

Circle Square Building 3

Remediation Strategy

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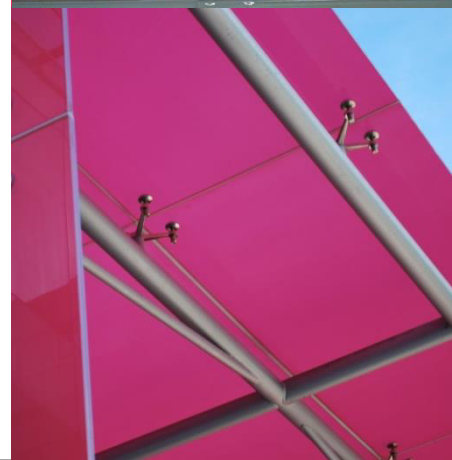
Client Name: Bruntwood Circle Square 12 Ltd

Client Address: York House, York Street, Manchester, M2 3BB

Site Address: Circle Square Development, Brancaster Rd, Manchester, M60 7HB

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

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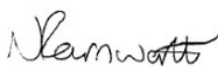


Remediation Strategy

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Author	Signature	Date
R Baksh-Jones BSc (Hons) Geo-Environmental Engineer		18 November 2022

Reviewed	Signature	Date
Niall Farnworth BSc (Hons) MCIWEM Senior Geo-Environmental Engineer		18 November 2022

Authorised	Signature	Date
R Allen BSc (Hons) MSc FGS MCIWEM C.WEM CEng Principal Engineer		18 November 2022

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1.0 Introduction

This Remediation Strategy has been prepared by Curtins for Bruntwood Sci Tech (the Client) to provide guidance with respect to remedial requirements for the proposed development site on the Circle Square Development off Newman Street, M60 7HB, known as No.3 Circle Square.

The proposed development on site comprises a 14-storey office development with ground floor commercial uses, along with road development off Newman Street, soft landscaping including an area of public open space on the west of site and hardstanding around the existing sub stations in the south west of the site.

Planit I.E Limited proposed site plan is enclosed in Appendix A.

The site has been characterised through site investigation undertaken by Curtins (Ref. 2) with two further stages of investigation, undertaken in August and November 2022 which have not been reported on previously, findings are detailed in Sections 3.0 and 4.0.

1.1 Requirements of the Remediation Strategy

The Remediation Statement is to account for the following;

- Provide summary of works undertaken to date and finalise ground contamination assessments;
- A description of the materials likely to be encountered by the developer and their sub-contractors;
- Proposals for excavations with respect to the materials likely to be encountered;
- Findings of additional investigation undertaken across the site in areas not within the building footprint which are within uncharacterised areas;
- Revised risk ratings associated with ground contamination and primary pollutant linkages remaining;
- Recommendations for appropriate PPE and managing asbestos appropriately during construction;

1.2 Definitions

In this document the following definitions apply,

Contractor	Refers to the appointed contractor responsible for undertaking the remediation works.
Site Manager	Refers to a representative of the appointed contractor resident on site.
Engineer	Refers to a suitably qualified representative from Curtins, who would not normally be resident on site.

1.3 References

The Remediation Strategy has been prepared with reference to the following existing reports;

- **Reference 1:** Curtins (2022) Circle Square, Building 3 Phase 1 Preliminary Risk Assessment Report Ref. 080-CUR-00-XX-RP-GE-001 P02.
- **Reference 2:** Curtins (2022) Circle Square, Building 3 Phase 2 Ground Investigation Report Ref. CS3-CUR-03-XX-RP-G-0002.
- **Reference 3:** Curtins (2022) Circle Square, Building 3, Piling Risk Assessment Report Ref. CS3-CUR-03-XX-RP-G-0004.
- **Reference 4:** Curtins (2023) Circle Square, Building 3, Updated Ground Gas Risk Assessment Report Ref. CS3-CUR-03-XX-RP-G-0005.

2.0 Ground Conditions

The following ground conditions section has been summarised, based on the Curtins Phase 2 Report (Ref. 2).

Curtins plans showing the locations of the exploratory holes undertaken during the investigation works are contained with Appendix A for ease of reference.

2.1 Made Ground

The surface covering across the site was either granular or concrete surface cover. Concrete was identified in WS101, WS104 and WS105 with a thickness of 0.10m. A variable gravel/sandy clay surfacing in the remaining boreholes.

