any planning permission are discharged prior to commencement of site works.



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<https://www.epa.gov/pfas/basic-information-pfas>

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Health and Safety Executive (2015) Construction (Design and Management) Regulations.

Coal Authority Interactive Map Viewer, <http://mapapps2.bgs.ac.uk/coalauthority/home.html>

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GROUND INVESTIGATION REPORT FOR MANCHESTER ART GALLERY, MANCHESTER

Report No : TE1764-TE-00-XX-RP-GE-001-V01

Page No : 57 of 58

Engineer: Stuart Milne & Henry Cox

Date: 22/02/2024

17. GLOSSARY OF TERMS

ACEC	Aggressive Chemical Environment for Concrete (classification)
aOD	Above Ordnance Datum
bgl	Below ground level
BGS	British Geological Survey
BRE	Building Research Establishment
CBR	California Bearing Ratio (test)
COMAH	Control of Major Accident Hazards (regulations)
Designated location	Site (and the ecosystem on that site) protected under national or international legislation. A potential ecological receptor to be considered as part of the assessment of land contamination. Example designated locations include SSSIs (q.v.), SACs (q.v.), national nature reserves, Ramsar sites and bird special protection areas.
DQA	Data Quality Assessment
DQO	Data Quality Objective
DQRA	Detailed Quantitative Risk Assessment
DWS	Drinking Water Standard
EQS	Environmental Quality Standard
GAC	Generic Assessment Criterion
GQA	General Quality Assessment (Environment Agency)
GSV	Gas Screening Value
HCV	Health Criteria Value
IPPC	Integrated Pollution Prevention and Control (regulations)
K _{ow}	Octanol-water partition coefficient
LEL	Lower Explosive Limit
LL	Liquid Limit
LoD	Limit of Detection (analytical)
LoQ	Limit of Quantification (analytical)
Mean Value Test	Statistical test (described in the CIEH Guidance) to estimate the mean value of a normally distributed population of data at a given level of confidence. Normally for contaminated land assessment, the 95th percentile (referred to as the 95%UCL or US95) is applied as a reasonable but conservative estimate of the mean concentration for comparison with the relevant assessment criteria.
Maximum Value Test	Statistical test (described in the CIEH Guidance) to identify whether an elevated concentration within a normally distributed data set forms part of the underlying population from which it has been sampled or whether it is an outlier (such as a localised area of contamination) that merits further consideration.
MC	Moisture Content
NGR	National Grid Reference
NIHHS	Notification of Installations Handling Hazardous Substances (regulations)
OS	Ordnance Survey
PI	Plasticity Index
PID	Photoionisation Detector
PL	Plastic Limit
ppm	Parts per million
ppmv	Parts per million by volume
QA	Quality Assurance
QC	Quality Control
SAC	Special Area of Conservation
SOM	Soil Organic Matter



GROUND INVESTIGATION REPORT FOR MANCHESTER ART GALLERY, MANCHESTER

Report No : TE1764-TE-00-XX-RP-GE-001-V01

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Engineer: Stuart Milne & Henry Cox

Date: 22/02/2024

SPT	Standard Penetration Test
SPZ	Source Protection Zone (see Appendix L)
SSAC	Site-Specific Assessment Criterion
SSSI	Site of Special Scientific Interest
SVOC	Semi-Volatile Organic Compound
TEF	Toxicity Equivalent Factor
TPH	Total Petroleum Hydrocarbons
TWA	Time Weighted Average
US95	95 th percentile estimate of the true mean value of a data population (also known as 95%UCL).
VOC	Volatile Organic Compound

APPENDIX A - DRAWINGS

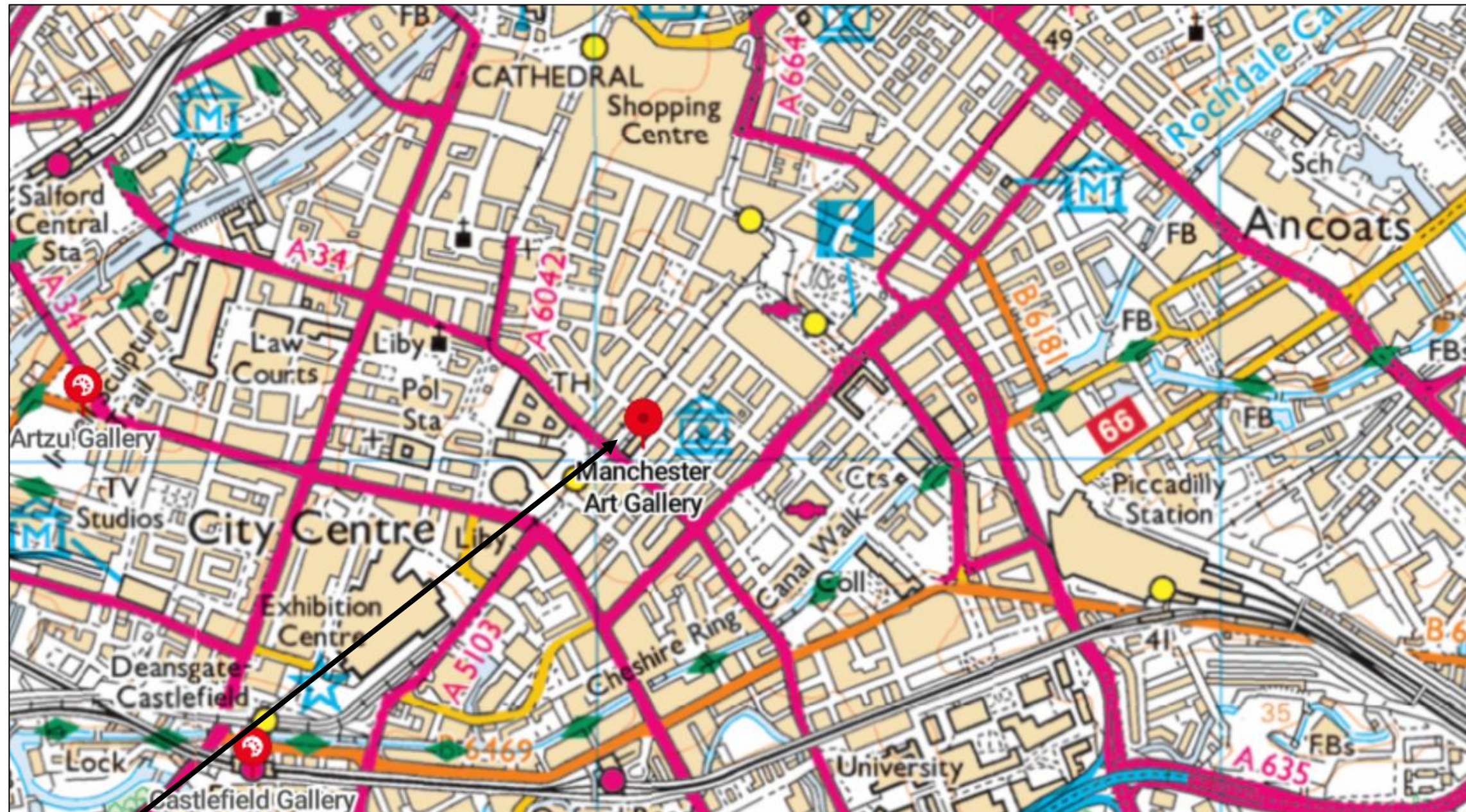


Site Location Plan

Contract Number: TE1764

Contract: Manchester Art Gallery

Client: Robertson NW



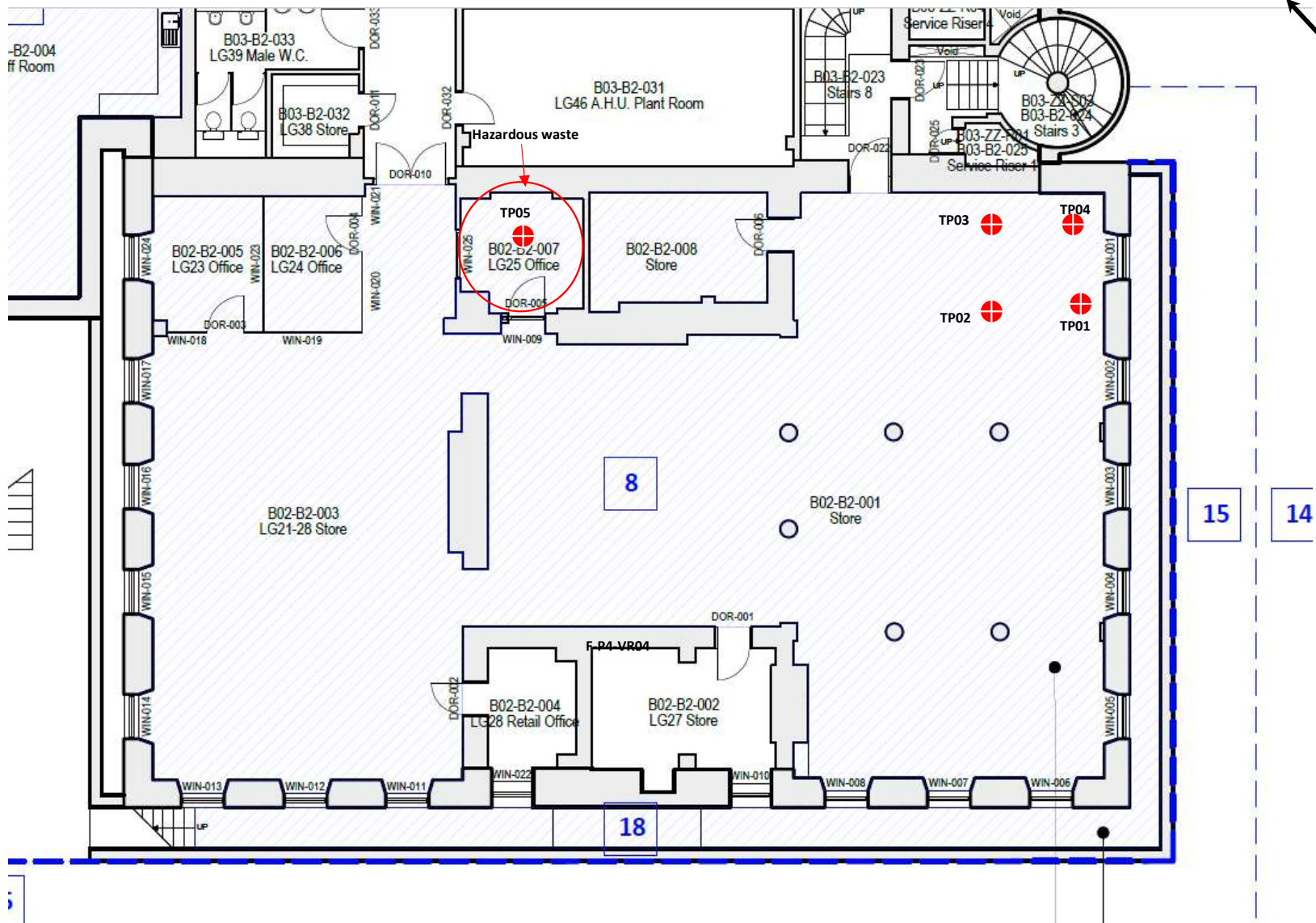
The Site

Scale: NTS

Drawn by: ER.

Approved: SM

Drawing Number: TE1764-TE-00-XX-
DR-GE-003-V01



Legend:



TP0

Sample Location



Tier Environmental Ltd,
Suite 513, Chadwick House,
Warrington Road,
Birchwood, WA3 6AE

CLIENT: Robertsons North West

PROJECT TITLE:
Manchester Art Gallery

DRAWING TITLE:
Sample Location Drawing

DRAWING REF: TE1764-TE-00-XX-DR-GE-002-V01

AUTHOR: SM

REVIEWER: SL

SCALE: NTS

DRAWING DATE:
Aug 2023

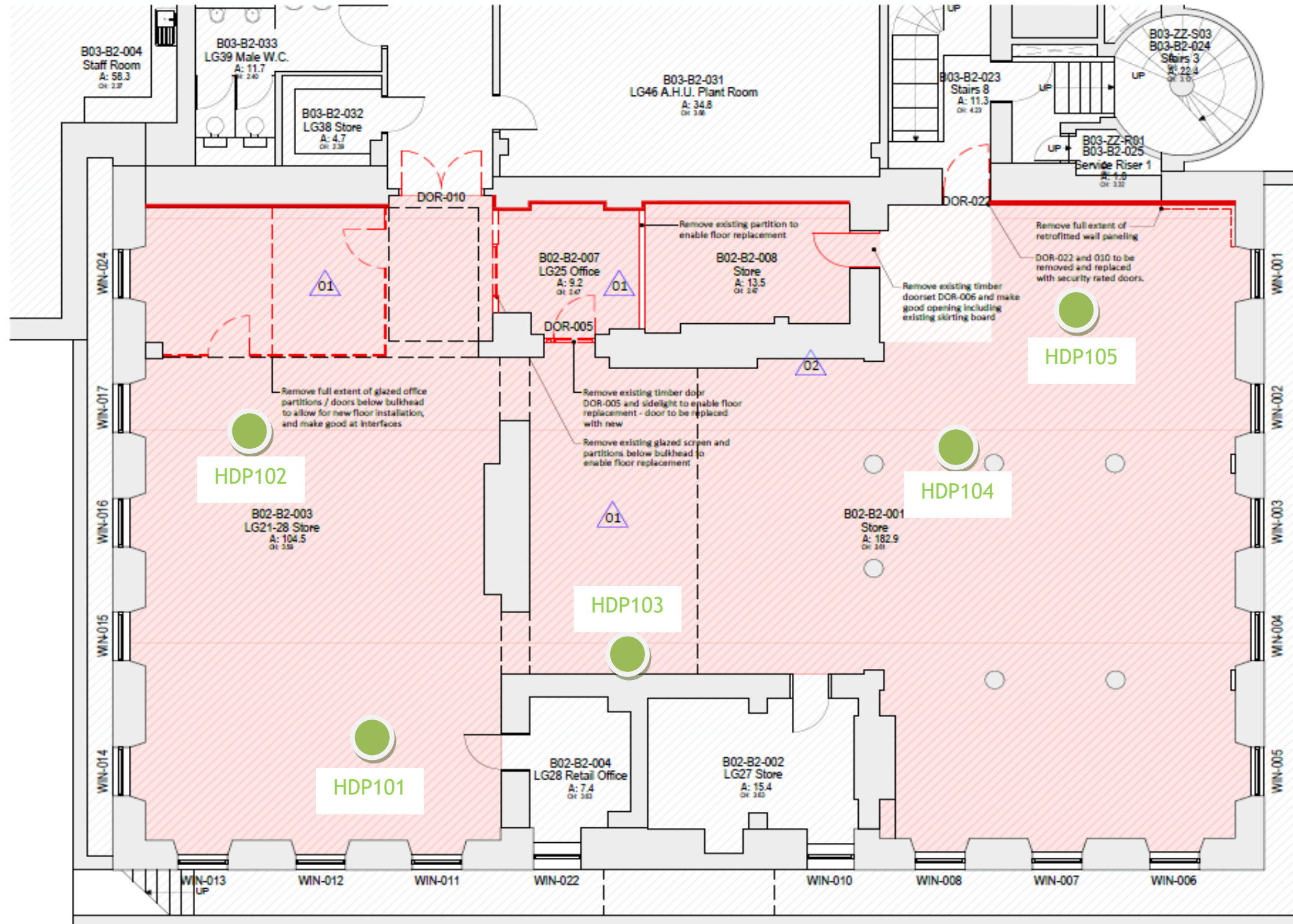
DRAWING STATUS:
FINAL



Project Number	TE1764
Project:	The Manchester Art Gallery
Client	Robertson North



Hand Dug pit Location



Scale	NTS	
Drawn by	CS	Approved AP
Drawing Number	TE1764-TE-00-XX-DR-GE-005-V01	

APPENDIX B - EXPLORATORY HOLE LOGS



Borehole Log

Borehole No.

HDP101

Sheet 1 of 1

Project Name: Manchester Art Gallery

Project No.
TE1764

Co-ords: -

Hole Type
WS

Location: Manchester

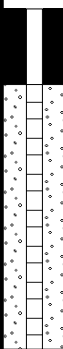
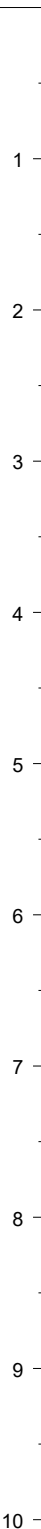
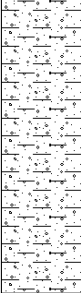
Level:

Scale
1:50

Client: Robertsons

Dates: 04/01/2024 -

Logged By
AP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.90	ES		0.15			MADE GROUND: Wooden Flooring	
								MADE GROUND	
								MADE GROUND: VOID	
								MADE GROUND	
				HVR=62	0.75			MADE GROUND: CONCRETE SCREED	
					0.80			MADE GROUND	
				HVR=82	1.00			MADE GROUND: Black and dark brown, slightly sandy to very sandy, angular to subrounded, fine to coarse GRAVEL of brick, concrete clinker and sandstone with a slight tar odour and a medium proportion of ash.	
								MADE GROUND	
				HVR=88			Firm, becoming stiff, dark brown, slightly sandy, slightly gravelly CLAY. Gravel is subrounded to rounded, fine to coarse of mixed natural lithologies.		
				HVR=90			TILL		
	3.00	----- End of borehole at 3.00 m							

Remarks

1) Hand dug pit . 2) No groundwater encountered. 3) Installed from top of concrete slab. 4) No visual or olfactory evidence of contamination.





Borehole Log

Borehole No.
HDP102
Sheet 1 of 1
Hole Type
WS
Scale
1:50
Logged By
AP

Project Name: Manchester Art Gallery
Project No. TE1764
Co-ords: -
Location: Manchester
Level:
Client: Robertsons
Dates: 04/01/2024 -

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.80	ES		0.45			MADE GROUND: Wood flooring MADE GROUND	
					0.70			MADE GROUND: VOID with birch sleeper wall MADE GROUND	
				HVR=50	1.00			MADE GROUND: Dark brown, slightly gravelly to very gravelly, fine to coarse SAND. Gravel is angular to rounded, fine to coarse of concrete and brick. MADE GROUND	1
				HVR=82				Firm, becoming stiff, dark brown, sandy CLAY. TILL	2
				HVR=64 HVR=104	3.00			End of borehole at 3.00 m	3
									4
									5
									6
									7
									8
									9
									10

Remarks
1) Hand dug pit 2) No groundwater encountered. 3) No visual or olfactory evidence of contamination.





Borehole Log

Borehole No.

HDP103

Sheet 1 of 1

Project Name: Manchester Art Gallery

Project No.
TE1764

Co-ords: -

Hole Type
WS

Location: Manchester

Level:

Scale
1:50

Client: Robertsons

Dates: 04/01/2024 -

Logged By
AP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.25			MADE GROUND: Wooden Flooring	
								MADE GROUND	
					0.55			MADE GROUND: VOID	
		0.75	ES					MADE GROUND	
		0.95	ES		0.85			MADE GROUND: Brown, sandy to very sandy, angular to rounded, fine to medium GRAVEL of brick, concrete and sandstone.	1
				HVR=54				MADE GROUND	
				HVR=58				MADE GROUND: Firm, dark brown, slightly sandy, slightly gravelly CLAY. Gravel is subrounded to rounded, fine to medium of mixed natural lithologies (reworked superficial deposits).	
					1.60			MADE GROUND	2
					1.70			MADE GROUND: Concrete Cobbles	
								MADE GROUND	
								End of borehole at 1.70 m	
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

1) Hand dug pit 2) No groundwater encountered 3) Terminated on suspected concrete. 4) No visual or olfactory evidence of contamination.





Borehole Log

Borehole No.

HDP104

Sheet 1 of 1

Project Name: Manchester Art Gallery

Project No.
TE1764

Co-ords: -

Hole Type
WS

Location: Manchester

Level:

Scale
1:50

Client: Robertsons

Dates: 04/01/2024 -

Logged By
AP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES		0.25			MADE GROUND: Wooden Floor	
					0.35			MADE GROUND: VOID	
					0.65			MADE GROUND	
					0.75			MADE GROUND: Dark brown, gravelly, fine to medium SAND. Gravel is subangular to subrounded, fine of mixed natural lithologies with a medium proportion of ash.	
								MADE GROUND: CONCRETE obstruction	
								MADE GROUND	
								End of borehole at 0.75 m	

Remarks

1) Hand dug pit 2) No groundwater ingress encountered 3) Terminated on obstruction. 4) No visual or olfactory evidence of contamination.





Borehole Log

Borehole No.

HDP105

Sheet 1 of 1

Project Name: Manchester Art Gallery

Project No.
TE1764

Co-ords: -

Hole Type
WS

Location: Manchester

Level:

Scale
1:50

Client: Robertsons

Dates: 04/01/2024 -

Logged By
AP

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES		0.10			MADE GROUND: Wooden Flooring	
					0.30			MADE GROUND: VOID	
					0.60			MADE GROUND: Dark and light brown and black, slightly gravelly to gravelly, fine to coarse SAND. Gravel is angular to rounded, fine to coarse if brick and concrete with a medium proportion of ash.	
				HVR=84				MADE GROUND	
				HVR=105				Firm becoming very stiff, dark brown, slightly sandy, slightly gravelly CLAY. Gravel is rounded, fine of mixed natural lithologies. Sand is coarse.	1
								TILL	2
				HVR=130	2.10			End of borehole at 2.10 m	
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

1) Hand dug pit 2) No groundwater ingress encountered 3) Terminated on very hard digging





Trial Pit Log

Trialpit No

TP01

Sheet 1 of 1

Project Name: Manchester Art Gallery

Project No.
TE1764Co-ords: -
Level:Date
06/07/2023

Location: Manchester

Dimensions
(m):Depth
0.80Scale
1:25Logged
AP

Client: Robertsons

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.40	ES		0.10 0.20		                                                            	MADE GROUND: Timber Floor MADE GROUND MADE GROUND: VOID MADE GROUND MADE GROUND: Light brown, slightly gravelly to very gravelly, fine to coarse SAND. Gravel is subangular to subrounded, fine to medium of concrete, brick and sandstone. MADE GROUND Firm, brown, sandy to very sandy CLAY End of pit at 0.80 m

1

2

3

4

5

Remarks: 1) No groundwater ingress encountered.