Beneath surface coverings of granular or concrete was underlain by a dark brown/dark grey sandy gravelly clay with cobbles. Gravels/cobbles comprised of brick, concrete, sandstone. Locally, fragments of tarmac, mudstone, quartzite, siltstone, ash, charcoal and wood were also recorded. Made Ground was encountered in all exploratory holes. The depth of Made Ground varied across the site of between 1.60m to 7.50m bgl. Deeper made ground was described as 'reworked' ground, comprising soft dark brown slightly silty, gravelly clay in BHA and BHB. WS102, WS104 and WS105 recorded similar soils from depths of 2.70m to 4.50m bgl.

Deeper Made Ground from 2.60m to 7.50m bgl in BHA and BHB was recorded to be 'Reworked Ground'. The Reworked Ground was also encountered within WS102, WS104 and WS105. These soils were recorded as either a soft dark brown slightly silty, gravelly clay, with gravel is fine to medium and subrounded to sub-angular of brick, sandstone, and siltstone. Or a cohesive soil comprising soft to firm, orangish brown, slightly silty sandy clay.

WS101 encountered deeper concrete from ground level to 0.20m bgl and a buried obstruction at 1.45m bgl most likely concrete.

No potential olfactory contamination was observed during the intrusive investigation works. All exploratory boreholes recorded ash within the Made Ground soils.

The following obstructions were encountered within made ground soils during site works detailed in *Table 2.1* below.

Table 2.1 – Obstructions Encountered

Location Number	Depth Encountered (m bgl)	Obstruction Description
WS01	0.30	Concrete. Thickness not identified.
WS01A	0.30	Concrete. Thickness not identified.
WS01B	0.25	Concrete. Thickness not identified.

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Location Number	Depth Encountered (m bgl)	Obstruction Description
WS02	0.75	Concrete. Thickness not identified.
WS02A	0.70	Concrete. Thickness not identified.
WS04	0.60	Concrete. Thickness not identified.
WS04A	0.55	Concrete. Thickness not identified.
WS101	1.45	Concrete boulder/slab

2.2 Glacial Till Deposits

Where natural soils were encountered following progression through Made Ground, deposits indicative of glacial till deposits were recorded.

Glacial till deposits were predominantly cohesive and recorded beneath Made Ground, with the top of these deposits identified at 1.60m to 7.50m bgl. Soils are typically recorded as firm or stiff dark brown or brown slightly gravelly silty clay. Gravels are typically recorded as fine and medium, subrounded sandstone, siltstone, mudstone and coal.

BH01 recorded a thin layer (0.20m) of orangish brown fine to coarse sand from 7.10m to 7.30m bgl. BHB recorded granular Glacial Till deposits from 10.50m to 11.00m bgl (23.71m to 23.21m AOD). The granular material comprised dense, dark grey sand and gravel with frequent cobbles. Gravel is rounded siltstone and sandstone and cobbles of siltstone.

2.3 Chester Formation Bedrock

The bedrock (Chester Formation) comprised of a medium strong locally weak, reddish-brown medium to coarse grained arenaceous sandstone from 9.50m to 11.00m bgl. The surface was heavily weathered in BHA (8.20m to 9.50m bgl), recovered as very dense reddish brown slightly gravelly medium and coarse sand. The quality of the rock improved with depth.

The base of the sandstone was not proven during the investigation. The deepest boreholes were terminated at a depth of 25.0m bgl.

2.4 Ground & Groundwater Contamination

As part of the Phase 2 Ground Investigation, a Generic Quantitative Risk Assessment (GQRA) was undertaken against *Commercial* Tier 1 thresholds protective of human health.

With respect to the proposed end-use of the site, no exceedances were reported against the GAC.

All were scheduled for asbestos identification, Asbestos Containing Materials (ACM's) were identified in three samples during the first stage of GI, as summarised in *Table 2.4*.

Table 2.4 – Asbestos Identified Through Laboratory Screening

Borehole Ref.	Depth (m bgl)	Asbestos Type	Quantification (% w/w)
WS101	0.50	Loose fibres – amosite	<0.001%
WS103	1.00	Loose fibres – amosite	<0.001%
WS03	0.20	Loose fibres – amosite	<0.001%

The two soil samples which identified Asbestos fibres underwent quantification to determine percentage unit weight of Asbestos in the samples. The results recorded <0.001% which is below the hazardous waste threshold (>0.1%) for Asbestos in soils.