Stability: Stable





Trial Pit Log

Trialpit No

TP02

Sheet 1 of 1

Project Name: Manchester Art Gallery

Project No.
TE1764Co-ords: -
Level:Date
06/07/2023

Location: Manchester

Dimensions
(m):Depth
0.90Scale
1:25Logged
AP

Client: Robertsons

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.50	ES		0.10			MADE GROUND: Wooden Floor MADE GROUND
				0.70			MADE GROUND: Dark grey, sandy to very sandy, angular to subrounded, fine to coarse GRAVEL of brick, concrete and clods of clay with fragment of timber. MADE GROUND
				0.90			MADE GROUND: Dark brown, clayey to very clayey, silty, slightly gravelly, fine SAND. Gravel is angular to subangular, fine to medium of clods of clay MADE GROUND
				0.90			MADE GROUND: Obstruction MADE GROUND
							End of pit at 0.90 m

1

2

3

4

5

Remarks: 1) No groundwater ingress encountered

Stability: Stable





Trial Pit Log

Trialpit No

TP03

Sheet 1 of 1

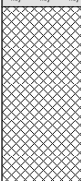
Project Name: Manchester Art Gallery

Project No.
TE1764Co-ords: -
Level:Date
06/07/2023

Location: Manchester

Dimensions
(m):Depth
0.80Scale
1:25Logged
AP

Client: Robertsons

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.25	ES		0.10			Timber Floor	
							MADE GROUND: Dark grey, sandy to very sandy, angular to subrounded, fine to coarse GRAVEL of brick, concrete and clods of clay with fragment of timber. MADE GROUND	
				0.70 0.80			Firm, brown, sandy to very sandy CLAY	
							End of pit at 0.80 m	

1

2

3

4

5

Remarks: 1) No groundwater ingress encountered

Stability: Stable





Trial Pit Log

Trialpit No

TP04

Sheet 1 of 1

Project Name: Manchester Art Gallery

Project No.
TE1764Co-ords: -
Level:Date
06/07/2023

Location: Manchester

Dimensions
(m):Depth
0.65Scale
1:25Logged
AP

Client: Robertsons

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.35	ES		0.10 0.20 0.65		                                                            	MADE GROUND: Timber MADE GROUND MADE GROUND: void MADE GROUND MADE GROUND: Dark grey, sandy to very sandy, angular to subrounded, fine to coarse GRAVEL of brick, concrete and clods of clay with fragment of timber. MADE GROUND OBSTRUCTION End of pit at 0.65 m

1

2

3

4

5

Remarks: 1) No groundwater ingress encountered

Stability: Stable



APPENDIX C - GEOENVIRONMENTAL SOIL LABORATORY RESULTS



Waste Classification Report

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

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



IT0F5-NQVEN-Z0LPZ

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

Job name

EMT-23-11018-Batch-1-202308151631

Description/Comments

Project

TE1764

Site

Manchester Art Gallery, Manchester

Classified by

Name: **Adrian Read**
Date: **17 Aug 2023 08:06 GMT**
Telephone: **01925 818388**

Company: **Tier Environmental**
Suite 414
Chadwick House
Warrington
WA3 6AE

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

HazWasteOnline™ Certification:**CERTIFIED****Course**

Hazardous Waste Classification

Date

03 Dec 2020

Next 3 year Refresher due by Dec 2023

Purpose of classification

2 - Material Characterisation

Address of the waste

Mosley St, Manchester

Post Code M2 3JL

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Proposed redevelopment of land

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

Waste created during excavation of soils during development

Description of the waste

Made ground and/or natural soils



Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP01-06/07/2023-0.40m		Potentially Hazardous	HP 3(i)	3
2	TP02-06/07/2023-0.50m		Potentially Hazardous	HP 3(i)	6
3	TP03-06/07/2023-0.25m		Potentially Hazardous	HP 3(i)	9
4	TP04-06/07/2023-0.35m		Potentially Hazardous	HP 3(i)	12
5	TP05-06/07/2023-0.30m		Hazardous	HP 3(i), HP 7, HP 10, HP 14	15

Related documents

#	Name	Description
1	EMT-23-11018-Batch-1-202308151631.HWOL	Element .hwol file used to populate the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Adrian Read

Created date: 17 Aug 2023 08:06 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	18
Appendix B: Rationale for selection of metal species	19
Appendix C: Version	20

Classification of sample: TP01-06/07/2023-0.40m

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
TP01-06/07/2023-0.40m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
7%	Entry:
(dry weight correction)	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 9.35e-07%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00533%)

Determinands

Moisture content: 7% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
1		arsenic { arsenic trioxide }				16.5 mg/kg	1.32	20.36 mg/kg	0.00204 %	✓	
		033-003-00-0	215-481-4	1327-53-3							
2		boron { diboron trioxide; boric oxide }				4.4 mg/kg	3.22	13.241 mg/kg	0.00132 %	✓	
		005-008-00-8	215-125-8	1303-86-2							
3		cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0							
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				41 mg/kg	2.27	86.981 mg/kg	0.0087 %	✓	
		024-017-00-8									
5		copper { dicopper oxide; copper (I) oxide }				40 mg/kg	1.126	42.089 mg/kg	0.00421 %	✓	
		029-002-00-X	215-270-7	1317-39-1							
6		lead { lead chromate }			1	614 mg/kg	1.56	895.071 mg/kg	0.0574 %	✓	
		082-004-00-2	231-846-0	7758-97-6							
7		mercury { mercury dichloride }				0.9 mg/kg	1.353	1.138 mg/kg	0.000114 %	✓	
		080-010-00-X	231-299-8	7487-94-7							
8		nickel { nickel chromate }				11.5 mg/kg	2.976	31.988 mg/kg	0.0032 %	✓	
		028-035-00-7	238-766-5	14721-18-7							
9		selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
		028-031-00-5	239-125-2	15060-62-5							
10		zinc { zinc chromate }				220 mg/kg	2.774	570.385 mg/kg	0.057 %	✓	
		024-007-00-3	236-878-9	13530-65-9							
11		TPH (C6 to C40) petroleum group				57 mg/kg		53.271 mg/kg	0.00533 %	✓	
				TPH							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
12	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	603-181-00-X	216-653-1	1634-04-4								
13	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
14	toluene				0.01 mg/kg		0.0093 mg/kg	0.000000935 %	✓		
	601-021-00-3	203-625-9	108-88-3								
15	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
16	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %			<LOD
	006-007-00-5										
18	pH				8.05 pH		8.05 pH	8.05 pH			
			PH								
19	naphthalene				0.06 mg/kg		0.0561 mg/kg	0.00000561 %	✓		
	601-052-00-2	202-049-5	91-20-3								
20	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-917-1	208-96-8								
21	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-469-6	83-32-9								
22	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		201-695-5	86-73-7								
23	phenanthrene				0.31 mg/kg		0.29 mg/kg	0.000029 %	✓		
		201-581-5	85-01-8								
24	anthracene				0.07 mg/kg		0.0654 mg/kg	0.00000654 %	✓		
		204-371-1	120-12-7								
25	fluoranthene				0.56 mg/kg		0.523 mg/kg	0.0000523 %	✓		
		205-912-4	206-44-0								
26	pyrene				0.61 mg/kg		0.57 mg/kg	0.000057 %	✓		
		204-927-3	129-00-0								
27	benzo[a]anthracene				0.4 mg/kg		0.374 mg/kg	0.0000374 %	✓		
	601-033-00-9	200-280-6	56-55-3								
28	chrysene				0.44 mg/kg		0.411 mg/kg	0.0000411 %	✓		
	601-048-00-0	205-923-4	218-01-9								
29	benzo[b]fluoranthene				0.45 mg/kg		0.421 mg/kg	0.0000421 %	✓		
	601-034-00-4	205-911-9	205-99-2								
30	benzo[k]fluoranthene				0.18 mg/kg		0.168 mg/kg	0.0000168 %	✓		
	601-036-00-5	205-916-6	207-08-9								
31	benzo[a]pyrene; benzo[def]chrysene				0.36 mg/kg		0.336 mg/kg	0.0000336 %	✓		
	601-032-00-3	200-028-5	50-32-8								
32	indeno[123-cd]pyrene				0.22 mg/kg		0.206 mg/kg	0.0000206 %	✓		
		205-893-2	193-39-5								
33	dibenz[a,h]anthracene				0.04 mg/kg		0.0374 mg/kg	0.00000374 %	✓		
	601-041-00-2	200-181-8	53-70-3								
34	benzo[ghi]perylene				0.27 mg/kg		0.252 mg/kg	0.0000252 %	✓		
		205-883-8	191-24-2								
35	polychlorobiphenyls; PCB				<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %			<LOD
	602-039-00-4	215-648-1	1336-36-3								
36	coronene				0.05 mg/kg		0.0467 mg/kg	0.00000467 %	✓		
		205-881-7	191-07-1								
Total:									0.14 %		



Key

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

Classification of sample: TP02-06/07/2023-0.50m

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
TP02-06/07/2023-0.50m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
10.3%	Entry:
(dry weight correction)	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 8.16e-07%)

Determinands

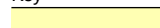
Moisture content: 10.3% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				9.1	mg/kg	1.32	10.893	mg/kg	0.00109 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	boron { diboron trioxide; boric oxide }				3.1	mg/kg	3.22	9.05	mg/kg	0.000905 %	✓	
	005-008-00-8	215-125-8	1303-86-2									
3	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				42.9	mg/kg	2.27	88.289	mg/kg	0.00883 %	✓	
	024-017-00-8											
5	copper { dicopper oxide; copper (I) oxide }				25	mg/kg	1.126	25.519	mg/kg	0.00255 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	53	mg/kg	1.56	74.95	mg/kg	0.00481 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				0.2	mg/kg	1.353	0.245	mg/kg	0.0000245 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				27.7	mg/kg	2.976	74.744	mg/kg	0.00747 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				65	mg/kg	2.774	163.481	mg/kg	0.0163 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	TPH (C6 to C40) petroleum group				<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
			TPH									
12	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
13	benzene 601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
14	toluene 601-021-00-3	203-625-9	108-88-3		0.009 mg/kg		0.0081 mg/kg	0.000000816 %	✓	
15	ethylbenzene 601-023-00-4	202-849-4	100-41-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
16	xylene 601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex } 006-007-00-5				<0.5 mg/kg	1.884	<0.942 mg/kg	<0.0000942 %		<LOD
18	pH		PH		8 pH		8 pH	8pH		
19	naphthalene 601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
20	acenaphthylene 205-917-1	208-96-8			<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
21	acenaphthene 201-469-6	83-32-9			<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
22	fluorene 201-695-5	86-73-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
23	phenanthrene 201-581-5	85-01-8			0.07 mg/kg		0.0635 mg/kg	0.00000635 %	✓	
24	anthracene 204-371-1	120-12-7			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
25	fluoranthene 205-912-4	206-44-0			0.08 mg/kg		0.0725 mg/kg	0.00000725 %	✓	
26	pyrene 204-927-3	129-00-0			0.09 mg/kg		0.0816 mg/kg	0.00000816 %	✓	
27	benzo[a]anthracene 601-033-00-9	200-280-6	56-55-3		0.08 mg/kg		0.0725 mg/kg	0.00000725 %	✓	
28	chrysene 601-048-00-0	205-923-4	218-01-9		0.09 mg/kg		0.0816 mg/kg	0.00000816 %	✓	
29	benzo[b]fluoranthene 601-034-00-4	205-911-9	205-99-2		0.08 mg/kg		0.0725 mg/kg	0.00000725 %	✓	
30	benzo[k]fluoranthene 601-036-00-5	205-916-6	207-08-9		0.03 mg/kg		0.0272 mg/kg	0.00000272 %	✓	
31	benzo[a]pyrene; benzo[def]chrysene 601-032-00-3	200-028-5	50-32-8		0.06 mg/kg		0.0544 mg/kg	0.00000544 %	✓	
32	indeno[123-cd]pyrene 205-893-2	193-39-5			<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
33	dibenz[a,h]anthracene 601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
34	benzo[ghi]perylene 205-883-8	191-24-2			0.04 mg/kg		0.0363 mg/kg	0.00000363 %	✓	
35	asbestos 650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
Total:								0.0487 %		



Key

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

Classification of sample: TP03-06/07/2023-0.25m

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
TP03-06/07/2023-0.25m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
8.9%	Entry:
(dry weight correction)	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0148%)

Determinands

Moisture content: 8.9% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number								
1		arsenic { arsenic trioxide }				14.5 mg/kg	1.32	17.58 mg/kg	0.00176 %	✓		
		033-003-00-0	215-481-4	1327-53-3								
2		boron { diboron trioxide; boric oxide }				5.5 mg/kg	3.22	16.262 mg/kg	0.00163 %	✓		
		005-008-00-8	215-125-8	1303-86-2								
3		cadmium { cadmium oxide }				0.2 mg/kg	1.142	0.21 mg/kg	0.000021 %	✓		
		048-002-00-0	215-146-2	1306-19-0								
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				40.4 mg/kg	2.27	84.213 mg/kg	0.00842 %	✓		
		024-017-00-8										
5		copper { dicopper oxide; copper (I) oxide }				51 mg/kg	1.126	52.728 mg/kg	0.00527 %	✓		
		029-002-00-X	215-270-7	1317-39-1								
6		lead { lead chromate }			1	718 mg/kg	1.56	1028.418 mg/kg	0.0659 %	✓		
		082-004-00-2	231-846-0	7758-97-6								
7		mercury { mercury dichloride }				0.8 mg/kg	1.353	0.994 mg/kg	0.0000994 %	✓		
		080-010-00-X	231-299-8	7487-94-7								
8		nickel { nickel chromate }				14.9 mg/kg	2.976	40.722 mg/kg	0.00407 %	✓		
		028-035-00-7	238-766-5	14721-18-7								
9		selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD	
		028-031-00-5	239-125-2	15060-62-5								
10		zinc { zinc chromate }				202 mg/kg	2.774	514.58 mg/kg	0.0515 %	✓		
		024-007-00-3	236-878-9	13530-65-9								
11		TPH (C6 to C40) petroleum group				161 mg/kg		147.842 mg/kg	0.0148 %	✓		
				TPH								
12		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD	
		603-181-00-X	216-653-1	1634-04-4								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
13	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
14	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
15	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
16	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				0.7 mg/kg	1.884	1.211 mg/kg	0.000121 %		✓	
	006-007-00-5										
18	pH		PH		7.7 pH		7.7 pH	7.7 pH			
19	naphthalene				0.08 mg/kg		0.0735 mg/kg	0.00000735 %		✓	
	601-052-00-2	202-049-5	91-20-3								
20	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-917-1	208-96-8								
21	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-469-6	83-32-9								
22	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %			<LOD
		201-695-5	86-73-7								
23	phenanthrene				0.59 mg/kg		0.542 mg/kg	0.0000542 %		✓	
		201-581-5	85-01-8								
24	anthracene				0.11 mg/kg		0.101 mg/kg	0.0000101 %		✓	
		204-371-1	120-12-7								
25	fluoranthene				0.82 mg/kg		0.753 mg/kg	0.0000753 %		✓	
		205-912-4	206-44-0								
26	pyrene				0.86 mg/kg		0.79 mg/kg	0.000079 %		✓	
		204-927-3	129-00-0								
27	benzo[a]anthracene				0.47 mg/kg		0.432 mg/kg	0.0000432 %		✓	
	601-033-00-9	200-280-6	56-55-3								
28	chrysene				0.6 mg/kg		0.551 mg/kg	0.0000551 %		✓	
	601-048-00-0	205-923-4	218-01-9								
29	benzo[b]fluoranthene				0.61 mg/kg		0.56 mg/kg	0.000056 %		✓	
	601-034-00-4	205-911-9	205-99-2								
30	benzo[k]fluoranthene				0.24 mg/kg		0.22 mg/kg	0.000022 %		✓	
	601-036-00-5	205-916-6	207-08-9								
31	benzo[a]pyrene; benzo[def]chrysene				0.42 mg/kg		0.386 mg/kg	0.0000386 %		✓	
	601-032-00-3	200-028-5	50-32-8								
32	indeno[123-cd]pyrene				0.3 mg/kg		0.275 mg/kg	0.0000275 %		✓	
		205-893-2	193-39-5								
33	dibenz[a,h]anthracene				0.09 mg/kg		0.0826 mg/kg	0.00000826 %		✓	
	601-041-00-2	200-181-8	53-70-3								
34	benzo[ghi]perylene				0.34 mg/kg		0.312 mg/kg	0.0000312 %		✓	
		205-883-8	191-24-2								
35	polychlorobiphenyls; PCB				<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %			<LOD
	602-039-00-4	215-648-1	1336-36-3								
36	coronene				0.07 mg/kg		0.0643 mg/kg	0.00000643 %		✓	
		205-881-7	191-07-1								
Total:									0.154 %		



Key

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

Classification of sample: TP04-06/07/2023-0.35m

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
TP04-06/07/2023-0.35m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
9.2%	Entry:
(dry weight correction)	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 4.58e-07%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.00879%)

xylene: (conc.: 9.16e-07%)

Determinands

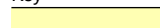
Moisture content: 9.2% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				13.3 mg/kg	1.32	16.081 mg/kg	0.00161 %		✓	
	033-003-00-0	215-481-4	1327-53-3								
2	boron { diboron trioxide; boric oxide }				4.6 mg/kg	3.22	13.564 mg/kg	0.00136 %		✓	
	005-008-00-8	215-125-8	1303-86-2								
3	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %			<LOD
	048-002-00-0	215-146-2	1306-19-0								
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				37.9 mg/kg	2.27	78.785 mg/kg	0.00788 %		✓	
	024-017-00-8										
5	copper { dicopper oxide; copper (I) oxide }				48 mg/kg	1.126	49.49 mg/kg	0.00495 %		✓	
	029-002-00-X	215-270-7	1317-39-1								
6	lead { lead chromate }			1	518 mg/kg	1.56	739.912 mg/kg	0.0474 %		✓	
	082-004-00-2	231-846-0	7758-97-6								
7	mercury { mercury dichloride }				0.9 mg/kg	1.353	1.116 mg/kg	0.000112 %		✓	
	080-010-00-X	231-299-8	7487-94-7								
8	nickel { nickel chromate }				13.4 mg/kg	2.976	36.522 mg/kg	0.00365 %		✓	
	028-035-00-7	238-766-5	14721-18-7								
9	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %			<LOD
	028-031-00-5	239-125-2	15060-62-5								
10	zinc { zinc chromate }				145 mg/kg	2.774	368.362 mg/kg	0.0368 %		✓	
	024-007-00-3	236-878-9	13530-65-9								

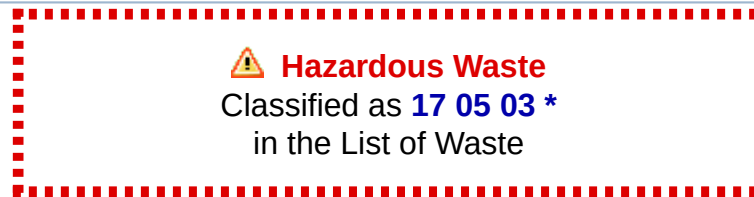
#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
11	TPH (C6 to C40) petroleum group				96 mg/kg		87.912 mg/kg	0.00879 %	✓	
			TPH							
12	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
13	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
14	toluene				0.005 mg/kg		0.0045 mg/kg	0.000000458 %	✓	
	601-021-00-3	203-625-9	108-88-3							
15	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
16	xylene				0.01 mg/kg		0.0091 mg/kg	0.000000916 %	✓	
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
17	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				1.2 mg/kg	1.884	2.07 mg/kg	0.000207 %	✓	
	006-007-00-5									
18	pH				7.68 pH		7.68 pH	7.68 pH		
			PH							
19	naphthalene				0.05 mg/kg		0.0458 mg/kg	0.00000458 %	✓	
	601-052-00-2	202-049-5	91-20-3							
20	acenaphthylene				0.04 mg/kg		0.0366 mg/kg	0.00000366 %	✓	
		205-917-1	208-96-8							
21	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
22	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
23	phenanthrene				0.32 mg/kg		0.293 mg/kg	0.0000293 %	✓	
		201-581-5	85-01-8							
24	anthracene				0.09 mg/kg		0.0824 mg/kg	0.00000824 %	✓	
		204-371-1	120-12-7							
25	fluoranthene				0.75 mg/kg		0.687 mg/kg	0.0000687 %	✓	
		205-912-4	206-44-0							
26	pyrene				0.79 mg/kg		0.723 mg/kg	0.0000723 %	✓	
		204-927-3	129-00-0							
27	benzo[a]anthracene				0.39 mg/kg		0.357 mg/kg	0.0000357 %	✓	
	601-033-00-9	200-280-6	56-55-3							
28	chrysene				0.51 mg/kg		0.467 mg/kg	0.0000467 %	✓	
	601-048-00-0	205-923-4	218-01-9							
29	benzo[b]fluoranthene				0.48 mg/kg		0.44 mg/kg	0.000044 %	✓	
	601-034-00-4	205-911-9	205-99-2							
30	benzo[k]fluoranthene				0.19 mg/kg		0.174 mg/kg	0.0000174 %	✓	
	601-036-00-5	205-916-6	207-08-9							
31	benzo[a]pyrene; benzo[def]chrysene				0.33 mg/kg		0.302 mg/kg	0.0000302 %	✓	
	601-032-00-3	200-028-5	50-32-8							
32	indeno[123-cd]pyrene				0.23 mg/kg		0.211 mg/kg	0.0000211 %	✓	
		205-893-2	193-39-5							
33	dibenz[a,h]anthracene				0.04 mg/kg		0.0366 mg/kg	0.00000366 %	✓	
	601-041-00-2	200-181-8	53-70-3							
34	benzo[ghi]perylene				0.27 mg/kg		0.247 mg/kg	0.0000247 %	✓	
		205-883-8	191-24-2							
Total:								0.114 %		



Key

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

Classification of sample: TP05-06/07/2023-0.30m



Sample details

Sample name:	LoW Code:	
TP05-06/07/2023-0.30m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:	Entry:	17 05 03 * (Soil and stones containing hazardous substances)
4.5% (dry weight correction)		

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1A; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

zinc chromate: (compound conc.: 0.327%)

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

lead chromate: (Note 1 conc.: 0.361%)

HP 10: Toxic for reproduction "waste which has adverse effects on sexual function and fertility in adult males and females, as well as developmental toxicity in the offspring"

Hazard Statements hit:

Repr. 1A; H360Df "May damage the unborn child. Suspected of damaging fertility."

Because of determinand:

lead chromate: (Note 1 conc.: 0.361%)

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Hazard Statements hit:

Aquatic Chronic 1; H410 "Very toxic to aquatic life with long lasting effects."

Because of determinands:

lead chromate: (Note 1 conc.: 0.361%)

zinc chromate: (compound conc.: 0.327%)

Hazard properties (substances considered hazardous until shown otherwise)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 1.24e-06%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.0421%)

xylene: (conc.: 1.24e-06%)



Determinands

Moisture content: 4.5% Dry Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number								
1		arsenic { arsenic trioxide }				13.7 mg/kg	1.32	17.31 mg/kg	0.00173 %	✓		
		033-003-00-0	215-481-4	1327-53-3								
2		boron { diboron trioxide; boric oxide }				17.1 mg/kg	3.22	52.689 mg/kg	0.00527 %	✓		
		005-008-00-8	215-125-8	1303-86-2								
3		cadmium { cadmium oxide }				6.5 mg/kg	1.142	7.105 mg/kg	0.000711 %	✓		
		048-002-00-0	215-146-2	1306-19-0								
4		chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				55.3 mg/kg	2.27	120.125 mg/kg	0.012 %	✓		
		024-017-00-8										
5		copper { dicopper oxide; copper (I) oxide }				92 mg/kg	1.126	99.121 mg/kg	0.00991 %	✓		
		029-002-00-X	215-270-7	1317-39-1								
6		lead { lead chromate }			1	3774 mg/kg	1.56	5633.246 mg/kg	0.361 %	✓		
		082-004-00-2	231-846-0	7758-97-6								
7		mercury { mercury dichloride }				2.8 mg/kg	1.353	3.627 mg/kg	0.000363 %	✓		
		080-010-00-X	231-299-8	7487-94-7								
8		nickel { nickel chromate }				28.5 mg/kg	2.976	81.171 mg/kg	0.00812 %	✓		
		028-035-00-7	238-766-5	14721-18-7								
9		selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD	
		028-031-00-5	239-125-2	15060-62-5								
10		zinc { zinc chromate }				1231 mg/kg	2.774	3267.918 mg/kg	0.327 %	✓		
		024-007-00-3	236-878-9	13530-65-9								
11		TPH (C6 to C40) petroleum group				440 mg/kg		421.053 mg/kg	0.0421 %	✓		
				TPH								
12		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD	
		603-181-00-X	216-653-1	1634-04-4								
13		benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD	
		601-020-00-8	200-753-7	71-43-2								
14		toluene				0.013 mg/kg		0.0124 mg/kg	0.00000124 %	✓		
		601-021-00-3	203-625-9	108-88-3								
15		ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD	
		601-023-00-4	202-849-4	100-41-4								
16		xylene				0.013 mg/kg		0.0124 mg/kg	0.00000124 %	✓		
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
17		cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				3.6 mg/kg	1.884	6.49 mg/kg	0.000649 %	✓		
		006-007-00-5										
18		pH				8.31 pH		8.31 pH	8.31 pH			
				PH								
19		naphthalene				0.11 mg/kg		0.105 mg/kg	0.0000105 %	✓		
		601-052-00-2	202-049-5	91-20-3								
20		acenaphthylene				0.11 mg/kg		0.105 mg/kg	0.0000105 %	✓		
			205-917-1	208-96-8								
21		acenaphthene				0.07 mg/kg		0.067 mg/kg	0.0000067 %	✓		
			201-469-6	83-32-9								
22		fluorene				0.04 mg/kg		0.0383 mg/kg	0.00000383 %	✓		
			201-695-5	86-73-7								
23		phenanthrene				0.96 mg/kg		0.919 mg/kg	0.0000919 %	✓		
			201-581-5	85-01-8								
24		anthracene				0.25 mg/kg		0.239 mg/kg	0.0000239 %	✓		
			204-371-1	120-12-7								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
25	fluoranthene	205-912-4	206-44-0		2.75 mg/kg		2.632 mg/kg	0.000263 %	✓	
26	pyrene	204-927-3	129-00-0		4.15 mg/kg		3.971 mg/kg	0.000397 %	✓	
27	benzo[a]anthracene	601-033-00-9	200-280-6		2.89 mg/kg		2.766 mg/kg	0.000277 %	✓	
28	chrysene	601-048-00-0	205-923-4		4.19 mg/kg		4.01 mg/kg	0.000401 %	✓	
29	benzo[b]fluoranthene	601-034-00-4	205-911-9		6.19 mg/kg		5.923 mg/kg	0.000592 %	✓	
30	benzo[k]fluoranthene	601-036-00-5	205-916-6		2.41 mg/kg		2.306 mg/kg	0.000231 %	✓	
31	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		3.94 mg/kg		3.77 mg/kg	0.000377 %	✓	
32	indeno[123-cd]pyrene	205-893-2	193-39-5		3.24 mg/kg		3.1 mg/kg	0.00031 %	✓	
33	dibenz[a,h]anthracene	601-041-00-2	200-181-8		0.97 mg/kg		0.928 mg/kg	0.0000928 %	✓	
34	benzo[ghi]perylene	205-883-8	191-24-2		4.04 mg/kg		3.866 mg/kg	0.000387 %	✓	
35	polychlorobiphenyls; PCB	602-039-00-4	215-648-1		<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
36	coronene	205-881-7	191-07-1		0.47 mg/kg		0.45 mg/kg	0.000045 %	✓	
37	asbestos	650-013-00-6	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
Total:								0.774 %		

Key

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

Appendix A: Classifier defined and non GB MCL determinands

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4

Description/Comments:

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

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

GB MCL index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

pH (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Skin Irrit. 2; H315, Eye Irrit. 2; H319, STOT SE 3; H335, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Carc. 2; H351

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

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410

▪ **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

GB MCL index number: 602-039-00-4

Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans;

POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.