A **Moderate/Low** risk rating was identified to end-users, construction workers and adjacent residents from inhalation or direct contact with contaminants within shallow site soils, this is owing to the presence asbestos in shallow soils. An appropriate asbestos management measures should be put in place during construction which should include the provision of an asbestos management plan to mitigate risk to construction workers and adjacent residents. Although hardstanding associated with the building footprint or surrounding external areas is considered to prevent the potential contaminant linkage to end users being realised in these areas, further investigation was recommended outside of the proposed building footprint, to assess if a potential contaminant linkage is present elsewhere.

A **Very Low to Low** risk rating was identified for nearest surface water feature and groundwater receptors respectively, considering no evidence of gross or free phase contamination was encountered on site, the predominance of cohesive superficial soils beneath made ground on site acting to limit migration of contamination, the anticipated sensitivity of the adjacent watercourse (city centre location, culverted for long stretches, River Quality E) and accounting for the betterment to site conditions development will present as proposed hardstanding cover across majority of the site will act to limit any leaching of contamination.

2.5 Ground Gas

Curtins previously carried out a ground gas risk assessment for the site as part of Ground Investigation works (Ref.2). The gas risk assessment was subsequently updated within a standalone ground gas risk assessment (Ref.4), intended to provide a revised ground gas risk assessment following recent enabling works and earthworks which had materially altered the site's Conceptual Site Model.

The Conceptual Site Model, based on environmental, historical, and geological setting, review of intrusive investigation data and review of recent earthworks, identified limited remaining ground gas generation sources, all of which were noted to have a 'Very Low' gas generation potential. Limited migration pathways were also identified.

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Eleven ground gas monitoring visits were undertaken by Curtins in total across two phases of ground investigation, albeit with only one borehole monitored during the 2019 programme. The frequency and duration of monitoring was considered to be in full compliance with both current standards and guidance.

Evaluation of the 'borehole' scenario (highest gas flow rate in a single borehole) and 'worst case check' (highest hazardous gas flow rate that is theoretically possible, i.e. in any borehole) recorded a maximum Qhg of 0.0048 l/hr for methane and 0.0011 l/hr for carbon dioxide. Peak gas concentrations in 'flooded' boreholes were discounted as deemed to be unrepresentative. The 'Worst Case Check' indicates a Characteristic Situation 1 (CS1) gas regime, not requiring protection measures.

Elevated methane was encountered in one monitoring well previously (WS102) at a maximum concentration of 4.7%. As no viable mechanism for flow had been identified and in view of the recent earthworks acting to remove any minor unsuitable/organic materials from the upper soils where (minor) gas generation potential was previously noted, it was assessed that the Conceptual Site Model does not warrant an increase in Characteristic Situation from CS1 to CS2 based on methane concentrations in WS102 alone.

The site is not situated within a radon affected area with less than 1% of properties above the radon action level. The likelihood of Radon gas affecting the buildings was therefore considered to be Unlikely and radon protection measures are not considered necessary.

No ground gas protection measures were therefore considered to be required within the proposed development. It is recommended that Curtins Remediation Strategy report is updated to account for these changes.

3.0 Additional Ground Investigation Within Uncharacterised Areas

3.1 Scope of Works

Curtins previous Phase 2 investigation had recommended further ground investigation in uncharacterised areas of the site which are outside the building footprint, following an extension to the site's red line boundary.

Investigation was undertaken on 17th August 2022 and comprised of five machine excavated trial pits (ref. TP1-TP5) to a max depth 2.20m bgl. Curtins borehole location plan (Ref. CS12-CUR-12-XX-DR-GE-80005-P01) is enclosed in Appendix A whilst borehole logs and environmental chemistry analysis results are enclosed in Appendix C.

These trial pits were undertaken with the aim of further characterising ground conditions in this area where access had been limited previously, allow further chemical analysis of soils and to identify the depth of made ground in this area.

Five made ground samples were obtained from the trial pits and tested for a broad suite of contamination in line with samples obtained during the Phase 2 Ground Investigation, including asbestos screen.