Additional Hazard Statement(s): Carc. 1A; H350

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 1A; H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

▪ **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC - Group 3, not carcinogenic.

Data source: <http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en>

Data source date: 16 Jun 2014

Hazard Statements: STOT SE 2; H371

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

boron {diboron trioxide; boric oxide}

Reasonable case CLP species based on hazard statements/ molecular weight, physical form and low solubility. Industrial sources include: fluxing agent for glass/enamels; additive for fibre optics, borosilicate glass (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worst case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)



selenium {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

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

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide] (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2023.226.5717.10536 (14 Aug 2023)

HazWasteOnline Database: 2023.226.5717.10536 (14 Aug 2023)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK:

2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021



Waste Classification Report

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

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



7411R-OI3UQ-HTZC9

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

Job name

EMT-24-1102-Batch-1-202402021204

Description/Comments

Project

TE1764

Site

Manchester Art Gallery, Manchester

Classified by

Name: **Adrian Read**
Date: **08 Feb 2024 10:52 GMT**
Telephone: **01925 818388**

Company: **Tier Environmental**
Suite 414
Chadwick House
Warrington
WA3 6AE

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

HazWasteOnline™ Certification:

CERTIFIED

Course

Hazardous Waste Classification
Most recent 3 year Refresher

Date

03 Dec 2020
05 Dec 2023

Next 3 year Refresher due by Dec 2026

Purpose of classification

2 - Material Characterisation

Address of the waste

Mosley St, Manchester

Post Code M2 3JL

SIC for the process giving rise to the waste

Description of industry/producer giving rise to the waste

Proposed redevelopment of land

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

Waste created during excavation of soils during development

Description of the waste

Made ground and/or natural soils



Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	HDP101-22/01/2024-0.50m		Potentially Hazardous	HP 3(i)	3
2	HDP102-22/01/2024-0.80m		Non Hazardous		9
3	HDP103-22/01/2024-0.75m		Non Hazardous		11
4	HDP105-22/01/2024-0.50m		Potentially Hazardous	HP 3(i)	13

Related documents

#	Name	Description
1	EMT-24-1102-Batch-1-202402021204.HWOL	Element .hwol file used to populate the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Adrian Read

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Classification of sample: HDP101-22/01/2024-0.50m

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
HDP101-22/01/2024-0.50m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
2%	Entry:
(dry weight correction)	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

ethylbenzene: (conc.: 4.9e-07%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

xylene: (conc.: 2.55e-06%)

mesitylene; 1,3,5-trimethylbenzene: (conc.: 1.08e-06%)

1,2,4-trimethylbenzene: (conc.: 2.94e-06%)

Determinands

Moisture content: 2% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				7.4 mg/kg	1.32	9.579 mg/kg	0.000958 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				37.4 mg/kg	2.27	83.233 mg/kg	0.00832 %	✓	
	024-017-00-8									
4	copper { dicopper oxide; copper (I) oxide }				24 mg/kg	1.126	26.491 mg/kg	0.00265 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
5	lead { lead chromate }			1	12 mg/kg	1.56	18.351 mg/kg	0.00118 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
6	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
7	nickel { nickel chromate }				38.1 mg/kg	2.976	111.172 mg/kg	0.0111 %	✓	
	028-035-00-7	238-766-5	14721-18-7							
8	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
9	zinc { zinc chromate }				68 mg/kg	2.774	184.943 mg/kg	0.0185 %	✓	
	024-007-00-3	236-878-9	13530-65-9							
10	TPH (C6 to C40) petroleum group				<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
			TPH							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
12	benzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				0.005 mg/kg		0.0049 mg/kg	0.00000049 %	✓	
	601-023-00-4	202-849-4	100-41-4							
15	xylene				0.026 mg/kg		0.0255 mg/kg	0.00000255 %	✓	
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
16	pH		PH		8.66 pH		8.66 pH	8.66 pH		
17	naphthalene				3.45 mg/kg		3.382 mg/kg	0.000338 %	✓	
	601-052-00-2	202-049-5	91-20-3							
18	acenaphthylene				0.04 mg/kg		0.0392 mg/kg	0.00000392 %	✓	
		205-917-1	208-96-8							
19	acenaphthene				0.41 mg/kg		0.402 mg/kg	0.0000402 %	✓	
		201-469-6	83-32-9							
20	fluorene				0.27 mg/kg		0.265 mg/kg	0.0000265 %	✓	
		201-695-5	86-73-7							
21	phenanthrene				2.87 mg/kg		2.814 mg/kg	0.000281 %	✓	
		201-581-5	85-01-8							
22	anthracene				0.43 mg/kg		0.422 mg/kg	0.0000422 %	✓	
		204-371-1	120-12-7							
23	fluoranthene				4.05 mg/kg		3.971 mg/kg	0.000397 %	✓	
		205-912-4	206-44-0							
24	pyrene				3.25 mg/kg		3.186 mg/kg	0.000319 %	✓	
		204-927-3	129-00-0							
25	benzo[a]anthracene				1.03 mg/kg		1.01 mg/kg	0.000101 %	✓	
	601-033-00-9	200-280-6	56-55-3							
26	chrysene				1.2 mg/kg		1.176 mg/kg	0.000118 %	✓	
	601-048-00-0	205-923-4	218-01-9							
27	benzo[b]fluoranthene				0.76 mg/kg		0.745 mg/kg	0.0000745 %	✓	
	601-034-00-4	205-911-9	205-99-2							
28	benzo[k]fluoranthene				0.29 mg/kg		0.284 mg/kg	0.0000284 %	✓	
	601-036-00-5	205-916-6	207-08-9							
29	benzo[a]pyrene; benzo[def]chrysene				0.64 mg/kg		0.627 mg/kg	0.0000627 %	✓	
	601-032-00-3	200-028-5	50-32-8							
30	indeno[123-cd]pyrene				0.26 mg/kg		0.255 mg/kg	0.0000255 %	✓	
		205-893-2	193-39-5							
31	dibenz[a,h]anthracene				0.08 mg/kg		0.0784 mg/kg	0.00000784 %	✓	
	601-041-00-2	200-181-8	53-70-3							
32	benzo[ghi]perylene				0.3 mg/kg		0.294 mg/kg	0.0000294 %	✓	
		205-883-8	191-24-2							
33	phenol				0.253 mg/kg		0.248 mg/kg	0.0000248 %	✓	
	604-001-00-2	203-632-7	108-95-2							
34	1,1-dichloroethane and 1,2-dichloroethane (combined)				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
		203-458-1, 200-863-5	107-06-2, 75-34-3							
35	tetrachloroethylene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-028-00-4	204-825-9	127-18-4							
36	carbon tetrachloride; tetrachloromethane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-008-00-5	200-262-8	56-23-5							
37	trichloroethylene; trichloroethene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-027-00-9	201-167-4	79-01-6							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
38	vinyl chloride; chloroethylene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	602-023-00-7	200-831-0	75-01-4							
39	hexachlorobenzene				<0.01 mg/kg		<0.01 mg/kg	<0.0000001 %		<LOD
	602-065-00-6	204-273-9	118-74-1							
40	dichlorodifluoromethane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
		200-893-9	75-71-8							
41	chloromethane; methyl chloride				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-001-00-7	200-817-4	74-87-3							
42	bromomethane; methylbromide				<0.001 mg/kg		<0.001 mg/kg	<0.0000001 %		<LOD
	602-002-00-2	200-813-2	74-83-9							
43	chloroethane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	602-009-00-0	200-830-5	75-00-3							
44	trichlorofluoromethane				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
		200-892-3	75-69-4							
45	1,1-dichloroethylene; vinylidene chloride				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-025-00-8	200-864-0	75-35-4							
46	dichloromethane; methylene chloride				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
	602-004-00-3	200-838-9	75-09-2							
47	2,2-dichloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		209-832-0	594-20-7							
48	bromochloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		200-826-3	74-97-5							
49	chloroform; trichloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-006-00-4	200-663-8	67-66-3							
50	1,1,1-trichloroethane; methyl chloroform				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-013-00-2	200-756-3	71-55-6							
51	1,1-dichloropropene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-031-00-0	209-253-3	563-58-6							
52	1,2-dichloropropane; propylene dichloride				<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
	602-020-00-0	201-152-2	78-87-5							
53	dibromomethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-003-00-8	200-824-2	74-95-3							
54	bromodichloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		200-856-7	75-27-4							
55	1,3-dichloropropene; [1] (Z)-1,3-dichloropropene [2]				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-030-00-5	208-826-5 [1] 233-195-8 [2]	542-75-6 [1] 10061-01-5 [2]							
56	trans-1,3-dichloropropene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		431-460-4	10061-02-6							
57	1,1,2-trichloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-014-00-8	201-166-9	79-00-5							
58	1,3-dichloropropane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		205-531-3	142-28-9							
59	dibromochloromethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		204-704-0	124-48-1							
60	1,2-dibromoethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-010-00-6	203-444-5	106-93-4							
61	chlorobenzene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-033-00-1	203-628-5	108-90-7							
62	1,1,1,2-tetrachloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
		211-135-1	630-20-6							
63	bromoform; tribromomethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-007-00-X	200-854-6	75-25-2							
64	cumene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-024-00-X	202-704-5	98-82-8							
65	1,1,2,2-tetrachloroethane				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	602-015-00-3	201-197-8	79-34-5							
66	bromobenzene				<0.002 mg/kg		<0.002 mg/kg	<0.0000002 %		<LOD
	602-060-00-9	203-623-8	108-86-1							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
67	1,2,3-trichloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-062-00-X	202-486-1	96-18-4							
68	mesitylene; 1,3,5-trimethylbenzene				0.011 mg/kg		0.0108 mg/kg	0.00000108 %	✓	
	601-025-00-5	203-604-4	108-67-8							
69	tert-butylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		202-632-4	98-06-6							
70	1,2,4-trimethylbenzene				0.03 mg/kg		0.0294 mg/kg	0.00000294 %	✓	
	601-043-00-3	202-436-9	95-63-6							
71	sec-butylbenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		205-227-0	135-98-8							
72	4-isopropyltoluene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		202-796-7	99-87-6							
73	1,3-dichlorobenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-067-00-7	208-792-1	541-73-1							
74	1,4-dichlorobenzene; p-dichlorobenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-035-00-2	203-400-5	106-46-7							
75	n-butylbenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		203-209-7	104-51-8							
76	1,2-dichlorobenzene; o-dichlorobenzene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-034-00-7	202-425-9	95-50-1							
77	1,2-dibromo-3-chloropropane				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
	602-021-00-6	202-479-3	96-12-8							
78	1,2,4-trichlorobenzene				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
	602-087-00-6	204-428-0	120-82-1							
79	hexachlorobutadiene				<0.004 mg/kg		<0.004 mg/kg	<0.0000004 %		<LOD
		201-765-5	87-68-3							
80	1,2,3-trichlorobenzene				<0.007 mg/kg		<0.007 mg/kg	<0.0000007 %		<LOD
		201-757-1	87-61-6							
81	styrene				<0.003 mg/kg		<0.003 mg/kg	<0.0000003 %		<LOD
	601-026-00-0	202-851-5	100-42-5							
82	2-chlorophenol; [1] 4-chlorophenol; [2] 3-chlorophenol; [3] chlorophenol [4]				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-008-00-0	202-433-2 [1]	95-57-8 [1]							
		203-402-6 [2]	106-48-9 [2]							
		203-582-6 [3]	108-43-0 [3]							
		246-691-4 [4]	25167-80-0 [4]							
83	2-nitrophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		201-857-5	88-75-5							
84	2,4-dichlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-011-00-7	204-429-6	120-83-2							
85	3,4-xyleneol; [1] 2,5-xyleneol; [2] 2,4-xyleneol; [3] 2,3-xyleneol; [4] 2,6-xyleneol; [5] xyleneol; [6] 2,4(or 2,5)-xyleneol [7]				0.19 mg/kg		0.186 mg/kg	0.0000186 %	✓	
	604-006-00-X	202-439-5 [1]	95-65-8 [1]							
		202-461-5 [2]	95-87-4 [2]							
		203-321-6 [3]	105-67-9 [3]							
		208-395-3 [4]	526-75-0 [4]							
		209-400-1 [5]	576-26-1 [5]							
		215-089-3 [6]	1300-71-6 [6]							
		276-245-4 [7]	71975-58-1 [7]							
86	2,4,5-trichlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-017-00-X	202-467-8	95-95-4							
87	2,4,6-trichlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-018-00-5	201-795-9	88-06-2							
88	chlorocresol; 4-chloro-m-cresol; 4-chloro-3-methylphenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-014-00-3	200-431-6	59-50-7							
89	4-nitrophenol; p-nitrophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	609-015-00-2	202-811-7	100-02-7							
90	pentachlorophenol				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	604-002-00-8	201-778-6	87-86-5							



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
91	2-chloronaphthalene	202-079-9	91-58-7		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
92	2-methyl naphthalene	202-078-3	91-57-6		1.307 mg/kg		1.281 mg/kg	0.000128 %	✓	
93	bis(2-ethylhexyl) phthalate; di-(2-ethylhexyl) phthalate; DEHP	607-317-00-9	204-211-0	117-81-7	0.172 mg/kg		0.169 mg/kg	0.0000169 %	✓	
94	BBP; benzyl butyl phthalate	607-430-00-3	201-622-7	85-68-7	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
95	dibutyl phthalate; DBP	607-318-00-4	201-557-4	84-74-2	<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
96	di-n-octyl phthalate	204-214-7	117-84-0		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
97	diethyl phthalate	201-550-6	84-66-2		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
98	dimethyl phthalate	205-011-6	131-11-3		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
99	2,4-dinitrotoluene; [1] dinitrotoluene [2]	609-007-00-9	204-450-0 [1] 246-836-1 [2]	121-14-2 [1] 25321-14-6 [2]	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
100	2,6-dinitrotoluene	609-049-00-8	210-106-0	606-20-2	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
101	4-bromophenylphenylether	202-952-4	101-55-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
102	4-chloroaniline	612-137-00-9	203-401-0	106-47-8	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
103	4-chlorophenylphenylether	230-281-7	7005-72-3		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
104	azobenzene	611-001-00-6	203-102-5	103-33-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
105	bis(2-chloroethoxy)methane	203-920-2	111-91-1		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
106	bis(2-chloroethyl) ether	603-029-00-2	203-870-1	111-44-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
107	carbazole	201-696-0	86-74-8		0.156 mg/kg		0.153 mg/kg	0.0000153 %	✓	
108	dibenzofuran	205-071-3	132-64-9		0.348 mg/kg		0.341 mg/kg	0.0000341 %	✓	
109	hexachlorocyclopentadiene	602-078-00-7	201-029-3	77-47-4	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
110	hexachloroethane	200-666-4	67-72-1		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
111	3,5-trimethylcyclohex-2-enone; isophorone	606-012-00-8	201-126-0	78-59-1	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
112	nitrosodipropylamine	612-098-00-8	210-698-0	621-64-7	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
113	nitrobenzene	609-003-00-7	202-716-0	98-95-3	<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
114	1,2-dichloroethylene; [1] cis-dichloroethylene; [2] trans-dichloroethylene [3]	602-026-00-3	208-750-2 [1] 205-859-7 [2] 205-860-2 [3]	540-59-0 [1] 156-59-2 [2] 156-60-5 [3]	<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD
115	2-chlorotoluene; [1] 3-chlorotoluene; [2] 4-chlorotoluene; [3] chlorotoluene [4]	602-040-00-X	202-424-3 [1] 203-580-5 [2] 203-397-0 [3] 246-698-2 [4]	95-49-8 [1] 108-41-8 [2] 106-43-4 [3] 25168-05-2 [4]	<0.006 mg/kg		<0.006 mg/kg	<0.0000006 %		<LOD



#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		EU CLP index number	EC Number	CAS Number							
116		m-cresol; [1] o-cresol; [2] p-cresol; [3] mix-cresol [4]				0.599 mg/kg	0.587 mg/kg	0.0000587 %	✓		
	604-004-00-9	203-577-9 [1]	108-39-4 [1]								
		202-423-8 [2]	95-48-7 [2]								
		203-398-6 [3]	106-44-5 [3]								
		215-293-2 [4]	1319-77-3 [4]								
117		o-nitroaniline; [1] m-nitroaniline; [2] p-nitroaniline [3]				<0.03 mg/kg	<0.03 mg/kg	<0.000003 %		<LOD	
	612-012-00-9	201-855-4 [1]	88-74-4 [1]								
		202-729-1 [2]	99-09-2 [2]								
		202-810-1 [3]	100-01-6 [3]								
Total:								0.0505 %			

Key

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

Classification of sample: HDP102-22/01/2024-0.80m

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

Sample details

Sample name:	LoW Code:
HDP102-22/01/2024-0.80m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
6.6% (dry weight correction)	Entry:
	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 6.6% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				7 mg/kg	1.32	8.67	mg/kg	0.000867 %	✓	
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				<0.1 mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0								
3	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				35.8 mg/kg	2.27	76.235	mg/kg	0.00762 %	✓	
	024-017-00-8										
4	copper { dicopper oxide; copper (I) oxide }				25 mg/kg	1.126	26.405	mg/kg	0.00264 %	✓	
	029-002-00-X	215-270-7	1317-39-1								
5	lead { lead chromate }			1	13 mg/kg	1.56	19.022	mg/kg	0.00122 %	✓	
	082-004-00-2	231-846-0	7758-97-6								
6	mercury { mercury dichloride }				<0.1 mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
7	nickel { nickel chromate }				36.1 mg/kg	2.976	100.791	mg/kg	0.0101 %	✓	
	028-035-00-7	238-766-5	14721-18-7								
8	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5								
9	zinc { zinc chromate }				67 mg/kg	2.774	174.36	mg/kg	0.0174 %	✓	
	024-007-00-3	236-878-9	13530-65-9								
10	pH				8.75 pH		8.75	pH	8.75 pH		
11	naphthalene				14.67 mg/kg		13.762	mg/kg	0.00138 %	✓	
	601-052-00-2	202-049-5	91-20-3								
12	acenaphthylene				0.1 mg/kg		0.0938	mg/kg	0.00000938 %	✓	
		205-917-1	208-96-8								
13	acenaphthene				2.15 mg/kg		2.017	mg/kg	0.000202 %	✓	
		201-469-6	83-32-9								
14	fluorene				1.23 mg/kg		1.154	mg/kg	0.000115 %	✓	
		201-695-5	86-73-7								
15	phenanthrene				5.84 mg/kg		5.478	mg/kg	0.000548 %	✓	
		201-581-5	85-01-8								
16	anthracene				1.01 mg/kg		0.947	mg/kg	0.0000947 %	✓	
		204-371-1	120-12-7								
17	fluoranthene				3.84 mg/kg		3.602	mg/kg	0.00036 %	✓	
		205-912-4	206-44-0								



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	pyrene	204-927-3	129-00-0		3.91 mg/kg		3.668 mg/kg	0.000367 %	✓	
19	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	1.82 mg/kg		1.707 mg/kg	0.000171 %	✓	
20	chrysene	601-048-00-0	205-923-4	218-01-9	2.41 mg/kg		2.261 mg/kg	0.000226 %	✓	
21	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	1.84 mg/kg		1.726 mg/kg	0.000173 %	✓	
22	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.71 mg/kg		0.666 mg/kg	0.0000666 %	✓	
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	1.66 mg/kg		1.557 mg/kg	0.000156 %	✓	
24	indeno[123-cd]pyrene	205-893-2	193-39-5		0.75 mg/kg		0.704 mg/kg	0.0000704 %	✓	
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.26 mg/kg		0.244 mg/kg	0.0000244 %	✓	
26	benzo[ghi]perylene	205-883-8	191-24-2		0.9 mg/kg		0.844 mg/kg	0.0000844 %	✓	
Total:								0.0442 %		

Key

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

Classification of sample: HDP103-22/01/2024-0.75m

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

Sample details

Sample name:	LoW Code:
HDP103-22/01/2024-0.75m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
14.1%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(dry weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 14.1% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				13.2	mg/kg	1.32	15.275	mg/kg	0.00153 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				27.8	mg/kg	2.27	55.308	mg/kg	0.00553 %	✓	
	024-017-00-8											
4	copper { dicopper oxide; copper (I) oxide }				53	mg/kg	1.126	52.298	mg/kg	0.00523 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	780	mg/kg	1.56	1066.307	mg/kg	0.0684 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury dichloride }				1.1	mg/kg	1.353	1.305	mg/kg	0.00013 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel chromate }				17.3	mg/kg	2.976	45.127	mg/kg	0.00451 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
9	zinc { zinc chromate }				149	mg/kg	2.774	362.268	mg/kg	0.0362 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	pH				7.84	pH		7.84	pH	7.84 pH		
11	naphthalene				0.1	mg/kg		0.0876	mg/kg	0.00000876 %	✓	
	601-052-00-2	202-049-5	91-20-3									
12	acenaphthylene				0.05	mg/kg		0.0438	mg/kg	0.00000438 %	✓	
		205-917-1	208-96-8									
13	acenaphthene				0.06	mg/kg		0.0526	mg/kg	0.00000526 %	✓	
		201-469-6	83-32-9									
14	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7									
15	phenanthrene				0.63	mg/kg		0.552	mg/kg	0.0000552 %	✓	
		201-581-5	85-01-8									
16	anthracene				0.15	mg/kg		0.131	mg/kg	0.0000131 %	✓	
		204-371-1	120-12-7									
17	fluoranthene				0.91	mg/kg		0.798	mg/kg	0.0000798 %	✓	
		205-912-4	206-44-0									



#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
18	pyrene	204-927-3	129-00-0		0.95 mg/kg		0.833 mg/kg	0.0000833 %	✓	
19	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	0.76 mg/kg		0.666 mg/kg	0.0000666 %	✓	
20	chrysene	601-048-00-0	205-923-4	218-01-9	0.87 mg/kg		0.762 mg/kg	0.0000762 %	✓	
21	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	0.91 mg/kg		0.798 mg/kg	0.0000798 %	✓	
22	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	0.35 mg/kg		0.307 mg/kg	0.0000307 %	✓	
23	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	0.76 mg/kg		0.666 mg/kg	0.0000666 %	✓	
24	indeno[123-cd]pyrene	205-893-2	193-39-5		0.41 mg/kg		0.359 mg/kg	0.0000359 %	✓	
25	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	0.14 mg/kg		0.123 mg/kg	0.0000123 %	✓	
26	benzo[ghi]perylene	205-883-8	191-24-2		0.4 mg/kg		0.351 mg/kg	0.0000351 %	✓	
Total:								0.122 %		

Key

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

Classification of sample: HDP105-22/01/2024-0.50m

*** Potentially Hazardous Waste**
Classified as **17 05 04** or **17 05 03 ***
in the List of Waste

Sample details

Sample name:	LoW Code:
HDP105-22/01/2024-0.50m	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
13.8%	Entry:
(dry weight correction)	17 05 04 or 17 05 03 * (Soil and stones other than those mentioned in 17 05 03 or Soil and stones containing hazardous substances)

Hazard properties (substances considered hazardous until shown otherwise)

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0087%)

Determinands

Moisture content: 13.8% Dry Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				15.1	mg/kg	1.32	17.519	mg/kg	0.00175 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				26.3	mg/kg	2.27	52.461	mg/kg	0.00525 %	✓	
	024-017-00-8											
4	copper { dicopper oxide; copper (I) oxide }				60	mg/kg	1.126	59.361	mg/kg	0.00594 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	1096	mg/kg	1.56	1502.247	mg/kg	0.0963 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury dichloride }				1.5	mg/kg	1.353	1.784	mg/kg	0.000178 %	✓	
	080-010-00-X	231-299-8	7487-94-7									
7	nickel { nickel chromate }				14.1	mg/kg	2.976	36.876	mg/kg	0.00369 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
8	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
9	zinc { zinc chromate }				258	mg/kg	2.774	628.937	mg/kg	0.0629 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
10	TPH (C6 to C40) petroleum group		TPH		99	mg/kg		86.995	mg/kg	0.0087 %	✓	
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									
12	benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
13	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
16	pH		PH		7.93 pH		7.93 pH	7.93 pH		
17	naphthalene				0.07 mg/kg		0.0615 mg/kg	0.00000615 %	✓	
	601-052-00-2	202-049-5	91-20-3							
18	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8							
19	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
20	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		201-695-5	86-73-7							
21	phenanthrene				0.26 mg/kg		0.228 mg/kg	0.0000228 %	✓	
		201-581-5	85-01-8							
22	anthracene				0.06 mg/kg		0.0527 mg/kg	0.00000527 %	✓	
		204-371-1	120-12-7							
23	fluoranthene				0.4 mg/kg		0.351 mg/kg	0.0000351 %	✓	
		205-912-4	206-44-0							
24	pyrene				0.42 mg/kg		0.369 mg/kg	0.0000369 %	✓	
		204-927-3	129-00-0							
25	benzo[a]anthracene				0.26 mg/kg		0.228 mg/kg	0.0000228 %	✓	
	601-033-00-9	200-280-6	56-55-3							
26	chrysene				0.31 mg/kg		0.272 mg/kg	0.0000272 %	✓	
	601-048-00-0	205-923-4	218-01-9							
27	benzo[b]fluoranthene				0.33 mg/kg		0.29 mg/kg	0.000029 %	✓	
	601-034-00-4	205-911-9	205-99-2							
28	benzo[k]fluoranthene				0.13 mg/kg		0.114 mg/kg	0.0000114 %	✓	
	601-036-00-5	205-916-6	207-08-9							
29	benzo[a]pyrene; benzo[def]chrysene				0.26 mg/kg		0.228 mg/kg	0.0000228 %	✓	
	601-032-00-3	200-028-5	50-32-8							
30	indeno[123-cd]pyrene				0.17 mg/kg		0.149 mg/kg	0.0000149 %	✓	
		205-893-2	193-39-5							
31	dibenz[a,h]anthracene				0.06 mg/kg		0.0527 mg/kg	0.00000527 %	✓	
	601-041-00-2	200-181-8	53-70-3							
32	benzo[ghi]perylene				0.2 mg/kg		0.176 mg/kg	0.0000176 %	✓	
		205-883-8	191-24-2							
Total:								0.185 %		

Key

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

Appendix A: Classifier defined and non GB MCL determinands

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: Flam. Liq. 3; H226, Asp. Tox. 1; H304, STOT RE 2; H373, Muta. 1B; H340, Carc. 1B; H350, Repr. 2; H361d, Aquatic Chronic 2; H411

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4

Description/Comments:

Additional Hazard Statement(s): Carc. 2; H351

Reason for additional Hazards Statement(s):

20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

pH (CAS Number: PH)

Description/Comments: Appendix C4

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: None.

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302, Acute Tox. 1; H330, Acute Tox. 1; H310, Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Aquatic Acute 1; H400, Aquatic Chronic 1; H410, Aquatic Chronic 2; H411

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Acute Tox. 4; H302, Eye Irrit. 2; H319, STOT SE 3; H335, Carc. 2; H351, Skin Sens. 1; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410, Skin Irrit. 2; H315

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Skin Sens. 1; H317, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Skin Irrit. 2; H315, Eye Irrit. 2; H319, STOT SE 3; H335, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

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

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

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

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

■ **1,1-dichloroethane and 1,2-dichloroethane (combined)** (EC Number: 203-458-1, 200-863-5, CAS Number: 107-06-2, 75-34-3)

Description/Comments: Combines the hazard statements and risk phrases for 1,1-dichloroethane and 1,2-dichloroethane
Data source: N/A
Data source date: 14 Oct 2016
Hazard Statements: Flam. Liq. 2; H225 , Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 1B; H350 , Aquatic Chronic 3; H412

■ **dichlorodifluoromethane** (EC Number: 200-893-9, CAS Number: 75-71-8)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Aquatic Chronic 3; H412 , Ozone 1; H420 , Press. Gas; H280

■ **trichlorofluoromethane** (EC Number: 200-892-3, CAS Number: 75-69-4)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H312 , Ozone 1; H420

■ **2,2-dichloropropane** (EC Number: 209-832-0, CAS Number: 594-20-7)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H332 , Flam. Liq. 2; H225 , Acute Tox. 4; H302 , Acute Tox. 4; H312 , Eye Irrit. 2; H319

■ **bromochloromethane** (EC Number: 200-826-3, CAS Number: 74-97-5)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H312 , Skin Corr. 1B; H314 , Eye Dam. 1; H318 , Acute Tox. 4; H332 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Ozone 1; H420

■ **bromodichloromethane** (EC Number: 200-856-7, CAS Number: 75-27-4)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Dam. 1; H318 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 1A; H360

■ **trans-1,3-dichloropropene** (EC Number: 431-460-4, CAS Number: 10061-02-6)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Flam. Liq. 3; H226 , Acute Tox. 3; H301 , Asp. Tox. 1; H304 , Acute Tox. 3; H311 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , Aquatic Chronic 1; H410

■ **1,3-dichloropropane** (EC Number: 205-531-3, CAS Number: 142-28-9)

Description/Comments: VOC; Data from C&L Inventory Database
Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 02 Mar 2017
Hazard Statements: Acute Tox. 4; H332 , Flam. Liq. 2; H225 , Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335

▪ **dibromochloromethane** (EC Number: 204-704-0, CAS Number: 124-48-1)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 3;

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , STOT SE 3; H336 , Muta. 2; H341 , Aquatic Chronic 2; H411

▪ **1,1,1,2-tetrachloroethane** (EC Number: 211-135-1, CAS Number: 630-20-6)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , Acute Tox. 3; H331 , Eye Dam. 1; H318 , Acute Tox. 4; H332 , Carc. 2; H351 , Acute Tox. 4; H312 , Aquatic Chronic 3; H412 , Skin Irrit. 2; H315

▪ **tert-butylbenzene** (EC Number: 202-632-4, CAS Number: 98-06-6)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 3; H331 , Acute Tox. 4; H332 , STOT SE 3; H335 , Asp. Tox. 1; H304 , Aquatic Chronic 2; H411

▪ **sec-butylbenzene** (EC Number: 205-227-0, CAS Number: 135-98-8)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Aquatic Chronic 2; H411

▪ **4-isopropyltoluene** (EC Number: 202-796-7, CAS Number: 99-87-6)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Chronic 2; H411

▪ **n-butylbenzene** (EC Number: 203-209-7, CAS Number: 104-51-8)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Flam. Liq. 3; H226 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **hexachlorobutadiene** (EC Number: 201-765-5, CAS Number: 87-68-3)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 3;

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 3; H301 , Acute Tox. 2; H310 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Irrit. 2; H319 , Acute Tox. 2; H330 , Carc. 2; H351 , Repr. 2; H361 , STOT SE 2; H371 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **1,2,3-trichlorobenzene** (EC Number: 201-757-1, CAS Number: 87-61-6)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , STOT SE 3; H336 , Aquatic Acute 1; H400 , Aquatic Chronic 3; H410

▪ **2-nitrophenol** (EC Number: 201-857-5, CAS Number: 88-75-5)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 4; H332 , STOT SE 3; H335 , STOT RE 2; H373 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

▪ **2-chloronaphthalene** (EC Number: 202-079-9, CAS Number: 91-58-7)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

■ **2-methyl naphthalene** (EC Number: 202-078-3, CAS Number: 91-57-6)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , STOT SE 3; H336 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **di-n-octyl phthalate** (EC Number: 204-214-7, CAS Number: 117-84-0)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Repr. 2; H361 , Skin Sens. 1; H317 , Resp. Sens. 1; H334 , Eye Irrit. 2; H319 , Aquatic Chronic 4; H413

■ **diethyl phthalate** (EC Number: 201-550-6, CAS Number: 84-66-2)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Skin Irrit. 2; H315 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , STOT SE 3; H335 , STOT RE 2; H373 , Repr. 2; H361 , Acute Tox. 4; H302 , STOT SE 3; H336 , Skin Sens. 1; H317 , Aquatic Chronic 1; H410

■ **dimethyl phthalate** (EC Number: 205-011-6, CAS Number: 131-11-3)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , Acute Tox. 3; H331 , STOT SE 3; H335 , STOT SE 3; H336 , Repr. 2; H361 , Aquatic Chronic 3; H412

■ **4-bromophenylphenylether** (EC Number: 202-952-4, CAS Number: 101-55-3)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Dam. 1; H318 , Eye Irrit. 2; H319 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **4-chlorophenylphenylether** (EC Number: 230-281-7, CAS Number: 7005-72-3)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Eye Dam. 1; H318 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **bis(2-chloroethoxy)methane** (EC Number: 203-920-2, CAS Number: 111-91-1)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 3; H301 , Acute Tox. 4; H312 , Acute Tox. 1; H330 , Acute Tox. 2; H330 , STOT SE 1; H370 , STOT RE 2; H373

■ **carbazole** (EC Number: 201-696-0, CAS Number: 86-74-8)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Muta. 2; H341 , Carc. 2; H351 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Acute Tox. 3; H331 , Acute Tox. 3; H311 , Acute Tox. 3; H301

■ **dibenzofuran** (EC Number: 205-071-3, CAS Number: 132-64-9)

Description/Comments: VOC; Data from C&L Inventory Database

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 4; H312 , Acute Tox. 4; H332 , Aquatic Chronic 2; H411

■ **hexachloroethane** (EC Number: 200-666-4, CAS Number: 67-72-1)

Description/Comments: VOC; Data from C&L Inventory Database; IARC considers substance Group 2B;

Data source: <https://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 02 Mar 2017

Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , STOT RE 2; H373

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worst case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2024.30.5942.10989 (30 Jan 2024)

HazWasteOnline Database: 2024.26.5938.10982 (26 Jan 2024)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK: 2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

GB MCL List v2.0 - version 2.0 of 20th October 2023

Tier Environmental
Suite 414, Chadwick House
Warrington Rd
Birchwood
Warrington
United Kingdom
WA3 6AE



4225



Attention : Stuart Milne
Date : 15th August, 2023
Your reference : TE1764
Our reference : Test Report 23/11018 Batch 1
Location : Manchester Art Gallery
Date samples received : 6th July, 2023
Status : Final Report
Issue : 2

Five samples were received for analysis on 6th July, 2023 of which five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:



Bruce Leslie
Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Stuart Milne
EMT Job No: 23/11018

Report : Solid

Solids: V=60g VOC jar. J=250g glass jar. T=plastic tub

EMT Sample No.	1-4	5-8	9-12	13-16	17-20						Please see attached notes for all abbreviations and acronyms		
Sample ID	TP01	TP02	TP03	TP04	TP05								
Depth	0.40	0.50	0.25	0.35	0.30								
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T								
Sample Date	06/07/2023	06/07/2023	06/07/2023	06/07/2023	06/07/2023								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1						LOD/LOR	Units	Method No.
Date of Receipt	06/07/2023	06/07/2023	06/07/2023	06/07/2023	06/07/2023								
Arsenic #	16.5	9.1	14.5	13.3	13.7						<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	<0.1	0.2	<0.1	6.5						<0.1	mg/kg	TM30/PM15
Chromium #	41.0	42.9	40.4	37.9	55.3						<0.5	mg/kg	TM30/PM15
Copper #	40	25	51	48	92						<1	mg/kg	TM30/PM15
Lead #	614	53	718	518	3774 ^{AA}						<5	mg/kg	TM30/PM15
Mercury #	0.9	0.2	0.8	0.9	2.8						<0.1	mg/kg	TM30/PM15
Nickel #	11.5	27.7	14.9	13.4	28.5						<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	<1	<1	<1						<1	mg/kg	TM30/PM15
Total Sulphate as SO4 #	4820	2451	8648	14440 ^{AA}	104100 ^{AB}						<50	mg/kg	TM50/PM29
Water Soluble Boron #	4.4	3.1	5.5	4.6	17.1						<0.1	mg/kg	TM74/PM32
Zinc #	220	65	202	145	1231						<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	0.06	<0.04	0.08	0.05	0.11						<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	0.04	0.11						<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	<0.05	0.07						<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	<0.04	0.04						<0.04	mg/kg	TM4/PM8
Phenanthrene #	0.31	0.07	0.59	0.32	0.96						<0.03	mg/kg	TM4/PM8
Anthracene #	0.07	<0.04	0.11	0.09	0.25						<0.04	mg/kg	TM4/PM8
Fluoranthene #	0.56	0.08	0.82	0.75	2.75						<0.03	mg/kg	TM4/PM8
Pyrene #	0.61	0.09	0.86	0.79	4.15						<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.40	0.08	0.47	0.39	2.89						<0.06	mg/kg	TM4/PM8
Chrysene #	0.44	0.09	0.60	0.51	4.19						<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	0.63	0.11	0.85	0.67	8.60						<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.36	0.06	0.42	0.33	3.94						<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.22	<0.04	0.30	0.23	3.24						<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.04	<0.04	0.09	0.04	0.97						<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.27	0.04	0.34	0.27	4.04						<0.04	mg/kg	TM4/PM8
Coronene	0.05	-	0.07	-	0.47						<0.04	mg/kg	TM4/PM8
PAH 16 Total	4.0	0.6	5.5	4.5	36.3						<0.6	mg/kg	TM4/PM8
PAH 17 Total	4.02	-	5.60	-	36.78						<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.45	0.08	0.61	0.48	6.19						<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.18	0.03	0.24	0.19	2.41						<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	96	98	96	92	91						<0	%	TM4/PM8
Mineral Oil (C10-C40) (EH_CU_1D_AL)	<30	-	64	-	68						<30	mg/kg	TM5/PM8/PM16

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Stuart Milne
EMT Job No: 23/11018

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-4	5-8	9-12	13-16	17-20						Please see attached notes for all abbreviations and acronyms		
Sample ID	TP01	TP02	TP03	TP04	TP05								
Depth	0.40	0.50	0.25	0.35	0.30								
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T								
Sample Date	06/07/2023	06/07/2023	06/07/2023	06/07/2023	06/07/2023								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1								
Date of Receipt	06/07/2023	06/07/2023	06/07/2023	06/07/2023	06/07/2023						LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	<0.2	<0.2	<0.2	<0.2						<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	<4	<4	<4	<4	4						<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	<7	11	10	8	14						<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	10	<7	54	37	50						<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_CU_1D_AL)	<7	<7	<7	<7	<7						<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH+HS_CU_1D_AL)	<26	<26	64	45	68						<26	mg/kg	TM5/PM8/PM16/PM12/PM10
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1	<0.1	<0.1	<0.1	<0.1						<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	<0.2	<0.2	<0.2	<0.2						<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	<4	<4	<4	<4						<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	13	<7	19	10	55						<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	44	<7	78	41	299						<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_CU_1D_AR)	<7	<7	<7	<7	18						<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH+HS_CU_1D_AR)	57	<26	97	51	372						<26	mg/kg	TM5/PM8/PM16/PM12/PM10
Total aliphatics and aromatics (C5-40) (EH+HS_CU_1D_Total)	57	<52	161	96	440						<52	mg/kg	TM5/PM8/PM16/PM12/PM10
MTBE #	<5	<5	<5	<5	<5						<5	ug/kg	TM36/PM12
Benzene #	<5	<5	<5	<5	<5						<5	ug/kg	TM36/PM12
Toluene #	10	9	<5	5	13						<5	ug/kg	TM36/PM12
Ethylbenzene #	<5	<5	<5	<5	<5						<5	ug/kg	TM36/PM12
m/p-Xylene #	<5	<5	<5	10	8						<5	ug/kg	TM36/PM12
o-Xylene #	<5	<5	<5	<5	5						<5	ug/kg	TM36/PM12
PCB 28 #	<5	-	<5	-	<5						<5	ug/kg	TM17/PM8
PCB 52 #	<5	-	<5	-	<5						<5	ug/kg	TM17/PM8
PCB 101 #	<5	-	<5	-	<5						<5	ug/kg	TM17/PM8
PCB 118 #	<5	-	<5	-	<5						<5	ug/kg	TM17/PM8
PCB 138 #	<5	-	<5	-	<5						<5	ug/kg	TM17/PM8
PCB 153 #	<5	-	<5	-	<5						<5	ug/kg	TM17/PM8
PCB 180 #	<5	-	<5	-	<5						<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	-	<35	-	<35						<35	ug/kg	TM17/PM8
Total Phenols HPLC	<0.15	<0.15	<0.15	<0.15	<0.15						<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	7.0	10.3	8.9	9.2	4.5						<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	1.4						<0.3	mg/kg	TM38/PM20

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Stuart Milne
EMT Job No: 23/11018

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Stuart Milne
EMT Job No: 23/11018

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Element Materials Technology

Client Name:	Tier Environmental	Report :	CEN 10:1 1 Batch (Duplicate results)
Reference:	TE1764		
Location:	Manchester Art Gallery	Solids:	V=60g VOC jar, J=250g glass jar, T=plastic tub
Contact:	Stuart Milne		
EMT Job No:	23/11018		

Report : CEN 10:1 1 Batch (Duplicate results)

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Stuart Milne
EMT Job No: 23/11018

Report : CEN 10:1 1 Batch (Duplicate results)

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Element Materials Technology

Client Name:	Tier Environmental	Report :	CEN 10:1 1 Batch (Duplicate results)
Reference:	TE1764		
Location:	Manchester Art Gallery	Solids:	V=60g VOC jar, J=250g glass jar, T=plastic tub
Contact:	Stuart Milne		
EMT Job No:	23/11018		

Report : CEN 10:1 1 Batch (Duplicate results)

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

[illegible]

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	9.7
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	91.1
Particle Size <4mm =	>95%		
EMT Job No	23/11018	Landfill Waste Acceptance Criteria Limits Inert Waste Landfill Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill Hazardous Waste Landfill	
Sample No	3		
Client Sample No	TP01		
Depth/Other	0.40		
Sample Date	06/07/2023		
Batch No	1		
Solid Waste Analysis			
Total Organic Carbon (%)	2.34	3	5
Loss on Ignition (%)	4.4	-	10
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	<30	500	-
PAH Sum of 17(mg/kg)	4.02	100	-
pH (pH Units)	8.05	-	>6
ANC to pH 7 (mol/kg)	<0.03	-	to be evaluated
ANC to pH 4 (mol/kg)	0.96	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	0.0223	0.222	0.5
Barium	0.030	0.30	20
Cadmium	<0.0005	<0.005	0.04
Chromium	<0.0015	<0.015	0.5
Copper	0.011	0.11	2
Mercury	<0.001	<0.01	0.01
Molybdenum	0.007	0.07	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	0.002	<0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	0.003	<0.03	4
Chloride	5.7	57	800
Fluoride	<0.3	<3	10
Sulphate as SO ₄	335.0	3349	1000
Total Dissolved Solids	620	6198	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	5	50	500

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	12.8
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	88.7
Particle Size <4mm =	>95%		
EMT Job No	23/11018	Landfill Waste Acceptance Criteria Limits Inert Waste Landfill Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill Hazardous Waste Landfill	
Sample No	11		
Client Sample No	TP03		
Depth/Other	0.25		
Sample Date	06/07/2023		
Batch No	1		
Solid Waste Analysis			
Total Organic Carbon (%)	1.97	3	5
Loss on Ignition (%)	6.6	-	10
Sum of BTEX (mg/kg)	<0.025	6	-
Sum of 7 PCBs (mg/kg)	<0.035	1	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	64	500	-
PAH Sum of 17(mg/kg)	5.60	100	-
pH (pH Units)	7.70	-	>6
ANC to pH 7 (mol/kg)	NDP	-	to be evaluated
ANC to pH 4 (mol/kg)	1.46	-	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg
	C ₁₀ mg/l	A ₁₀ mg/kg	
Arsenic	0.0080	0.080	0.5
Barium	0.016	0.16	20
Cadmium	<0.0005	<0.005	0.04
Chromium	<0.0015	<0.015	0.5
Copper	0.012	0.12	2
Mercury	<0.001	<0.01	0.01
Molybdenum	0.008	0.08	0.5
Nickel	<0.002	<0.02	0.4
Lead	<0.005	<0.05	0.5
Antimony	0.002	0.02	0.06
Selenium	<0.003	<0.03	0.1
Zinc	0.003	0.03	4
Chloride	48.8	488	800
Fluoride	<0.3	<3	10
Sulphate as SO ₄	361.1	3609	1000
Total Dissolved Solids	1189	11884	4000
Phenol	<0.01	<0.1	1
Dissolved Organic Carbon	8	80	500

Mass of sample taken (kg)	-	Moisture Content Ratio (%) =	11.4		
Mass of dry sample (kg) =	0.09	Dry Matter Content Ratio (%) =	89.8		
Particle Size <4mm =	>95%				
EMT Job No	23/11018		Landfill Waste Acceptance Criteria Limits		
Sample No	19				
Client Sample No	TP05		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Depth/Other	0.30				
Sample Date	06/07/2023				
Batch No	1				
Solid Waste Analysis					
Total Organic Carbon (%)	3.38				
Loss on Ignition (%)	11.4		-	-	10
Sum of BTEX (mg/kg)	0.026		6	-	-
Sum of 7 PCBs (mg/kg)	<0.035		1	-	-
Mineral Oil (mg/kg) (EH_CU_1D_AL)	68		500	-	-
PAH Sum of 17(mg/kg)	36.78		100	-	-
pH (pH Units)	8.31		-	>6	-
ANC to pH 7 (mol/kg)	0.04		-	to be evaluated	to be evaluated
ANC to pH 4 (mol/kg)	1.64		-	to be evaluated	to be evaluated
Eluate Analysis	10:1 conc ⁿ leached		Limit values for compliance leaching test using BS EN 12457-2 at L/S 10 l/kg		
	C ₁₀	A ₁₀			
	mg/l	mg/kg			
	mg/kg				
Arsenic	0.0144	0.144	0.5	2	25
Barium	0.029	0.29	20	100	300
Cadmium	<0.0005	<0.005	0.04	1	5
Chromium	0.0090	0.090	0.5	10	70
Copper	0.054	0.54	2	50	100
Mercury	<0.001	<0.01	0.01	0.2	2
Molybdenum	0.019	0.19	0.5	10	30
Nickel	0.003	0.03	0.4	10	40
Lead	0.023	0.23	0.5	10	50
Antimony	<0.002	<0.02	0.06	0.7	5
Selenium	0.052	0.52	0.1	0.5	7
Zinc	0.012	0.12	4	50	200
Chloride	163.4	1634	800	15000	25000
Fluoride	0.5	5	10	150	500
Sulphate as SO4	1763.7	17642	1000	20000	50000
Total Dissolved Solids	3919	39201	4000	60000	100000
Phenol	<0.01	<0.1	1	-	-
Dissolved Organic Carbon	38	380	500	800	1000