3.2 Ground Conditions

3.2.1 Made Ground

The base of Made Ground was not encountered in TP1, TP2 or TP4, terminating at a maximum depth of 2.10m bgl. The base of the Made Ground was encountered within TP3 at 1.50m bgl.

The surface covering comprised of either a grass and topsoil or a granular Made Ground.

A layer of asphalt was encountered within two locations (TP1 and TP3) underlying the topsoil. This asphalt layer was between 0.12m to 0.27m thick.

Made Ground was generally granular soils which comprised of either; a brown very gravelly sand with gravels of sandstone, siltstone and brick, or a grey slightly clayey very gravelly silty sand with frequent cobbles with gravel of brick, concrete, plastic, glass, sandstone and timber and cobbles of timber and brick.

In two locations the granular Made Ground was overlying cohesive Made Ground of brown slightly sandy very gravelly clay with gravels of brick and concrete.

Reworked cohesive Made Ground was encountered within TP5 underlying granular Made Ground. This was described as a brown slightly silty slightly gravelly clay with gravel of brick.

No evidence of gross/mobile phase contamination was identified. No evidence of Asbestos Containing Materials (ACM's) was noted.

3.2.2 Glacial Till

Glacial Till was encountered within one location (TP3) where the base of the Made Ground was encountered.

Granular Glacial Till was encountered from 1.50 to 1.80m bgl and was described as a light brown very gravelly fine to medium sand with gravel of sandstone and siltstone.

Cohesive Glacial Till was encountered underlying the granular material in TP3 and was described as stiff brown slightly silty clay.

Ground conditions were in line with those recorded on this section of the site within the previous, main ground investigation works.

3.2.3 Groundwater

No groundwater was recorded in any trial pit location.

3.3 Human Health GQRA

The five soil samples were tested for Curtins Suite A and screened against the relevant Generic Assessment Criteria (GAC). The results of the environmental testing can be referred to in *Appendix C*.

With respect to 'Public Open Space Park' thresholds, no elevated concentrations of any contaminants of concern were recorded.

No suspected asbestos containing materials (ACMs) were identified within any of the exploratory hole logs or laboratory screening.

4.0 Additional Samples Beneath Electrical Sub-Station

4.1 Scope of Works

Curtins Phase 2 recommended additional sampling from beneath the existing sub-station beneath the proposed building footprint on site, following its decommissioning to ensure there no risk remains from contamination, specifically Poly Chlorinated Biphenyl (PCB) contamination. On further review this sub-station appears to be a modern, temporary sub-station used by the contractors for the wider recent Circle Square development. The risk from PCB contamination is therefore considered to be minimal. The groundworks contractor (Bemus) confirmed that no visual evidence of contamination was noted in this area following sub-station removal. They also confirmed a reduced dig to natural low permeability clay has been undertaken with the overlying arisings taken offsite for disposal in a licensed waste disposal facility. On this basis no further testing was considered necessary.

Samples were however taken in close proximity to another sub-station onsite the age of which is unknown. It is understood that this sub-station will remain onsite and is located within the west of the site within the area of proposed soft landscaping/ Public Open Space.

Three samples were taken on 10th November 2022 within the side wall excavation (SSTP01 – SSTP03) for a attenuation tank, with samples tested for PCBs and TPHs to ensure assess risk from contamination in this area. Locations are shown on Curtins borehole location plan (Ref. CS12-CUR-12-XX-DR-GE-80005-P01) and is enclosed in Appendix A.

4.2 Ground Conditions

The samples were taken within two different strata's a made ground and granular cohesive.

The Made Ground was described as a dark greyish brown gravelly fine to coarse sand with gravel of concrete, brick, timber, plastic and sandstone. The Made Ground was to a depth of 0.60m bgl with one sample taken at 0.40m bgl.

The granular glacial till was encountered beneath the Made Ground and was described as light brown gravelly fine to coarse sand with gravel of sandstone and mudstone. Two samples were taken within this strata at 0.90m bgl and 1.50m bgl.

No evidence of gross/mobile phase contamination was identified.

4.3 Human Health GQRA

The three samples taken were tested for PCBs and TPHs. A Generic Quantitative Risk Assessment (GQRA) was undertaken against '*Public Open Space Park*' Generic Assessment Criteria thresholds protective of human health.

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All PCBs and BTEXs were below detection limit. The TPHs were all below GAC thresholds. Therefore very low risk of contaminant soils leaching into the attenuation tank.