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Stuart Milne

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analyst Name	Date Of Analysis	Analysis	Result
23/11018	1	TP01	0.40	4	Remigiusz Blichowski	17/07/2023	General Description (Bulk Analysis)	Brown sand with roots
					Remigiusz Blichowski	17/07/2023	Asbestos Fibres	NAD
					Remigiusz Blichowski	17/07/2023	Asbestos ACM	NAD
					Remigiusz Blichowski	17/07/2023	Asbestos Type	NAD
23/11018	1	TP02	0.50	8	Remigiusz Blichowski	17/07/2023	General Description (Bulk Analysis)	Brown sand with roots and bitumen
					Remigiusz Blichowski	17/07/2023	Asbestos Fibres	Fibre Bundles
					Remigiusz Blichowski	17/07/2023	Asbestos Fibres (2)	Fibre Bundles
					Remigiusz Blichowski	17/07/2023	Asbestos ACM	Bitumen Products
					Remigiusz Blichowski	17/07/2023	Asbestos ACM (2)	NAD
					Remigiusz Blichowski	17/07/2023	Asbestos Type	Chrysotile
					Remigiusz Blichowski	17/07/2023	Asbestos Type (2)	Amosite
					Remigiusz Blichowski	14/08/2023	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					Remigiusz Blichowski	14/08/2023	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					Remigiusz Blichowski	14/08/2023	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					Remigiusz Blichowski	15/08/2023	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					Remigiusz Blichowski	15/08/2023	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)
23/11018	1	TP03	0.25	12	Remigiusz Blichowski	17/07/2023	General Description (Bulk Analysis)	Brown loose sand with roots
					Remigiusz Blichowski	17/07/2023	Asbestos Fibres	NAD
					Remigiusz Blichowski	17/07/2023	Asbestos ACM	NAD
					Remigiusz Blichowski	17/07/2023	Asbestos Type	NAD
23/11018	1	TP04	0.35	16	Remigiusz Blichowski	17/07/2023	General Description (Bulk Analysis)	Brown loose sand with burned wood and roots
					Remigiusz Blichowski	17/07/2023	Asbestos Fibres	NAD
					Remigiusz Blichowski	17/07/2023	Asbestos ACM	NAD
					Remigiusz Blichowski	17/07/2023	Asbestos Type	NAD
23/11018	1	TP05	0.30	20	Remigiusz Blichowski	17/07/2023	General Description (Bulk Analysis)	Brown loose sand and rock
					Remigiusz Blichowski	17/07/2023	Asbestos Fibres	Fibre Bundles
					Remigiusz Blichowski	17/07/2023	Asbestos ACM	NAD
					Remigiusz Blichowski	17/07/2023	Asbestos Type	Chrysotile
					Remigiusz Blichowski	14/08/2023	Total ACM Gravimetric Quantification (% Asb)	<0.001 (mass %)
					Remigiusz Blichowski	14/08/2023	Total Detailed Gravimetric Quantification (% Asb)	<0.001 (mass %)
					Remigiusz Blichowski	14/08/2023	Total Gravimetric Quantification (ACM + Detailed) (% Asb)	<0.001 (mass %)
					Remigiusz Blichowski	15/08/2023	Asbestos PCOM Quantification (Fibres)	<0.001 (mass %)
					Remigiusz Blichowski	15/08/2023	Asbestos Gravimetric & PCOM Total	<0.001 (mass %)

Matrix : Solid

[illegible]

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Stuart Milne

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/11018

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x20 Dilution

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 23/11018

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270D v5:2014. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3:1990/USEPA 160.1/3 (TDS/TS: 1971) Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.			AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes
TM22	Modified BS1377-3:1990 Gravimetric determination of Loss on Ignition by temperature controlled Muffle Furnace (35C-440C). On request modified ASTM D2974-00 LOI (105C-440C)	PM0	No preparation is required.	Yes		AD	Yes

EMT Job No: 23/11018

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry); WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes

EMT Job No: 23/11018

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060A (2002), APHA SMEWW 5310B:1999 22nd Edition, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248 Second edition (2021)	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM74	Analysis of water soluble boron (20:1 extract) by ICP-OES.	PM32	Hot water soluble boron is extracted from dried and ground samples using a 20:1 ratio.	Yes		AD	Yes
TM77	Modified DDCE/TS method 15364:2006. Determination of Acid Neutralization Capacity by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	No
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.	Yes		AR	Yes
TM107	Determination of Sulphide/Thiocyanate by Skalar Continuous Flow Analyser	PM45	As received solid samples are extracted with 1M NaOH by orbital shaker for Cyanide, Sulphide and Thiocyanate analysis.			AR	Yes
TM131	Quantification of Asbestos Fibres and ACM based on HSG 248 Second edition:2021, HSG 264 Second edition:2012, HSE Contract Research Report No.83/1996, MDHS 87:1998, WM3 1st Edition v1.1:2018	PM42	Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 9214 - 340.2 (EPA 1998)	PM0	No preparation is required.			AR	Yes

EMT Job No: 23/11018

[illegible]

Tier Environmental
Suite 414, Chadwick House
Warrington Rd
Birchwood
Warrington
United Kingdom
WA3 6AE



4225



Attention : Adrian Read

Date : 2nd February, 2024

Your reference : TE1764

Our reference : Test Report 24/1102 Batch 1

Location : Manchester Art Gallery

Date samples received : 23rd January, 2024

Status : Final Report

Issue : 202402021204

Five samples were received for analysis on 23rd January, 2024 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 13.973 kg of CO2

Scope 1&2&3 emissions - 33.022 kg of CO2

Authorised By:



Phil Sommerton BSc

Senior Project Manager

Please include all sections of this report if it is reproduced

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Adrian Read
EMT Job No: 24/1102

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-4	5-8	9-12	17-20							Please see attached notes for all abbreviations and acronyms		
Sample ID	HDP101	HDP102	HDP103	HDP105									
Depth	0.50	0.80	0.75	0.50									
COC No / misc													
Containers	V J T	V J T	V J T	V J T									
Sample Date	22/01/2024	22/01/2024	22/01/2024	22/01/2024									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	23/01/2024	23/01/2024	23/01/2024	23/01/2024							LOD/LOR	Units	Method No.
Arsenic #	7.4	7.0	13.2	15.1							<0.5	mg/kg	TM30/PM15
Cadmium #	<0.1	<0.1	<0.1	<0.1							<0.1	mg/kg	TM30/PM15
Chromium #	37.4	35.8	27.8	26.3							<0.5	mg/kg	TM30/PM15
Copper #	24	25	53	60							<1	mg/kg	TM30/PM15
Lead #	12	13	780	1096							<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	1.1	1.5							<0.1	mg/kg	TM30/PM15
Nickel #	38.1	36.1	17.3	14.1							<0.7	mg/kg	TM30/PM15
Selenium #	<1	<1	<1	<1							<1	mg/kg	TM30/PM15
Total Sulphate as SO4 #	261	358	12810 ^{AA}	27240 ^{AA}							<50	mg/kg	TM50/PM29
Zinc #	68	67	149	258							<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene #	3.45	14.67	0.10	0.07							<0.04	mg/kg	TM4/PM8
Acenaphthylene	0.04	0.10	0.05	<0.03							<0.03	mg/kg	TM4/PM8
Acenaphthene #	0.41	2.15	0.06	<0.05							<0.05	mg/kg	TM4/PM8
Fluorene #	0.27	1.23	<0.04	<0.04							<0.04	mg/kg	TM4/PM8
Phenanthrene #	2.87	5.84	0.63	0.26							<0.03	mg/kg	TM4/PM8
Anthracene #	0.43	1.01	0.15	0.06							<0.04	mg/kg	TM4/PM8
Fluoranthene #	4.05	3.84	0.91	0.40							<0.03	mg/kg	TM4/PM8
Pyrene #	3.25	3.91	0.95	0.42							<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	1.03	1.82	0.76	0.26							<0.06	mg/kg	TM4/PM8
Chrysene #	1.20	2.41	0.87	0.31							<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	1.05	2.55	1.26	0.46							<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.64	1.66	0.76	0.26							<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene #	0.26	0.75	0.41	0.17							<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	0.08	0.26	0.14	0.06							<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.30	0.90	0.40	0.20							<0.04	mg/kg	TM4/PM8
PAH 16 Total	19.3	43.1	7.5	2.9							<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.76	1.84	0.91	0.33							<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.29	0.71	0.35	0.13							<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	93	88	93	84							<0	%	TM4/PM8
Methyl Tertiary Butyl Ether #	<2	-	-	-							<2	ug/kg	TM15/PM10
Benzene #	<3	-	-	-							<3	ug/kg	TM15/PM10
Toluene #	<3	-	-	-							<3	ug/kg	TM15/PM10
Ethylbenzene #	5	-	-	-							<3	ug/kg	TM15/PM10
m/p-Xylene #	10	-	-	-							<5	ug/kg	TM15/PM10
o-Xylene #	8	-	-	-							<3	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	68	-	-	-							<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	60	-	-	-							<0	%	TM15/PM10

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Adrian Read
EMT Job No: 24/1102

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	1-4	5-8	9-12	17-20							Please see attached notes for all abbreviations and acronyms		
Sample ID	HDP101	HDP102	HDP103	HDP105									
Depth	0.50	0.80	0.75	0.50									
COC No / misc													
Containers	V J T	V J T	V J T	V J T									
Sample Date	22/01/2024	22/01/2024	22/01/2024	22/01/2024									
Sample Type	Soil	Soil	Soil	Soil									
Batch Number	1	1	1	1									
Date of Receipt	23/01/2024	23/01/2024	23/01/2024	23/01/2024							LOD/LOR	Units	Method No.
TPH CWG													
Aliphatics													
>C5-C6 (HS_1D_AL) #	<0.1	-	-	<0.1							<0.1	mg/kg	TM36/PM12
>C6-C8 (HS_1D_AL) #	<0.1	-	-	<0.1							<0.1	mg/kg	TM36/PM12
>C8-C10 (HS_1D_AL)	<0.1	-	-	<0.1							<0.1	mg/kg	TM36/PM12
>C10-C12 (EH_CU_1D_AL) #	<0.2	-	-	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 (EH_CU_1D_AL) #	7	-	-	<4							<4	mg/kg	TM5/PM8/PM16
>C16-C21 (EH_CU_1D_AL) #	16	-	-	<7							<7	mg/kg	TM5/PM8/PM16
>C21-C35 (EH_CU_1D_AL) #	<7	-	-	<7							<7	mg/kg	TM5/PM8/PM16
>C35-C40 (EH_CU_1D_AL)	<7	-	-	<7							<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40 (EH_CU+HS_1D_AL)	<26	-	-	<26							<26	mg/kg	TM5/PM8/PM16
Aromatics													
>C5-EC7 (HS_1D_AR) #	<0.1	-	-	<0.1							<0.1	mg/kg	TM36/PM12
>EC7-EC8 (HS_1D_AR) #	<0.1	-	-	<0.1							<0.1	mg/kg	TM36/PM12
>EC8-EC10 (HS_1D_AR) #	<0.1	-	-	<0.1							<0.1	mg/kg	TM36/PM12
>EC10-EC12 (EH_CU_1D_AR) #	<0.2	-	-	<0.2							<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 (EH_CU_1D_AR) #	<4	-	-	<4							<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 (EH_CU_1D_AR) #	<7	-	-	25							<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 (EH_CU_1D_AR) #	<7	-	-	74							<7	mg/kg	TM5/PM8/PM16
>EC35-EC40 (EH_CU_1D_AR)	<7	-	-	<7							<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40 (EH_CU+HS_1D_AR)	<26	-	-	99							<26	mg/kg	TM5/PM8/PM16
Total aliphatics and aromatics (C5-40) (EH_CU+HS_1D_Total)	<52	-	-	99							<52	mg/kg	TM5/PM8/PM16
MTBE #	-	-	-	<5							<5	ug/kg	TM36/PM12
Benzene #	-	-	-	<5							<5	ug/kg	TM36/PM12
Toluene #	-	-	-	<5							<5	ug/kg	TM36/PM12
Ethylbenzene #	-	-	-	<5							<5	ug/kg	TM36/PM12
m/p-Xylene #	-	-	-	<5							<5	ug/kg	TM36/PM12
o-Xylene #	-	-	-	<5							<5	ug/kg	TM36/PM12
Total Phenols HPLC	0.17	1.82	<0.15	<0.15							<0.15	mg/kg	TM26/PM21B
Natural Moisture Content	2.0	6.6	14.1	13.8							<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3							<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0513	0.0958	1.4653	1.4652							<0.0015	g/l	TM38/PM20
Total Organic Carbon #	0.89	0.90	1.81	2.16							<0.02	%	TM21/PM24
pH #	8.66	8.75	7.84	7.93							<0.01	pH units	TM73/PM11
Asbestos Type*	NAD	NAD	NAD	NAD								None	Subcontracted

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Adrian Read
EMT Job No: 24/1102

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	5-8										Please see attached notes for all abbreviations and acronyms		
Sample ID	HDP102												
Depth	0.80												
COC No / misc													
Containers	V J T												
Sample Date	22/01/2024												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	23/01/2024										LOD/LOR	Units	Method No.
Dissolved Arsenic #	<2.5										<2.5	ug/l	TM30/PM1
Dissolved Boron #	52										<12	ug/l	TM30/PM1
Dissolved Cadmium #	<0.5										<0.5	ug/l	TM30/PM1
Dissolved Chromium #	<1.5										<1.5	ug/l	TM30/PM1
Dissolved Copper #	<7										<7	ug/l	TM30/PM1
Dissolved Lead #	<5										<5	ug/l	TM30/PM1
Dissolved Mercury #	<1										<1	ug/l	TM30/PM1
Dissolved Nickel #	<2										<2	ug/l	TM30/PM1
Dissolved Selenium #	5										<3	ug/l	TM30/PM1
Dissolved Zinc #	5										<3	ug/l	TM30/PM1
PAH MS													
Napthalene	>>240.9 ^{AB}										<0.1	ug/l	TM4/PM30
Acenaphthylene	0.068										<0.005	ug/l	TM4/PM30
Acenaphthene	5.477										<0.005	ug/l	TM4/PM30
Fluorene	1.967										<0.005	ug/l	TM4/PM30
Phenanthrene	2.702										<0.005	ug/l	TM4/PM30
Anthracene	0.590										<0.005	ug/l	TM4/PM30
Fluoranthene	0.650										<0.005	ug/l	TM4/PM30
Pyrene	0.601										<0.005	ug/l	TM4/PM30
Benzo(a)anthracene	0.287										<0.005	ug/l	TM4/PM30
Chrysene	0.312										<0.005	ug/l	TM4/PM30
Benzo(bk)fluoranthene	0.366										<0.008	ug/l	TM4/PM30
Benzo(a)pyrene	0.225										<0.005	ug/l	TM4/PM30
Indeno(123cd)pyrene	0.124										<0.005	ug/l	TM4/PM30
Dibenzo(ah)anthracene	0.034										<0.005	ug/l	TM4/PM30
Benzo(ghi)perylene	0.140										<0.005	ug/l	TM4/PM30
PAH 16 Total	254.443										<0.173	ug/l	TM4/PM30
Benzo(b)fluoranthene	0.264										<0.008	ug/l	TM4/PM30
Benzo(k)fluoranthene	0.102										<0.008	ug/l	TM4/PM30
PAH Surrogate % Recovery	65 ^{SV}										<0	%	TM4/PM30
Total Phenols HPLC	0.85										<0.05	mg/l	TM26/PM0
Mass of raw test portion	0.0955											kg	NONE/PM1
Mass of dried test portion	0.09											kg	NONE/PM1
pH	7.29										<0.01	pH units	TM73/PM0

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Adrian Read
EMT Job No: 24/1102

SVOC Report : Solid

EMT Sample No.	1-4										Please see attached notes for all abbreviations and acronyms		
Sample ID	HDP101												
Depth	0.50												
COC No / misc													
Containers	V J T												
Sample Date	22/01/2024												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	23/01/2024												
SVOC MS													
Phenols													
2-Chlorophenol #	<10										<10	ug/kg	TM16/PM8
2-Methylphenol	184										<10	ug/kg	TM16/PM8
2-Nitrophenol	<10										<10	ug/kg	TM16/PM8
2,4-Dichlorophenol #	<10										<10	ug/kg	TM16/PM8
2,4-Dimethylphenol	190										<10	ug/kg	TM16/PM8
2,4,5-Trichlorophenol	<10										<10	ug/kg	TM16/PM8
2,4,6-Trichlorophenol	<10										<10	ug/kg	TM16/PM8
4-Chloro-3-methylphenol	<10										<10	ug/kg	TM16/PM8
4-Methylphenol	415										<10	ug/kg	TM16/PM8
4-Nitrophenol	<10										<10	ug/kg	TM16/PM8
Pentachlorophenol	<10										<10	ug/kg	TM16/PM8
Phenol #	253										<10	ug/kg	TM16/PM8
PAHs													
2-Chloronaphthalene #	<10										<10	ug/kg	TM16/PM8
2-Methylnaphthalene #	1307										<10	ug/kg	TM16/PM8
Phthalates													
Bis(2-ethylhexyl) phthalate	172										<100	ug/kg	TM16/PM8
Butylbenzyl phthalate	<100										<100	ug/kg	TM16/PM8
Di-n-butyl phthalate	<100										<100	ug/kg	TM16/PM8
Di-n-Octyl phthalate	<100										<100	ug/kg	TM16/PM8
Diethyl phthalate	<100										<100	ug/kg	TM16/PM8
Dimethyl phthalate #	<100										<100	ug/kg	TM16/PM8
Other SVOCs													
1,2-Dichlorobenzene	<10										<10	ug/kg	TM16/PM8
1,2,4-Trichlorobenzene #	<10										<10	ug/kg	TM16/PM8
1,3-Dichlorobenzene	<10										<10	ug/kg	TM16/PM8
1,4-Dichlorobenzene	<10										<10	ug/kg	TM16/PM8
2-Nitroaniline	<10										<10	ug/kg	TM16/PM8
2,4-Dinitrotoluene	<10										<10	ug/kg	TM16/PM8
2,6-Dinitrotoluene	<10										<10	ug/kg	TM16/PM8
3-Nitroaniline	<10										<10	ug/kg	TM16/PM8
4-Bromophenylphenylether #	<10										<10	ug/kg	TM16/PM8
4-Chloroaniline	<10										<10	ug/kg	TM16/PM8
4-Chlorophenylphenylether	<10										<10	ug/kg	TM16/PM8
4-Nitroaniline	<10										<10	ug/kg	TM16/PM8
Azobenzene	<10										<10	ug/kg	TM16/PM8
Bis(2-chloroethoxy)methane	<10										<10	ug/kg	TM16/PM8
Bis(2-chloroethyl)ether	<10										<10	ug/kg	TM16/PM8
Carbazole	156										<10	ug/kg	TM16/PM8
Dibenzofuran #	348										<10	ug/kg	TM16/PM8
Hexachlorobenzene	<10										<10	ug/kg	TM16/PM8
Hexachlorobutadiene #	<10										<10	ug/kg	TM16/PM8
Hexachlorocyclopentadiene	<10										<10	ug/kg	TM16/PM8
Hexachloroethane	<10										<10	ug/kg	TM16/PM8
Isophorone #	<10										<10	ug/kg	TM16/PM8
N-nitrosodi-n-propylamine #	<10										<10	ug/kg	TM16/PM8
Nitrobenzene #	<10										<10	ug/kg	TM16/PM8
Surrogate Recovery 2-Fluorobiphenyl	118										<0	%	TM16/PM8
Surrogate Recovery p-Terphenyl-d14	125										<0	%	TM16/PM8

Element Materials Technology

Client Name: Tier Environmental
Reference: TE1764
Location: Manchester Art Gallery
Contact: Adrian Read
EMT Job No: 24/1102

VOC Report : Solid

EMT Sample No.	1-4												
Sample ID	HDP101												
Depth	0.50												
COC No / misc													
Containers	V J T												
Sample Date	22/01/2024												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	23/01/2024												
											LOD/LOR	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2										<2	ug/kg	TM15/PM10
Methyl Tertiary Butyl Ether #	<2										<2	ug/kg	TM15/PM10
Chloromethane #	<3										<3	ug/kg	TM15/PM10
Vinyl Chloride	<2										<2	ug/kg	TM15_A/PM10
Bromomethane	<1										<1	ug/kg	TM15/PM10
Chloroethane #	<2										<2	ug/kg	TM15/PM10
Trichlorofluoromethane #	<2										<2	ug/kg	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<6										<6	ug/kg	TM15/PM10
Dichloromethane (DCM) #	<7										<7	ug/kg	TM15/PM10
trans-1,2-Dichloroethene #	<3										<3	ug/kg	TM15/PM10
1,1-Dichloroethane #	<3										<3	ug/kg	TM15/PM10
cis-1,2-Dichloroethene #	<3										<3	ug/kg	TM15/PM10
2,2-Dichloropropane	<4										<4	ug/kg	TM15/PM10
Bromochloromethane #	<3										<3	ug/kg	TM15/PM10
Chloroform #	<3										<3	ug/kg	TM15/PM10
1,1,1-Trichloroethane #	<3										<3	ug/kg	TM15/PM10
1,1-Dichloropropene #	<3										<3	ug/kg	TM15/PM10
Carbon tetrachloride #	<4										<4	ug/kg	TM15/PM10
1,2-Dichloroethane #	<4										<4	ug/kg	TM15/PM10
Benzene #	<3										<3	ug/kg	TM15/PM10
Trichloroethene (TCE) #	<3										<3	ug/kg	TM15/PM10
1,2-Dichloropropane #	<6										<6	ug/kg	TM15/PM10
Dibromomethane #	<3 ⁺										<3	ug/kg	TM15/PM10
Bromodichloromethane #	<3										<3	ug/kg	TM15/PM10
cis-1,3-Dichloropropene	<4										<4	ug/kg	TM15/PM10
Toluene #	<3										<3	ug/kg	TM15/PM10
trans-1,3-Dichloropropene	<3										<3	ug/kg	TM15/PM10
1,1,2-Trichloroethane #	<3										<3	ug/kg	TM15/PM10
Tetrachloroethene (PCE) #	<3										<3	ug/kg	TM15/PM10
1,3-Dichloropropane #	<3										<3	ug/kg	TM15/PM10
Dibromochloromethane #	<3										<3	ug/kg	TM15/PM10
1,2-Dibromoethane #	<3										<3	ug/kg	TM15/PM10
Chlorobenzene #	<3										<3	ug/kg	TM15/PM10
1,1,1,2-Tetrachloroethane #	<3										<3	ug/kg	TM15/PM10
Ethylbenzene #	5										<3	ug/kg	TM15/PM10
m/p-Xylene #	10										<5	ug/kg	TM15/PM10
o-Xylene #	8										<3	ug/kg	TM15/PM10
Styrene	<3										<3	ug/kg	TM15_A/PM10
Bromoform	<3										<3	ug/kg	TM15/PM10
Isopropylbenzene #	<3										<3	ug/kg	TM15/PM10
1,1,2,2-Tetrachloroethane #	<3										<3	ug/kg	TM15/PM10
Bromobenzene	<2										<2	ug/kg	TM15/PM10
1,2,3-Trichloropropane #	<4										<4	ug/kg	TM15/PM10
Propylbenzene #	<4										<4	ug/kg	TM15/PM10
2-Chlorotoluene	<3										<3	ug/kg	TM15/PM10
1,3,5-Trimethylbenzene #	11										<3	ug/kg	TM15/PM10
4-Chlorotoluene	<3										<3	ug/kg	TM15/PM10
tert-Butylbenzene #	<5										<5	ug/kg	TM15/PM10
1,2,4-Trimethylbenzene #	30										<6	ug/kg	TM15/PM10
sec-Butylbenzene #	<4										<4	ug/kg	TM15/PM10
4-Isopropyltoluene	<4										<4	ug/kg	TM15/PM10
1,3-Dichlorobenzene #	<4										<4	ug/kg	TM15/PM10
1,4-Dichlorobenzene #	<4										<4	ug/kg	TM15/PM10
n-Butylbenzene	<4										<4	ug/kg	TM15/PM10
1,2-Dichlorobenzene #	<4										<4	ug/kg	TM15/PM10
1,2-Dibromo-3-chloropropane	<4										<4	ug/kg	TM15/PM10
1,2,4-Trichlorobenzene	<7										<7	ug/kg	TM15/PM10
Hexachlorobutadiene	<4										<4	ug/kg	TM15/PM10
Naphthalene	>>2300										<27	ug/kg	TM15/PM10
1,2,3-Trichlorobenzene	<7										<7	ug/kg	TM15/PM10
Surrogate Recovery Toluene D8	68										<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	60										<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Client Name:	Tier Environmental
Reference:	TE1764
Location:	Manchester Art Gallery
Contact:	Adrian Read

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 24/1102

SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

Age of Diesel

The age of release estimation is based on the nC17/pristane ratio only as prescribed by Christensen and Larsen (1993) and Kaplan, Galperin, Alimi et al., (1996).

Age estimation should be treated with caution as it can be influenced by site specific factors of which the laboratory are not aware.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x10 Dilution

HWOL ACRONYMS AND OPERATORS USED

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

EMT Job No: 24/1102

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes

EMT Job No: 24/1102

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM16	Modified USEPA 8270D v5:2014. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM21B	As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.			AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes		AR	Yes
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes

EMT Job No: 24/1102

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM50	Acid soluble sulphate (Total Sulphate) analysed by ICP-OES	PM29	A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.	Yes		AD	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
NONE	No Method Code	PM17	Modified method BS EN12457-2:2002 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.			AR	
Subcontracted	See attached subcontractor report for accreditation status and provider.					AR	
TM15_A	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds, Vinyl Chloride & Styrene by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes

APPENDIX D - GEOTECHNICAL IN SITU FIELDWORK AND LABORATORY RESULTS

TEST REPORT

Client Tier Environmental Ltd

Address Suite 513
Chadwick House
Warrington Road
Birchwood
WA3 6AE

Contract TE1764 -
Manchester Art Gallery

Job Number MRN 4625/45
Date of Issue 26 September 2023
Page 1 of 4

Approved Signatories

S J Hutchings, O P Davies

Notes

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



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

Also at: London: 020 8523 1999

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MURRAY RIX

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



TEST CERTIFICATE

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

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

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

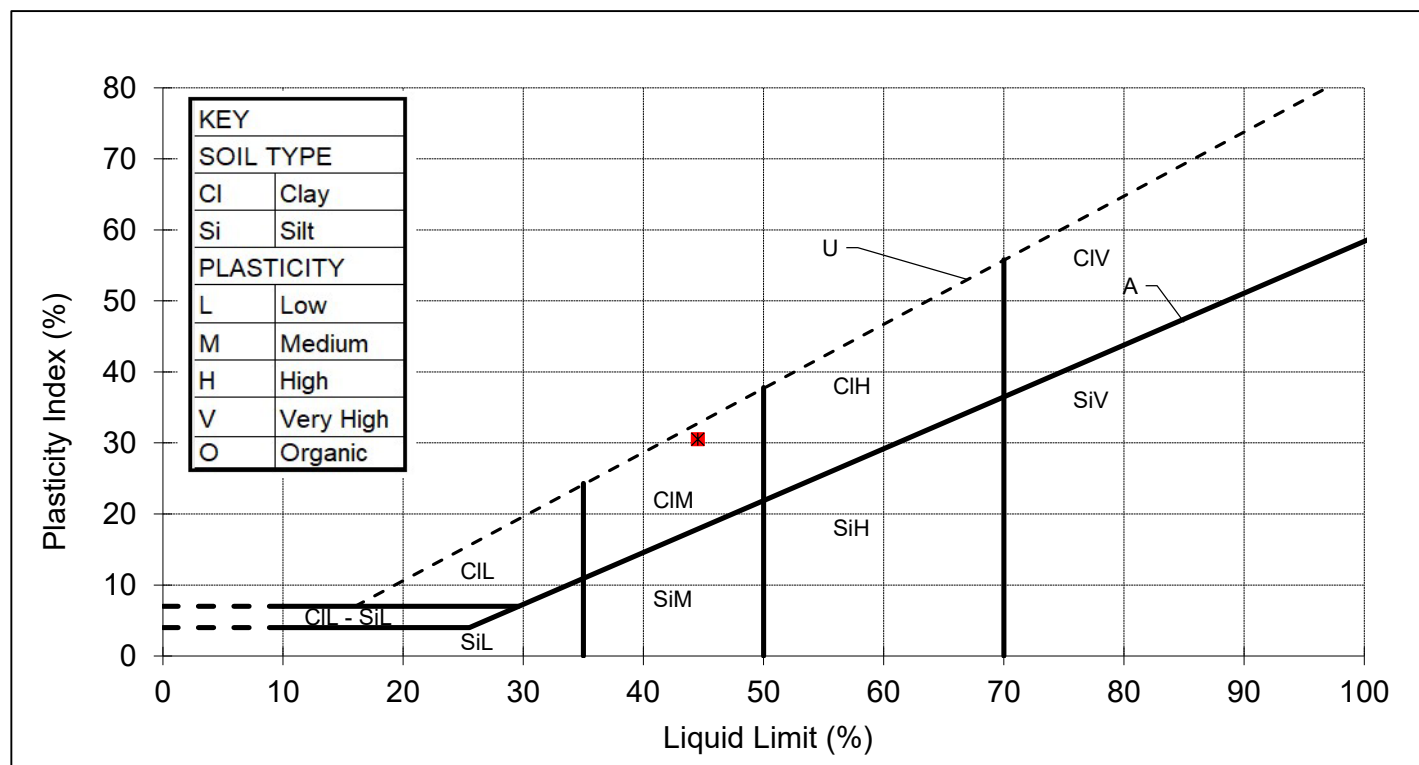
CLIENT	Tier Environmental Ltd
SITE	TE1764 - Manchester Art Gallery
JOB NUMBER	MRN 4625/45

SAMPLE LABEL	WS02 1.2	DATE SAMPLED	31-Aug-23
SAMPLE No.	131050	DATE RECEIVED	08-Sep-23
DATE TESTED	12-Sep-23	SAMPLED BY	Client

MATERIAL	Dark brown silty slightly sandy CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	18.6	43.8	1.023	
Determination 2 (avg)	18.7	43.2		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
19.8	45	14	31	98



REMARKS

SIGNED

NAME

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

DATE

26-Sep-23

MURRAY RIX

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DUKINFIELD, CHESHIRE SK16 4QX
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TEST CERTIFICATE

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

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

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

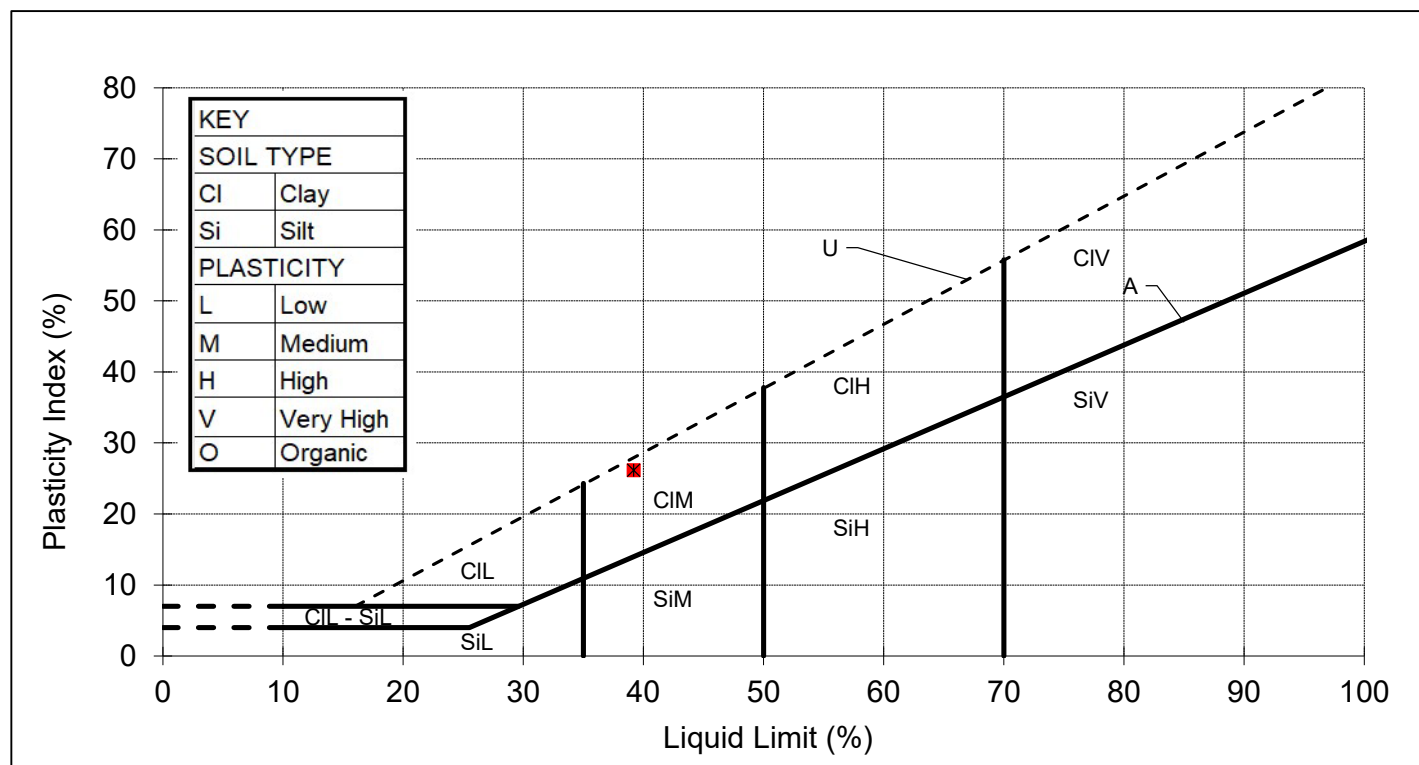
CLIENT	Tier Environmental Ltd
SITE	TE1764 - Manchester Art Gallery
JOB NUMBER	MRN 4625/45

SAMPLE LABEL	WS03 1.2	DATE SAMPLED	31-Aug-23
SAMPLE No.	131053	DATE RECEIVED	08-Sep-23
DATE TESTED	12-Sep-23	SAMPLED BY	Client

MATERIAL	Dark brown silty slightly sandy slightly gravelly CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	21.7	40.1	0.978	
Determination 2 (avg)	21.2	40.0		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
19.3	39	13	26	88



REMARKS

SIGNED

NAME

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

DATE

26-Sep-23

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TEST CERTIFICATE

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

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

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

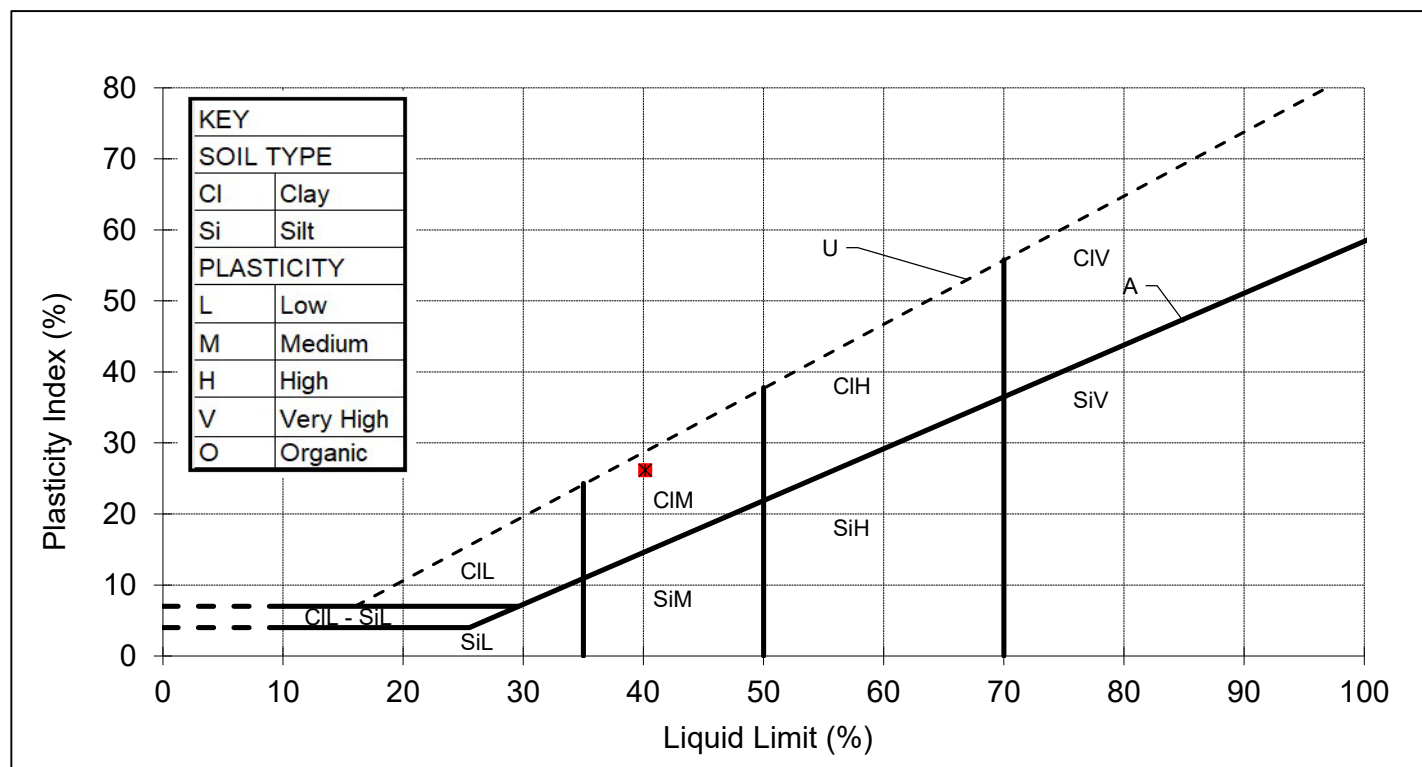
CLIENT	Tier Environmental Ltd
SITE	TE1764 - Manchester Art Gallery
JOB NUMBER	MRN 4625/45

SAMPLE LABEL	WS03 3	DATE SAMPLED	31-Aug-23
SAMPLE No.	131055	DATE RECEIVED	08-Sep-23
DATE TESTED	12-Sep-23	SAMPLED BY	Client

MATERIAL	Dark brown silty slightly sandy CLAY		
ADVISED SOURCE	Site Investigation Sample	WATER CONTENT	Increasing
SAMPLE HISTORY	Natural State	% RET. 425um BY	Hand Picked

Test Readings mm (average)		Moisture Content %	Correction Factor	Correction factor from Clayton and Jukes 1978
Determination 1 (avg)	19.5	39.8	1.010	
Determination 2 (avg)	19.5	39.7		

Natural Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Passing 425 micron (%)
31.5	40	14	26	97



REMARKS

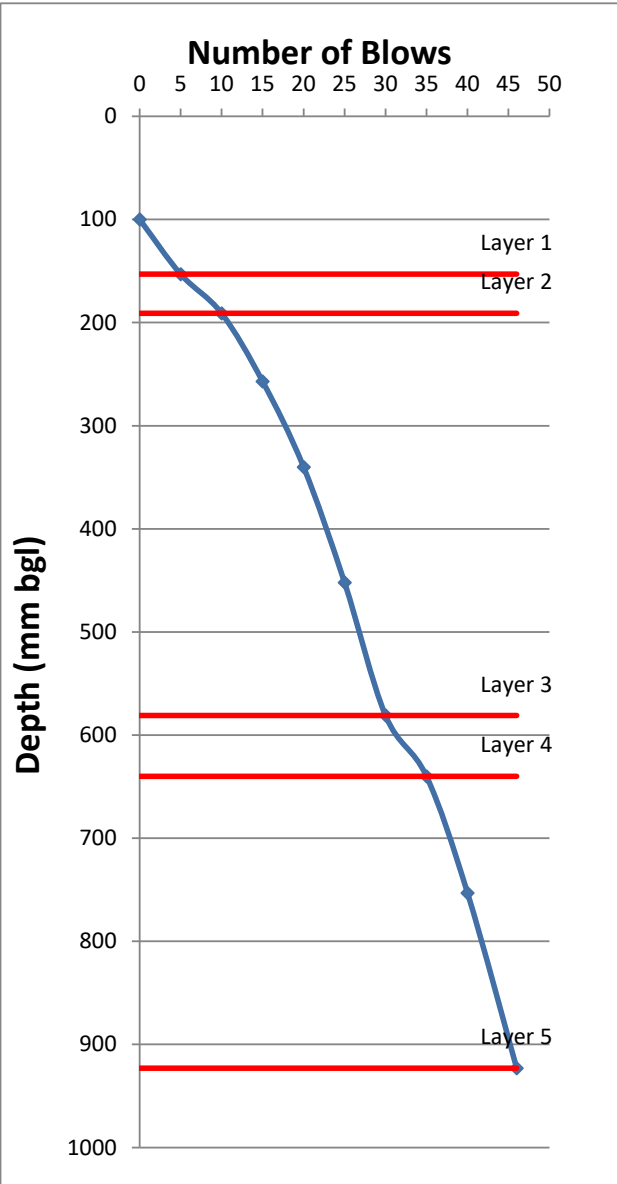
SIGNED

NAME

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

DATE

26-Sep-23

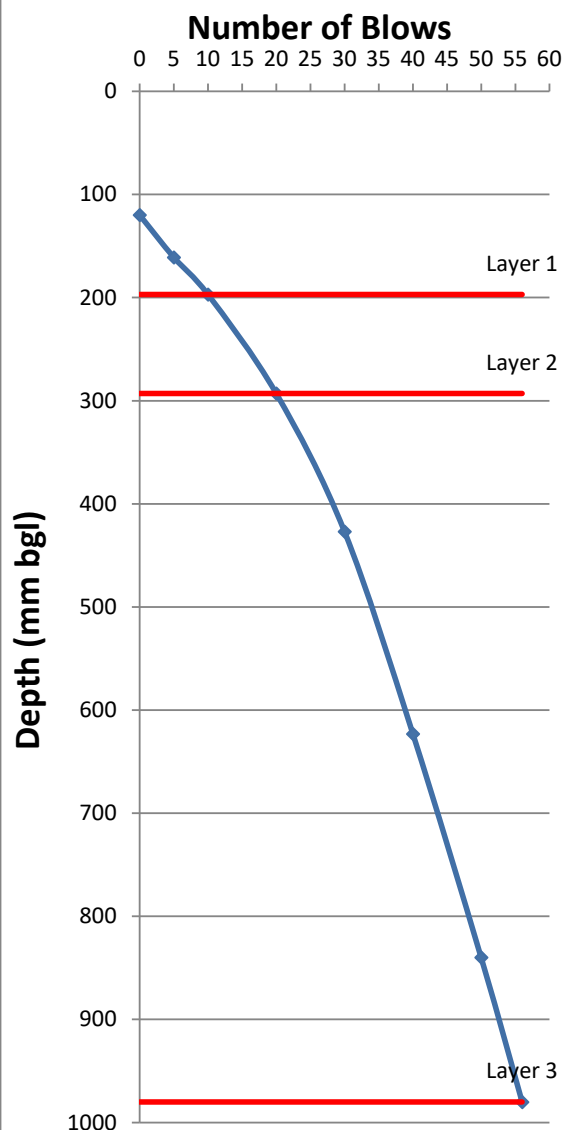
[illegible][illegible]

Based on the Kleyn and Van Heerden Model					
Layer	Top of layer	Base of Layer	Total blows	DCP (mm / blow)	CBR %
1	100	153	5	10.60	21.03
2	153	191	10	7.60	32.12
3	191	581	30	19.50	9.68
4	581	640	35	11.80	18.34
5	640	923	46	25.73	6.80

DYNAMIC CONE PENETROMETER RECORD SHEET

JOB DETAILS

Job No:	TE1764
Site:	MANCHESTER ART GALLERY
Location	DCP102
Test Date	04.01.2024
Zero Error mm	1
Cone Angle	60
Layers Removed	

[illegible]

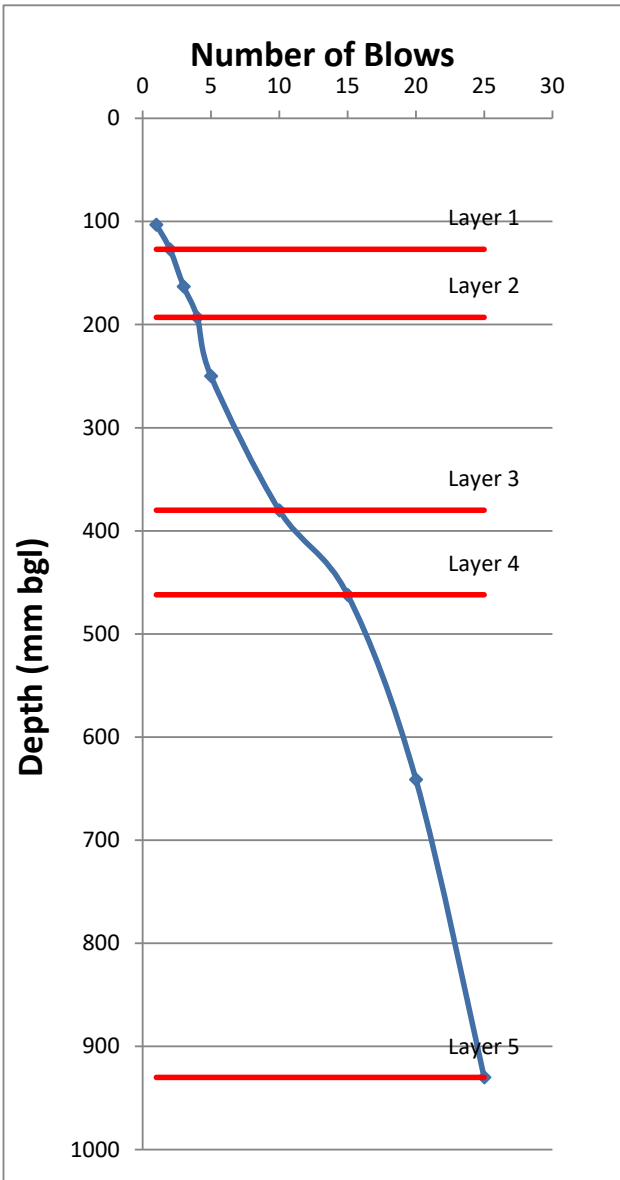
Based on the Kleyn and Van Heerden Model

Layer	Top of layer	Base of Layer	Total blows	DCP (mm / blow)	CBR %
1	120	197	10	7.70	31.59
2	197	293	20	9.60	23.85
3	293	980	56	19.08	9.95
4					
5					

DYNAMIC CONE PENETROMETER RECORD SHEET

JOB DETAILS

Job No:	TE1764
Site:	MANCHESTER ART GALLERY
Location	DCP103
Test Date	04.01.2024
Zero Error mm	1
Cone Angle	60
Layers Removed	

[illegible]

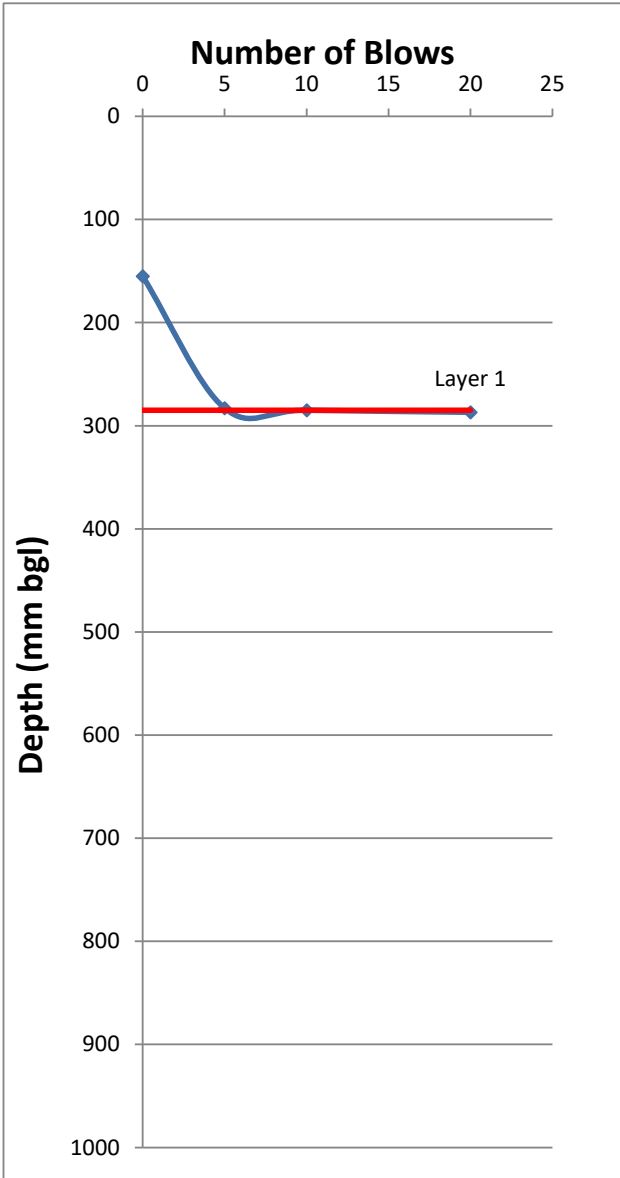
Based on the Kleyn and Van Heerden Model

Layer	Top of layer	Base of Layer	Total blows	DCP (mm / blow)	CBR %
1	103	127	2	12.00	17.96
2	127	193	4	33.00	4.95
3	193	380	10	31.17	5.33
4	380	462	15	16.40	12.06
5	462	930	25	46.80	3.18