Environmental chemistry analysis results are enclosed in *Appendix C*.

5.0 Conceptual Site Model

A conceptual site model (CSM) for the site has been developed as part of the site investigation that was undertaken at the site and considered based on the current enabling works proposed.

The CSM details a number of pollutant linkages at the site, however, based on the risk assessments undertaken, the potential contaminant linkages (PCLs) listed in *Table 5.1* were identified as requiring remediation to enable the safe re-development of the site.

Table 5.1 – Potential Contaminant Linkages

PCL	Sources	Receptor	Potential Pathway	Remediation Recommended
1	Made Ground soils containing asbestos fibres/containing materials.	On-site Construction workers	Direct contact, dermal uptake, soil and dust ingestion and inhalation. Inhalation of dust and fibres (off-site)	Appropriate PPE for construction staff and suitable asbestos management measures during construction.

The risk to end users has been reduced from Moderate/Low to **Low** on the bases of the following:

- No exceedances of contaminants against the respective GACs;
- Asbestos below detection limit and where asbestos identified it will be under the building footprint or hardstanding; and
- No asbestos identified within samples taken from outside the building footprint where soft landscaping will be located.
- A revised ground gas risk assessment re-classified the site as CS1 following recent enabling works.

Section 8.0 presents a strategy for handling unexpected contamination or contaminative incidents.

6.0 Remedial Works

In this document the term 'remediation' is used to define specific works required to address potential issues arising from contamination in site soils and ground gases, with due account taken of the known history of the site and the proposed end-user.

With reference to the Conceptual Site Model and the potential contaminant linkages detailed in *Table 3.1* three remedial actions are recommended in order for the site to be brought up to a condition that is deemed 'suitable for use';

- **Remedial Action 1:** Appropriate PPE for all construction workers and suitable asbestos management measures.; and

Measures for dealing appropriately to unexpected contamination encountered on site are outlined within Section 9.0.

6.1 Remedial Action 1 – Contamination and Asbestos Management During Construction

Under current health and safety legislation, employers are required to carry out their own appropriate risk assessments and mitigation to protect themselves and their employees, other human receptors and the environment from potential contamination. Such risks must be adequately mitigated by law, specifically the Construction Design Management (CDM) Regulations, 2015 which require that potential risks to human health and the environment from construction activities are appropriately identified and all necessary steps taken to eliminate / manage that risk.

It has been assumed that any future construction works on site will be undertaken in compliance with these requirements to address PCL1 (*Table 5.1*).

CL:AIRE have published guidance to aid in the classification of remediation works on Asbestos Containing Soils (ACS) compliant with Control of Asbestos Regulations 2012 (CAR). This is detailed in CL:AIRE (2016) "Control of Asbestos Regulations 2012 - Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials: Industry Guidance.

Any works with asbestos containing soils are required to determine their classification in accordance with Control of Asbestos Regulations 2012. The specialist groundworks contractor is therefore to designate the works based on the investigation results but utilising their own additional testing and delineation if they deem it to be required. Subsequently the specialist groundworks contractor is to compile a method statement to establish an appropriate management, monitoring and supervisory procedure for the movement of soils as part of the required cut and fill (earthworks) operations. The specialist remediation contractor is to be responsible for management and record keeping as detailed in their method statement document.

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Where, from the site investigations, materials are known to contain asbestos fibres good practice (JIWG CAR-Soil and CAR 2012) prescribes such material to be segregated to ensure materials would not cross-contaminate other soils and to reduce the risk of further fibre release to site workers.

Table 2.4 in *Section 2.4* above should be consulted together with Curtins Exploratory Hole Plan Drawings in *Appendix A* (Ref. CS12-CUR-12-XX-DR-GE-80004-P01) for the locations, depths and concentrations asbestos was identified during Curtins Ground Investigations (Ref. 1).

Where asbestos was detected during laboratory analysis, quantification confirmed asbestos was amosite loose fibres. All concentrations of asbestos fibres encountered within the Made Ground soils by Curtins were below detection limit (<0.001% w/w).

Materials containing asbestos >0.1% w/w would be classed as hazardous waste.