DYNAMIC CONE PENETROMETER RECORD SHEET

JOB DETAILS

Job No:	TE1764
Site:	MANCHESTER ART GALLERY
Location	DCP104
Test Date	04.01.2024
Zero Error mm	1
Cone Angle	60
Layers Removed	

[illegible]

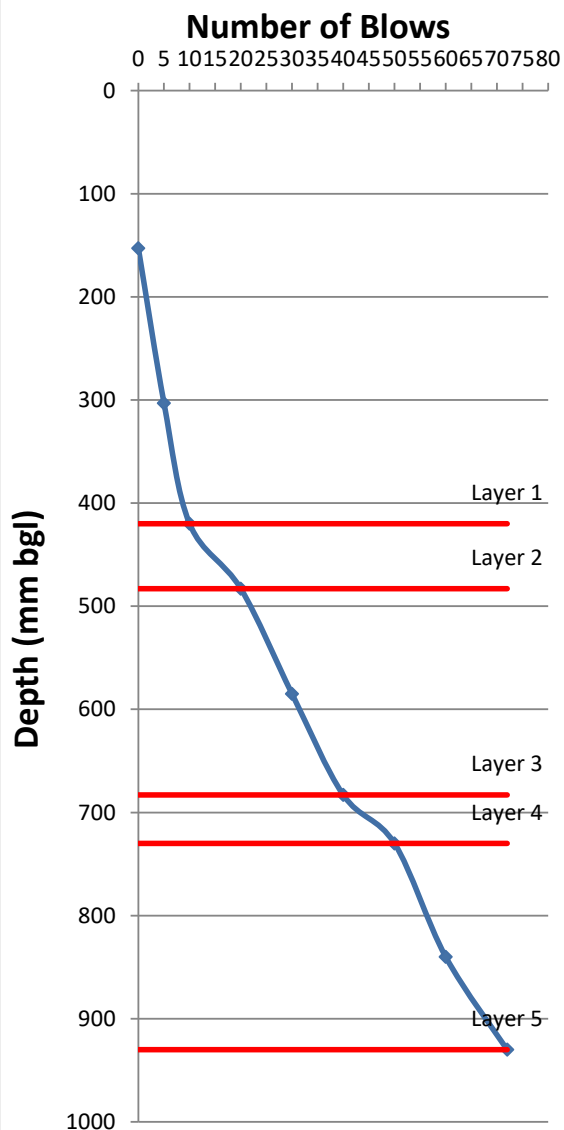
Based on the Kleyn and Van Heerden Model

Layer	Top of layer	Base of Layer	Total blows	DCP (mm / blow)	CBR %
1	155	285	10	13.00	16.22
2	285				
3					
4					
5					

DYNAMIC CONE PENETROMETER RECORD SHEET

JOB DETAILS

Job No:	TE1764
Site:	MANCHESTER ART GALLERY
Location	DCP105
Test Date	04.01.2024
Zero Error mm	1
Cone Angle	60
Layers Removed	

[illegible]

Based on the Kleyn and Van Heerden Model

Layer	Top of layer	Base of Layer	Total blows	DCP (mm / blow)	CBR %
1	153	420	10	26.70	6.49
2	420	483	20	6.30	40.78
3	483	683	40	10.00	22.65
4		730	50	73.00	1.80
5	730	930	72	9.09	25.57

APPENDIX E - GROUNDWATER AND GAS MONITORING RESULTS

Job No:	TE1764		
Visit No:	1	of	4
Operator:	LH		
Project Manager:	AP		

O ₂	20.7
----------------	------

	Snow		Frozen
	Strong		
	Overcast		
	Heavy		
1012	After		
	Rising		

[illegible]

TIER
CONSULT
GROUP

Job No:	TE1764		
Visit No:	2	of	4
Operator:	LH		
Project Manager:	AP		

O ₂	20.9
----------------	------

	Snow		Frozen
	Strong		
	Overcast		
	Heavy		
1017	After		
	Rising		

[illegible]

Job No:	TE1764		
Visit No:	3	of	4
Operator:	LH		
Project Manager:	AP		

O ₂	20.9
----------------	------

☐ Frozen

[illegible]

Job No:	TE1764		
Visit No:	4	of	4
Operator:	LH		
Project Manager:	AP		

O ₂	20.9
----------------	------

	Snow
	Strong
	Overcast
	Heavy
968	After
	Rising

☐ Frozen

Pressure Trend

[illegible]

APPENDIX F - PHOTOGRAPHS

Photograph 1:

APPENDIX G - GROUNDSURE REPORT

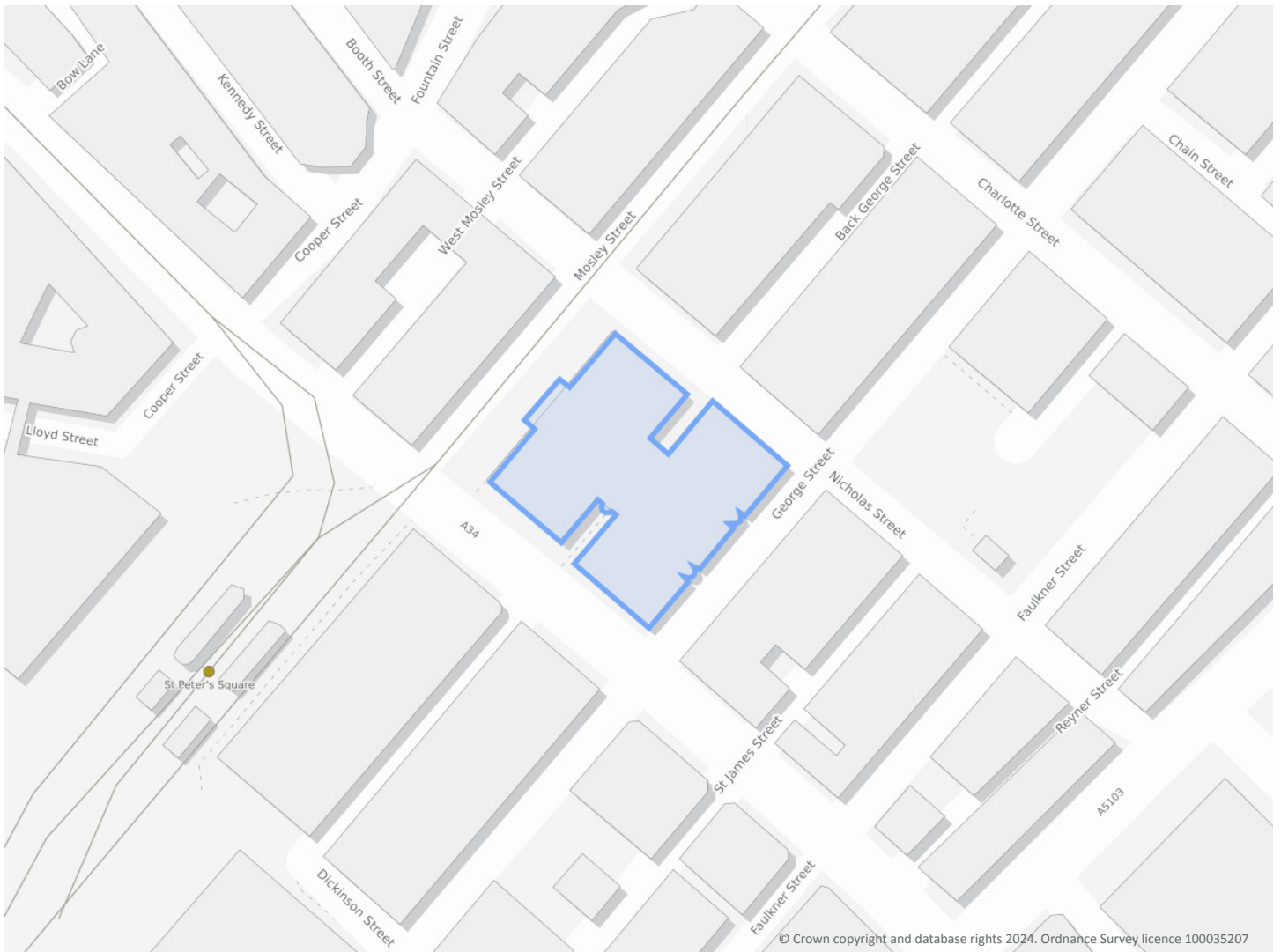
MANCHESTER CITY GALLERIES, MANCHESTER ART GALLERY, MOSLEY STREET, MANCHESTER, M2 3JL

Order Details

Date: 09/01/2024
Your ref: 2950_TE1764
Our Ref: GS-EYW-PV1-TD6-4XP

Site Details

Location: 384073 398018
Area: 0.29 ha
Authority: [Manchester City Council](#) ↗



Summary of findings

[p. 2 >](#) **Aerial image**

[p. 9 >](#)

OS MasterMap site plan

[p.14 >](#) groundsure.com/insightuserguide ↗

Contact us with any questions at:

info@groundsure.com ↗

01273 257 755

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
15 >	1.1 >	Historical industrial land uses >	0	0	4	74	-
18 >	1.2 >	Historical tanks >	0	0	1	31	-
20 >	1.3 >	Historical energy features >	0	0	3	18	-
21	1.4	Historical petrol stations	0	0	0	0	-
21 >	1.5 >	Historical garages >	0	0	2	14	-
22	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped >	On site	0-50m	50-250m	250-500m	500-2000m
23 >	2.1 >	Historical industrial land uses >	0	0	7	119	-
28 >	2.2 >	Historical tanks >	0	0	4	48	-
30 >	2.3 >	Historical energy features >	0	0	5	50	-
32	2.4	Historical petrol stations	0	0	0	0	-
33 >	2.5 >	Historical garages >	0	0	5	29	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
35	3.1	Active or recent landfill	0	0	0	0	-
35	3.2	Historical landfill (BGS records)	0	0	0	0	-
36	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
36	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
36 >	3.5 >	Historical waste sites >	0	0	0	2	-
37	3.6	Licensed waste sites	0	0	0	0	-
37 >	3.7 >	Waste exemptions >	0	0	5	58	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
43 >	4.1 >	Recent industrial land uses >	0	0	50	-	-
47	4.2	Current or recent petrol stations	0	0	0	0	-
47	4.3	Electricity cables	0	0	0	0	-
47	4.4	Gas pipelines	0	0	0	0	-
47	4.5	Sites determined as Contaminated Land	0	0	0	0	-



47	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
48	4.7	Regulated explosive sites	0	0	0	0	-
48	4.8	Hazardous substance storage/usage	0	0	0	0	-
48	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
48 >	4.10 >	Licensed industrial activities (Part A(1)) >	0	0	0	2	-
49 >	4.11 >	Licensed pollutant release (Part A(2)/B) >	0	0	1	2	-
49	4.12	Radioactive Substance Authorisations	0	0	0	0	-
50 >	4.13 >	Licensed Discharges to controlled waters >	0	0	0	19	-
53	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
53	4.15	Pollutant release to public sewer	0	0	0	0	-
53	4.16	List 1 Dangerous Substances	0	0	0	0	-
53	4.17	List 2 Dangerous Substances	0	0	0	0	-
53 >	4.18 >	Pollution Incidents (EA/NRW) >	0	0	0	2	-
54	4.19	Pollution inventory substances	0	0	0	0	-
54	4.20	Pollution inventory waste transfers	0	0	0	0	-
54	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology >	On site	0-50m	50-250m	250-500m	500-2000m
55 >	5.1 >	Superficial aquifer >	Identified (within 500m)				
57 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
59 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
60	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
60	5.5	Groundwater vulnerability- local information	None (within 0m)				
62 >	5.6 >	Groundwater abstractions >	0	2	0	2	52
76 >	5.7 >	Surface water abstractions >	0	0	0	0	2
77 >	5.8 >	Potable abstractions >	0	0	0	0	10
80 >	5.9 >	Source Protection Zones >	0	0	0	1	-
80	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m
81	6.1	Water Network (OS MasterMap)	0	0	0	-	-



81	6.2	Surface water features	0	0	0	-	-
82 >	6.3 >	WFD Surface water body catchments >	2	-	-	-	-
82 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
83 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
84	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
84	7.2	Historical Flood Events	0	0	0	-	-
84	7.3	Flood Defences	0	0	0	-	-
85	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
85	7.5	Flood Storage Areas	0	0	0	-	-
86	7.6	Flood Zone 2	None (within 50m)				
86	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding >					
87 >	8.1 >	Surface water flooding >	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	Groundwater flooding >					
89 >	9.1 >	Groundwater flooding >	Moderate (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
90	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
90	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
90	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
90	10.4	Special Protection Areas (SPA)	0	0	0	0	0
91	10.5	National Nature Reserves (NNR)	0	0	0	0	0
91	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
91	10.7	Designated Ancient Woodland	0	0	0	0	0
91	10.8	Biosphere Reserves	0	0	0	0	0
92	10.9	Forest Parks	0	0	0	0	0
92	10.10	Marine Conservation Zones	0	0	0	0	0
92	10.11	Green Belt	0	0	0	0	0
92	10.12	Proposed Ramsar sites	0	0	0	0	0



92	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
93	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
93	10.15	Nitrate Sensitive Areas	0	0	0	0	0
93 >	10.16 >	Nitrate Vulnerable Zones >	0	0	0	1	3
94 >	10.17 >	SSSI Impact Risk Zones >	1	-	-	-	-
95	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations >	On site	0-50m	50-250m	250-500m	500-2000m
96	11.1	World Heritage Sites	0	0	0	-	-
97	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
97	11.3	National Parks	0	0	0	-	-
97 >	11.4 >	Listed Buildings >	2	6	93	-	-
101 >	11.5 >	Conservation Areas >	1	2	2	-	-
102	11.6	Scheduled Ancient Monuments	0	0	0	-	-
102	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations >	On site	0-50m	50-250m	250-500m	500-2000m
103 >	12.1 >	Agricultural Land Classification >	Urban (within 250m)				
104	12.2	Open Access Land	0	0	0	-	-
104	12.3	Tree Felling Licences	0	0	0	-	-
104	12.4	Environmental Stewardship Schemes	0	0	0	-	-
104	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
105	13.1	Priority Habitat Inventory	0	0	0	-	-
105	13.2	Habitat Networks	0	0	0	-	-
105	13.3	Open Mosaic Habitat	0	0	0	-	-
105	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
106 >	14.1 >	10k Availability >	Identified (within 500m)				
107 >	14.2 >	Artificial and made ground (10k) >	0	0	0	2	-
108 >	14.3 >	Superficial geology (10k) >	1	0	0	1	-

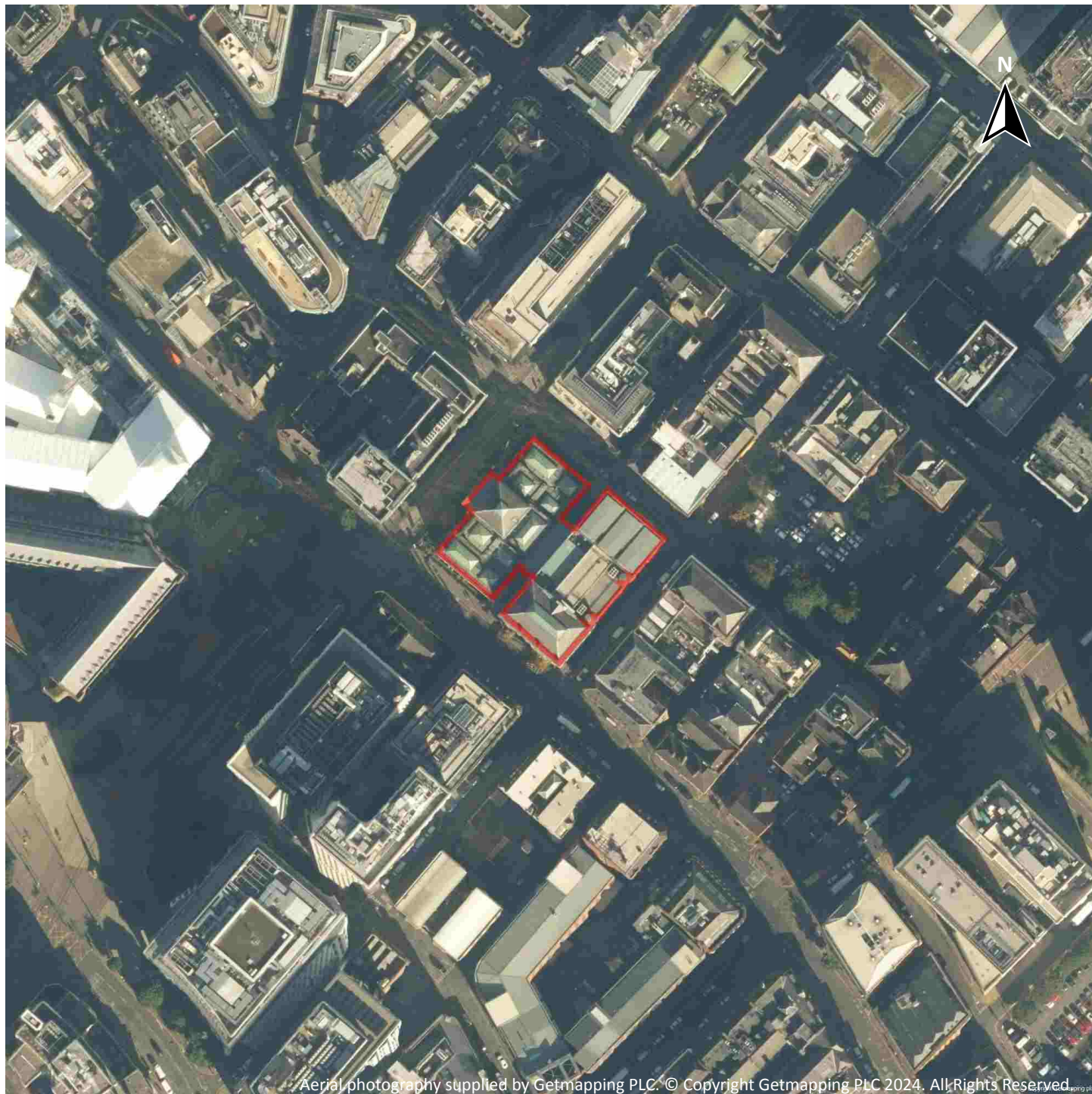
109	14.4	Landslip (10k)	0	0	0	0	-
110 >	14.5 >	Bedrock geology (10k) >	1	0	0	1	-
111 >	14.6 >	Bedrock faults and other linear features (10k) >	1	0	0	3	-
Page	Section	Geology 1:50,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
112 >	15.1 >	50k Availability >	Identified (within 500m)				
113 >	15.2 >	Artificial and made ground (50k) >	0	0	0	1	-
114	15.3	Artificial ground permeability (50k)	0	0	-	-	-
115 >	15.4 >	Superficial geology (50k) >	1	0	0	1	-
116 >	15.5 >	Superficial permeability (50k) >	Identified (within 50m)				
116	15.6	Landslip (50k)	0	0	0	0	-
116	15.7	Landslip permeability (50k)	None (within 50m)				
117 >	15.8 >	Bedrock geology (50k) >	1	0	0	1	-
118 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
118 >	15.10 >	Bedrock faults and other linear features (50k) >	1	0	0	3	-
Page	Section	Boreholes >	On site	0-50m	50-250m	250-500m	500-2000m
119 >	16.1 >	BGS Boreholes >	3	8	106	-	-
Page	Section	Natural ground subsidence >					
126 >	17.1 >	Shrink swell clays >	Very low (within 50m)				
127 >	17.2 >	Running sands >	Very low (within 50m)				
128 >	17.3 >	Compressible deposits >	Negligible (within 50m)				
129 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
130 >	17.5 >	Landslides >	Very low (within 50m)				
131 >	17.6 >	Ground dissolution of soluble rocks >	Negligible (within 50m)				
Page	Section	Mining and ground workings >	On site	0-50m	50-250m	250-500m	500-2000m
133	18.1	BritPits	0	0	0	0	-
134 >	18.2 >	Surface ground workings >	0	0	1	-	-
134	18.3	Underground workings	0	0	0	0	0
134	18.4	Underground mining extents	0	0	0	0	-
134	18.5	Historical Mineral Planning Areas	0	0	0	0	-



135	18.6	Non-coal mining	0	0	0	0	0
135 >	18.7 >	JPB mining areas >	Identified (within 0m)				
135	18.8	The Coal Authority non-coal mining	0	0	0	0	-
135	18.9	Researched mining	0	0	0	0	-
136	18.10	Mining record office plans	0	0	0	0	-
136	18.11	BGS mine plans	0	0	0	0	-
136 >	18.12 >	Coal mining >	Identified (within 0m)				
136	18.13	Brine areas	None (within 0m)				
137	18.14	Gypsum areas	None (within 0m)				
137	18.15	Tin mining	None (within 0m)				
137	18.16	Clay mining	None (within 0m)				
Page	Section	Ground cavities and sinkholes	On site	0-50m	50-250m	250-500m	500-2000m
138	19.1	Natural cavities	0	0	0	0	-
138	19.2	Mining cavities	0	0	0	0	0
138	19.3	Reported recent incidents	0	0	0	0	-
138	19.4	Historical incidents	0	0	0	0	-
139	19.5	National karst database	0	0	0	0	-
Page	Section	Radon >					
140 >	20.1 >	Radon >	Less than 1% (within 0m)				
Page	Section	Soil chemistry >	On site	0-50m	50-250m	250-500m	500-2000m
142 >	21.1 >	BGS Estimated Background Soil Chemistry >	4	4	-	-	-
143 >	21.2 >	BGS Estimated Urban Soil Chemistry >	3	4	-	-	-
143	21.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects >	On site	0-50m	50-250m	250-500m	500-2000m
144	22.1	Underground railways (London)	0	0	0	-	-
144	22.2	Underground railways (Non-London)	0	0	0	-	-
145	22.3	Railway tunnels	0	0	0	-	-
145 >	22.4 >	Historical railway and tunnel features >	0	0	1	-	-
145	22.5	Royal Mail tunnels	0	0	0	-	-

145	22.6	Historical railways	0	0	0	-	-
146 >	22.7 >	Railways >	0	13	17	-	-
147	22.8	Crossrail 1	0	0	0	0	-
147	22.9	Crossrail 2	0	0	0	0	-
147	22.10	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 18/10/2022

Site Area: 0.29ha



Recent site history - 2019 aerial photograph



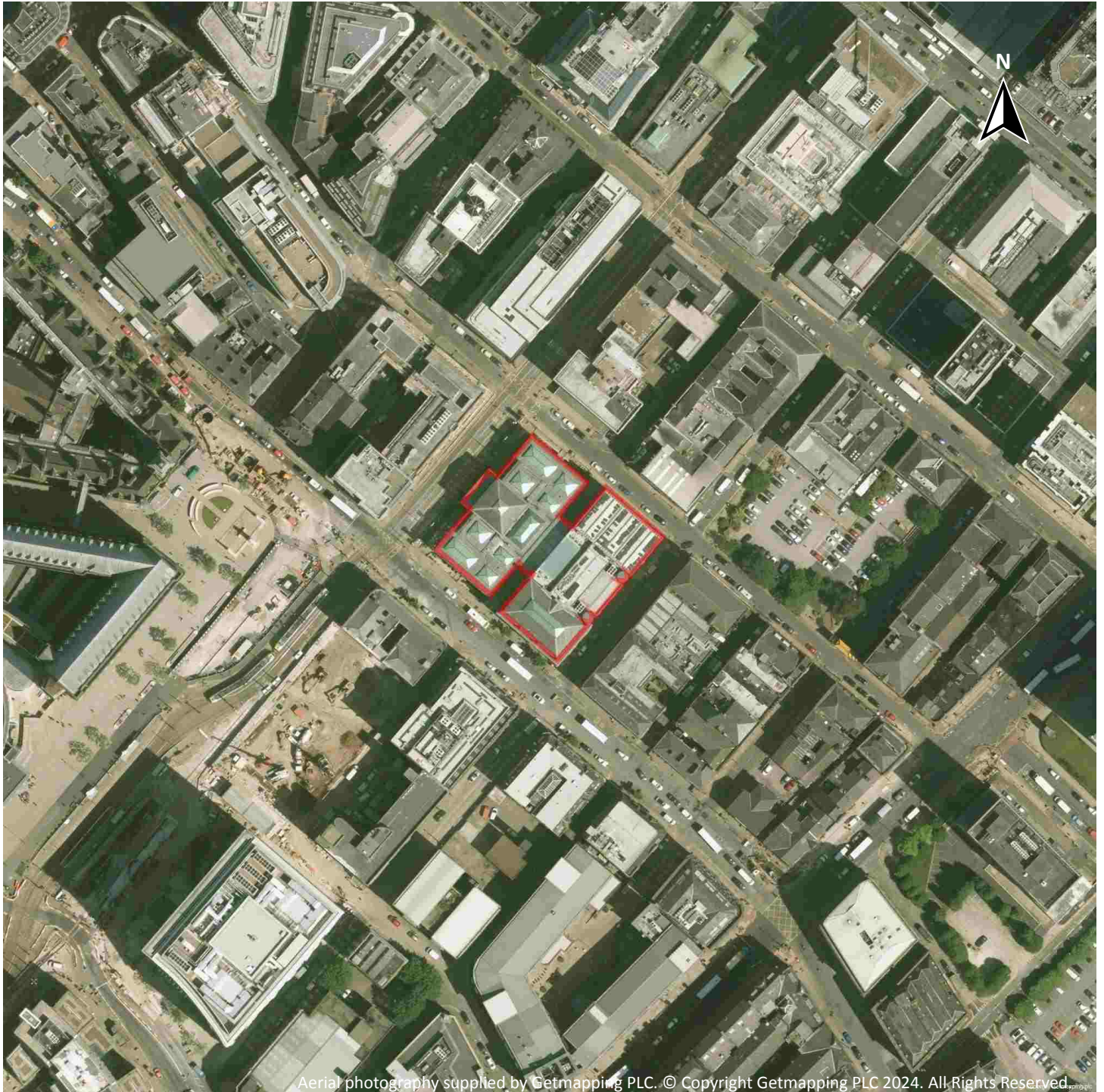
Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2024. All Rights Reserved.