Good practice prescribes that any fragments or asbestos containing materials where identified should be picked where possible and to be kept separated in line with those from any soil arisings. This is typically carried out by picking visible fragments at the point of excavation. Such operations are carried out by suitably qualified staff, wearing disposal overalls (type 5/6), gloves and fine dust (FPP3) masks in combination with adoption of dust suppression techniques and monitoring or other applicable methods as recommended by the Asbestos Management Specialist. The qualified staff are to be trained in the identification of asbestos at source. The qualification and competencies of all operatives undertaking monitoring and calibration documentation of equipment should be provided to the Engineer.

7.0 Specification for Site Won and Imported Soils

This section outlines the required chemical testing specification for site won or imported topsoil and subsoil for use soft landscaping. It is assumed that a specification for chemical testing general fill materials will be included within the sites Earthworks Specification.

7.1 Sourcing of Materials

7.1.1 Off-Site Sources

It is anticipated that materials may be imported to the site for use in constructing the clean engineered capping across the site's soft landscaping areas. It is strongly recommended that materials are sourced from reputable suppliers and comprise materials that have been suitably processed to produce standardised materials.

It is not recommended that materials are imported directly from 'donor' development sites. Imported material will also require verification testing to ensure suitability for reuse, and it is strongly advised that the Contractor undertake their own independent verification testing if accepting material from a third party, rather than relying on supplier reports.

7.1.2 On-Site Sources

Based on the findings of the Site Investigation, it is considered highly unlikely that the general shallow Made Ground could be considered 'uncontaminated', 'clean' or 'suitable' material for re-use as a subsoil or topsoil in soft landscaped areas due to the presence of asbestos fibres at a number of locations across the site as well as due to the physical natures of the existing site soils. In the limited areas where topsoil is currently present further testing will be required in line with the specification below.

7.2 Imported Topsoil

Imported Topsoil will invariably be required and should be supplied and placed in accordance with the Architects' specification but generally it is anticipated that all topsoil will be a minimum of 150mm thick in proposed soft landscaped areas. Where topsoil is imported, it is to be 'Multipurpose' in accordance with BS 3882:2015 'Specification for Topsoil and Requirements for Use'.

The topsoil should also be confirmed to be 'suitable for use' as per the analysis outlined in *Section 7.5*.

7.3 Imported Subsoil

Where imported subsoil is required as part of the growing medium this can be cohesive or granular but should be free-draining and confirmed to be 'suitable for use' as per the analysis outlined in *Section 7.5* and compliant with BS 8601:2013 'Specification for subsoil and requirements for use'.

7.4 Chemical Composition of Soils

All materials used in soft landscaped areas should not contain concentrations of contaminants that present an unacceptable risk to the health of future site occupants or off-site receptors.

The Contractor shall be responsible for demonstrating that imported material is 'clean' and therefore suitable for use as within soft landscaping areas. This will include the recovery of samples for laboratory testing from both the material source and verification testing of material following delivery to site. The required testing frequencies for materials source types are detailed below. Other sources may be applicable, however testing frequencies shall be confirmed with the Engineer prior to acceptance.

Table 7.4.1 – Environmental chemistry testing frequency for imported aggregate and soils

Source	Testing Frequency
Imported Topsoil/Subsoil (Greenfield/Manufactured)	On Site Verification: One sample every 200m ³ used (or a minimum of 3 No. samples whichever is greater), testing to be undertaken once material is imported to site.
Imported Topsoil/Subsoil (Remediated/Brownfield/Unknown)	On Site Verification: One sample every 150m ³ used (or a minimum of 3 No. samples whichever is greater), testing to be undertaken once material is imported to site.

The environmental chemistry testing requirements are as *Table 7.5.2*. Additions to the suite and frequency of sampling may be required based on the source of the imported materials. For example, if the imported Topsoil is not naturally sourced, e.g. recycled soil, further chemical determinants may be added to the chemical analysis suite at the discretion of the Engineer.

Table 7.4.2 – Environmental chemistry analysis suite for imported soils.

Suite Reference	Environmental Chemistry Analysis
Greenfield, Brownfield or Manufactured Soils	Total metals: Arsenic, cadmium, chromium, chromium VI, lead, mercury, selenium, copper, nickel, zinc, water soluble boron; pH Soil Organic Matter Asbestos Screening Polycyclic Aromatic Hydrocarbons by GC-MS (Detection Limit 0.1mg/kg for each compound) Total Petrol Hydrocarbons (Full TPHCWG analysis – aromatic/aliphatic split, Detection Limit 0.01mg/kg for each banding C5 to C10 and 1mg/kg for bandings above C10)

Assessment criteria: Concentrations of the above determinants shall not exceed the '*Residential without plant uptake*' screening criteria (contained within Appendix B).