Capture Date: 22/04/2019

Site Area: 0.29ha



Recent site history - 2015 aerial photograph

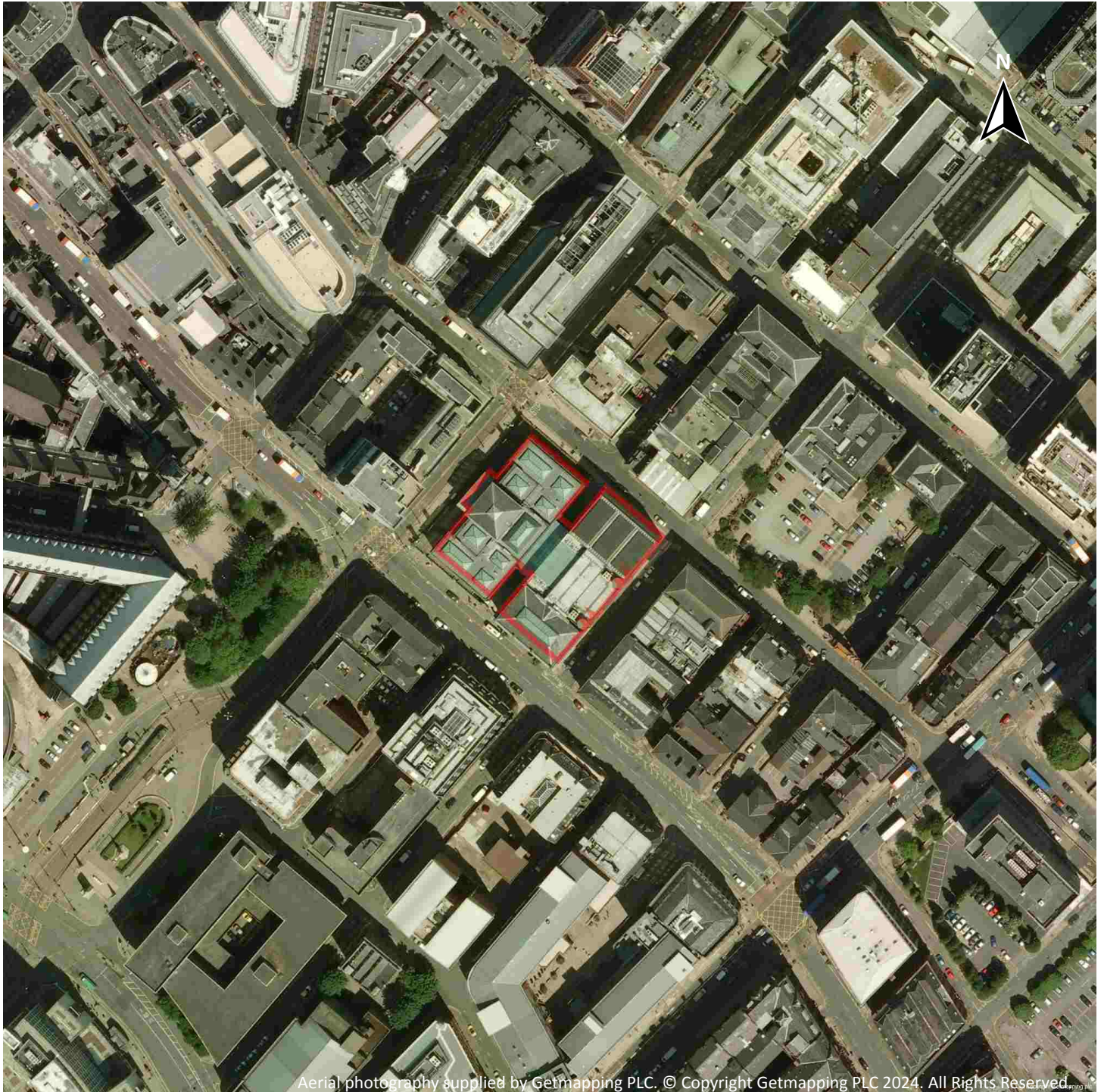


Capture Date: 11/06/2015

Site Area: 0.29ha



Recent site history - 2009 aerial photograph

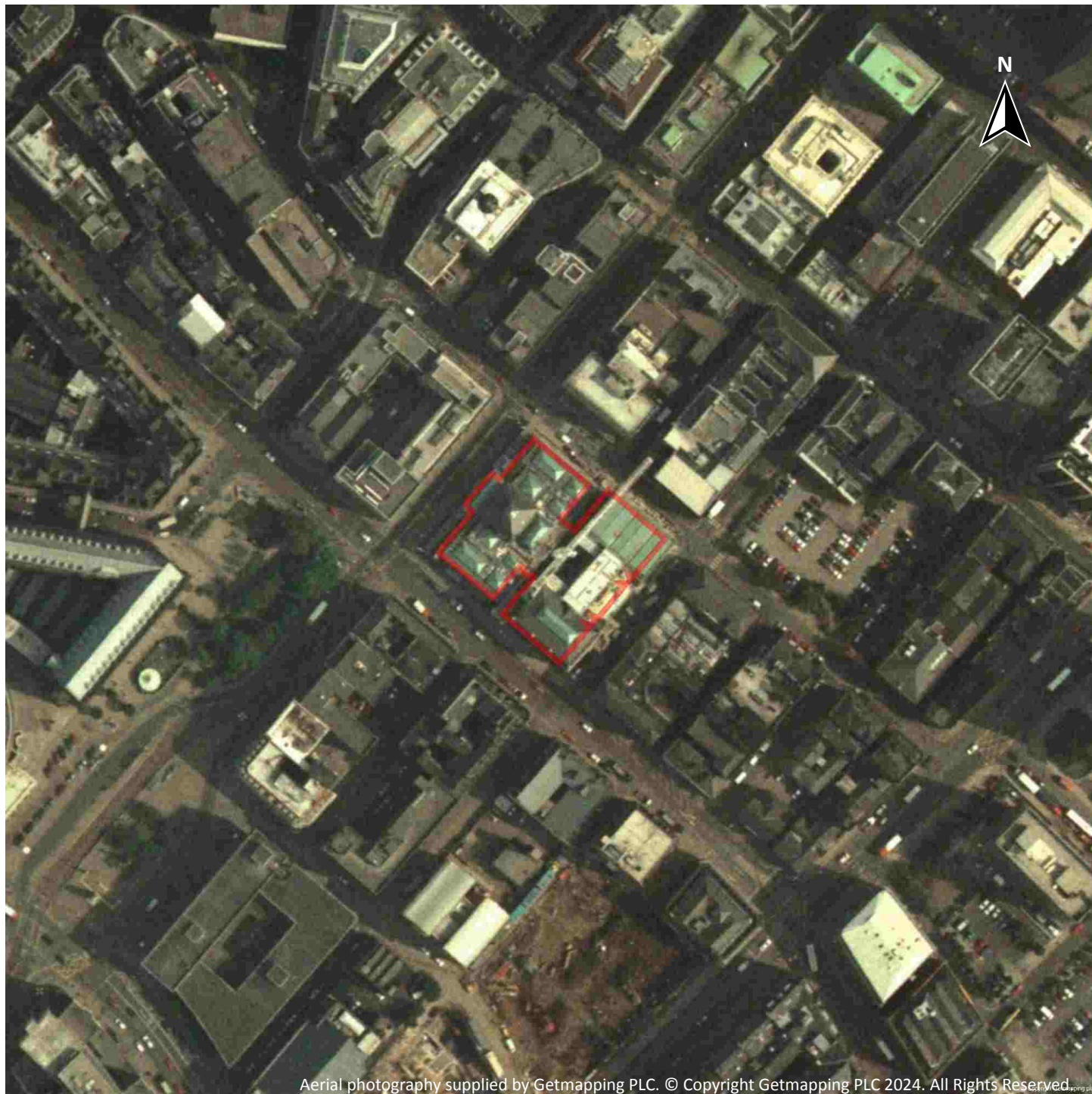


Capture Date: 02/06/2009

Site Area: 0.29ha



Recent site history - 2000 aerial photograph



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Capture Date: 27/06/2000

Site Area: 0.29ha



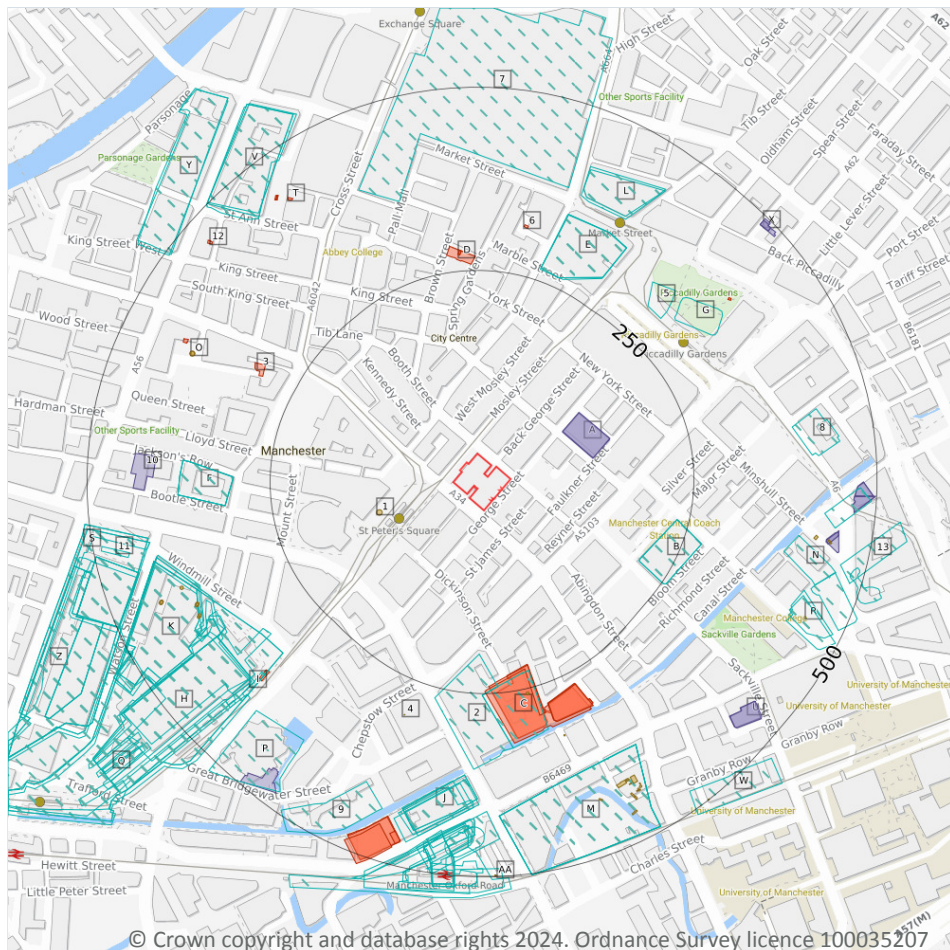
OS MasterMap site plan



Site Area: 0.29ha



1 Past land use



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

1.1 Historical industrial land uses

Records within 500m

78

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on [page 15](#) >

ID	Location	Land use	Dates present	Group ID
2	196m S	Unspecified Commercial/Industrial	1923	796724



ID	Location	Land use	Dates present	Group ID
B	207m SE	Bus Station	1978	884077
B	207m SE	Bus Station	1985 - 1994	952978
C	227m S	Electricity Station	1916 - 1923	992043
E	264m N	Unspecified Commercial/Industrial	1931	885632
E	264m N	Unspecified Commercial/Industrial	1916	924604
E	265m N	Unspecified Commercial/Industrial	1938	873846
5	300m NE	Bus Station	1978	842917
F	300m W	Police Station	1978	880849
F	300m W	Police Station	1956 - 1971	884199
F	300m W	Police Station	1985 - 1994	940998
G	313m NE	Unspecified Pit	1956	840494
H	323m SW	Railway Station	1956	888631
H	329m SW	Railway Sidings	1905 - 1916	871753
H	329m SW	Railway Sidings	1932 - 1938	982150
7	360m N	Bus Station	1985 - 1994	940823
J	362m S	Hospital	1956 - 1971	915521
J	362m S	Hospital	1978	957282
H	365m SW	Railway Sidings	1896	975593
I	367m SW	Railway Building	1932 - 1938	946173
H	367m SW	Disused Station	1978	925495
J	368m S	Hospital	1916	938342
K	370m SW	Goods Station	1923	943574
J	371m S	Coal Wharf	1851	794097
K	373m W	Goods Station	1956	923306
J	374m S	Hospital	1923	848326
L	376m N	Unspecified Commercial/Industrial	1938	796725
H	376m W	Railway Station	1896	915817
K	376m SW	Goods Station	1932 - 1938	883356



ID	Location	Land use	Dates present	Group ID
K	376m SW	Goods Station	1905 - 1916	938206
M	378m SE	Unspecified Mills	1916	861845
M	378m SE	Unspecified Commercial/Industrial	1923	874542
M	378m SE	Unspecified Commercial/Industrial	1905	968335
M	378m SE	Unspecified Mills	1932 - 1938	989884
H	378m SW	Railway Station	1905 - 1938	896284
L	379m NE	Unspecified Ground Workings	1931	800625
J	380m S	Hospital	1932 - 1938	949847
H	383m SW	Disused Station	1985	891253
N	386m E	Unspecified Wharf	1915 - 1923	848098
8	391m E	Infirmary	1915 - 1923	975872
P	398m SW	Cotton Mills	1851	811452
9	403m S	Corporation Yard	1905 - 1938	920120
Q	404m SW	Railway Sidings	1923	923309
J	411m S	Gas Works	1851	802208
R	420m E	Ice Works	1915	808540
R	420m SE	Unspecified Wharf	1890	826601
J	421m S	Railway Station	1988 - 1994	912150
J	422m S	Railway Building	1956	820261
S	422m W	Railway Buildings	1923	833657
J	428m S	Railway Station	1896	887032
J	430m S	Railway Sidings	1985 - 1994	928139
N	431m E	Unspecified Works	1915 - 1923	898319
J	431m S	Railway Sidings	1905 - 1938	864885
J	431m S	Railway Station	1905 - 1938	962635
J	432m S	Railway Station	1956	923967
J	432m S	Tanks	1851	832185
R	436m E	Unspecified Works	1923	830436



ID	Location	Land use	Dates present	Group ID
V	438m NW	Unspecified Commercial/Industrial	1894 - 1906	981915
V	439m NW	Unspecified Commercial/Industrial	1931 - 1938	888220
V	443m NW	Unspecified Commercial/Industrial	1916	908333
S	446m W	Disused Goods Station	1978	814351
S	446m W	Goods Station	1956	945355
S	446m W	Goods Station	1971	945855
J	446m S	Railway Station	1971	960776
J	446m S	Railway Station	1985	962611
J	446m S	Railway Station	1978	981767
S	451m W	Goods Station	1905 - 1938	846931
11	452m W	Railway Buildings	1923	833653
J	459m S	Railway Sidings	1896	989778
13	465m E	Unspecified Mill	1915 - 1923	946972
W	475m SE	Unspecified Commercial/Industrial	1923	796719
Q	481m SW	Railway Sidings	1956	917334
R	482m E	Unspecified Ground Workings	1934 - 1938	906423
Y	492m NW	Unspecified Commercial/Industrial	1931 - 1938	890147
Y	493m NW	Unspecified Commercial/Industrial	1906 - 1916	878688
Z	496m W	Railway Sidings	1971	946450
Z	496m W	Railway Sidings	1985	958621
Z	496m W	Railway Sidings	1978	989903

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m

32

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.



Features are displayed on the Past land use map on [page 15 >](#)

ID	Location	Land use	Dates present	Group ID
1	105m W	Unspecified Tank	1994 - 1999	133983
C	255m S	Unspecified Tank	1891	115965
4	299m S	Unspecified Tank	1891	115956
C	325m S	Unspecified Tank	1891	115964
K	384m SW	Unspecified Tank	1986 - 1999	148721
K	385m SW	Unspecified Tank	1988	133750
K	389m SW	Unspecified Tank	1988 - 1999	136452
K	391m SW	Unspecified Tank	1986	147812
O	394m NW	Tanks	1995	106801
O	394m NW	Unspecified Tank	1989	115966
K	395m W	Unspecified Tank	1988 - 1999	137115
M	415m SE	Tanks	1891	106792
M	415m SE	Unspecified Tank	1891	115960
M	415m SE	Unspecified Tank	1891	115962
M	415m SE	Unspecified Tank	1893	115963
N	421m E	Unspecified Tank	1891	115912
M	423m SE	Unspecified Tank	1891	115961
M	423m S	Tanks	1891	106782
K	428m W	Unspecified Tank	1986 - 1999	144065
M	428m SE	Unspecified Tank	1891	115949
K	429m W	Unspecified Tank	1988	124833
M	430m SE	Unspecified Tank	1891	115947
M	432m SE	Unspecified Tank	1891 - 1893	141146
M	433m SE	Unspecified Tank	1891	115959
M	435m SE	Unspecified Tank	1891	115958
M	436m SE	Unspecified Tank	1891	115948
N	441m E	Unspecified Tank	1891	115913



ID	Location	Land use	Dates present	Group ID
M	441m SE	Tanks	1891	106786
M	458m SE	Tanks	1891	106787
AA	498m S	Unspecified Tank	1955	136262
AA	498m S	Unspecified Tank	1953	136354
W	499m SE	Unspecified Tank	1891	115946

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m

21

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on [page 15 >](#)

ID	Location	Land use	Dates present	Group ID
C	218m S	Electricity Station	1950 - 1955	66381
C	219m S	Electricity Station	1948	73425
C	223m S	Electricity Station	1908 - 1922	81883
D	259m N	Electricity Substation	1953	74071
C	266m SE	Electricity Station	1950	68267
C	268m SE	Electricity Station	1955	77896
D	272m N	Electricity Substation	1953 - 1967	74509
D	272m N	Electricity Substation	1948 - 1968	80770
3	298m NW	Electricity Substation	1989 - 1995	71770
6	315m N	Electricity Substation	1995	62186
I	360m SW	Electricity Substation	1948 - 1985	80627
G	385m NE	Electricity Substation	1986 - 1995	72406
O	410m NW	Electricity Substation	1980 - 1995	80026



ID	Location	Land use	Dates present	Group ID
T	429m NW	Electricity Substation	1980	62185
J	437m S	Hydraulic Power Station	1948 - 1979	64692
J	439m S	Hydraulic Power Station	1948 - 1973	64396
T	441m NW	Electricity Substation	1948 - 1995	65939
T	442m NW	Electricity Substation	1986	67191
J	451m S	Hydraulic Power Station	1932	78003
J	454m S	Electricity Substation	1948 - 1999	65682
12	458m NW	Electricity Substation	1986	62184

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0
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Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	16
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Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on [page 15 >](#)

ID	Location	Land use	Dates present	Group ID
A	95m NE	Garage	1948 - 1953	24294
A	96m NE	Garage	1953 - 1965	27406
10	407m W	Garage	1948	20292

ID	Location	Land use	Dates present	Group ID
U	437m SE	Garage	1985 - 1990	27728
U	438m SE	Garage	1948 - 1968	26993
N	439m E	Garage	1948 - 1971	25857
N	439m E	Garage	1968 - 1984	24849
N	439m E	Garage	1955 - 1965	25421
P	453m SW	Garage	1973	20296
N	467m E	Garage	1948	24212
N	468m E	Garage	1971	22467
N	470m E	Garage	1971	23089
N	471m E	Garage	1948 - 1971	25009
X	486m NE	Garage	1953	21528
X	486m NE	Garage	1965	23515
X	487m NE	Garage	1953	25567

This data is sourced from Ordnance Survey / Groundsure.

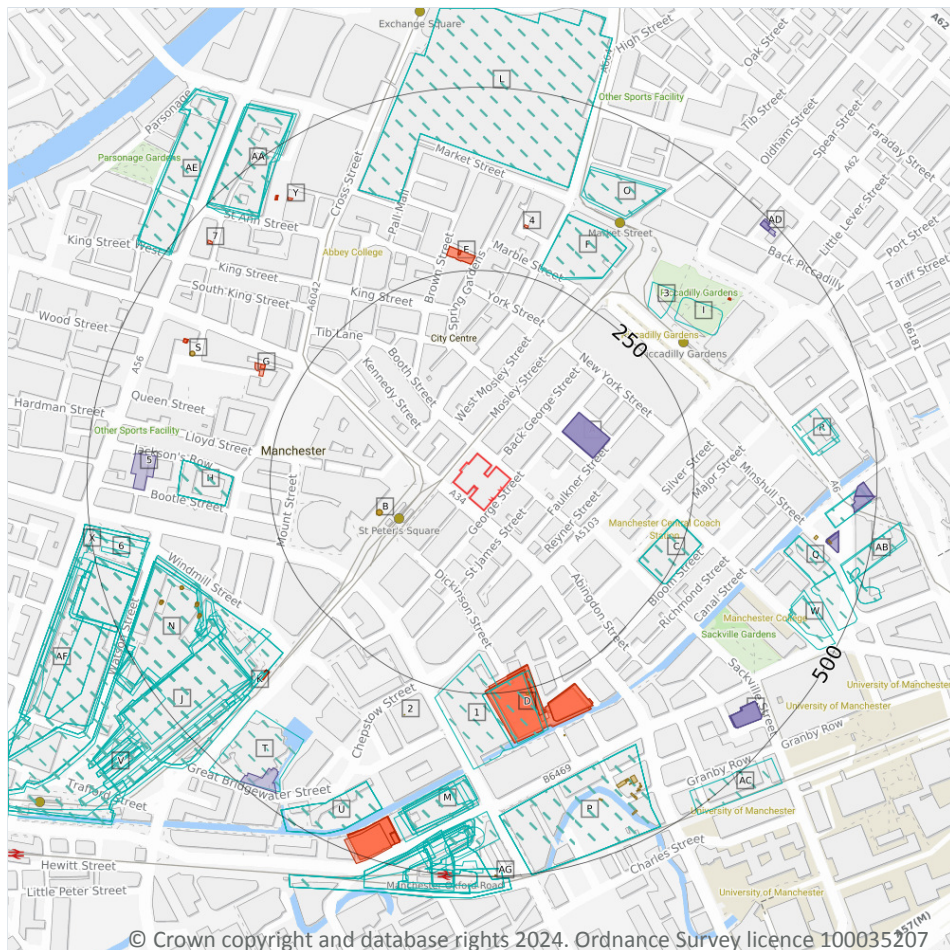
1.6 Historical military land

Records within 500m	0
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Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical garages

2.1 Historical industrial land uses

Records within 500m

126

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on [page 23](#) >

ID	Location	Land Use	Date	Group ID
1	196m S	Unspecified Commercial/Industrial	1923	796724
C	207m SE	Bus Station	1988	952978
C	207m SE	Bus Station	1978	884077