Definition of 'clean': Where ALL concentrations are less than these values the soils shall be defined as 'clean'.

Soil organic matter (SOM): A review of the thresholds may be made for specific soil sources whereby the Soil Organic Matter is proving to be routinely above 6%.

8.0 Strategy for Handling Potentially Contaminated Soils and Contaminative Incidents on Site

8.1 Contaminated Soils

Surplus soils to be removed from site, which have been identified as unsuitable for re-use should be loaded onto a lorry, covered securely and transported directly to the landfill facility.

Where stockpiling is unavoidable, the stockpile should be located on an impermeable membrane and be covered also with a low permeability membrane at the end of each working day. Where soils are wet when excavated, measures should be taken to ensure there is no runoff from the soils onto the surrounding soils.

Duty of Care: Under his duty of care, the Principal Contractor shall ensure the proper and safe disposal of waste from each site after it has been passed on to another party. In this respect details of the landfill facility to be used and the company disposing of the waste with regard to hazardous and non-hazardous waste shall be provided to the Site Manager. Copies of Consignment Notices for special waste and Waste Transfer Notes for hazardous and non-hazardous waste shall be kept on site for review by Curtins Consulting.

8.2 Contaminative Incidents

It is possible that some below ground features / structures exist that have not been recorded on plans and have not been encountered during the ground investigation works or demolition works. It is possible that further unknown/unrecorded substructures (e.g. fuel tanks) may exist which if ruptured may release materials that could contaminate the surrounding soils and groundwater (petroleum hydrocarbons, solvents, for example). In the unlikely event that this occurs an outline strategy is detailed below.

Where such a tank/pipework is damaged during excavation and the contents are released into the surrounding soil, the tank/pipework should be immediately pumped dry into another suitable container and a trench with a low permeability base formed around the tank/pipework to prevent seepage laterally and to collect the contaminant. Where groundwater is encountered in the trench, it should be pumped into a suitable container and tested for the contaminant. All soils affected shall then be tested and removed from site as appropriate.

Where the damage is caused to the underside of a tank and seepage is vertical, the contaminants may present a risk of polluting the groundwater. In this instance and subject to the findings of a risk assessment boreholes may be required to prove and intercept the contaminant. The contaminant will then be pumped into suitable containers.

The procedure outlined in *Section 8.3* should also be adhered too and the Engineer shall approve all proposals for such remediation.

8.3 Unexpected Contamination & Watching Brief

In the event that material is revealed on the site of a nature that does not accord with the previously observed and recorded descriptions the following procedure is to be complied with.

- a) Cease and make safe all excavations in this location and report observations to the Site Manager.
- b) The Site Manager is to notify the Engineer.
- c) Under guidance of the Engineer take representative samples of the suspect materials and forward to a suitably accredited laboratory for analysis.
- d) Manchester City Council and if relevant the Environment Agency are to be kept fully informed of any site such occurrences. Manchester City Council must agree the strategy for dealing with unexpected contamination before works continue in that area.
- e) Await Engineers instructions with respect to re-commencement of the works and or removal from of suspect material to a suitably licensed disposal facility (following guidance outlined in Section 8.1 above).

Records of any unexpected contamination must be included within the Remediation Completion Report.

9.0 Verification

Validation visits shall be undertaken by an appropriately qualified environmental engineer throughout the construction phase to ensure that the requirements of the Remediation Strategy have been implemented at the site. It is anticipated records of the following will be taken during the below phases of work:

- Documentation of general works including records from asbestos management procedures during the works and records of contaminative incidents and any unexpected contamination;
- On import of soils to prove they are suitable for use; and
- On removal of soils from site for off-site disposal, waste transfer notes and consignment notes should be maintained (including from initial enabling works).

All associated documentation pertaining to the above will be supplied to the Engineer and incorporated within a Completion Report.

Confirmatory analysis is required to confirm the suitability of any imported soils, the results of which will be included within the Completion Report. Any additional, confirmatory testing will also be included herein.

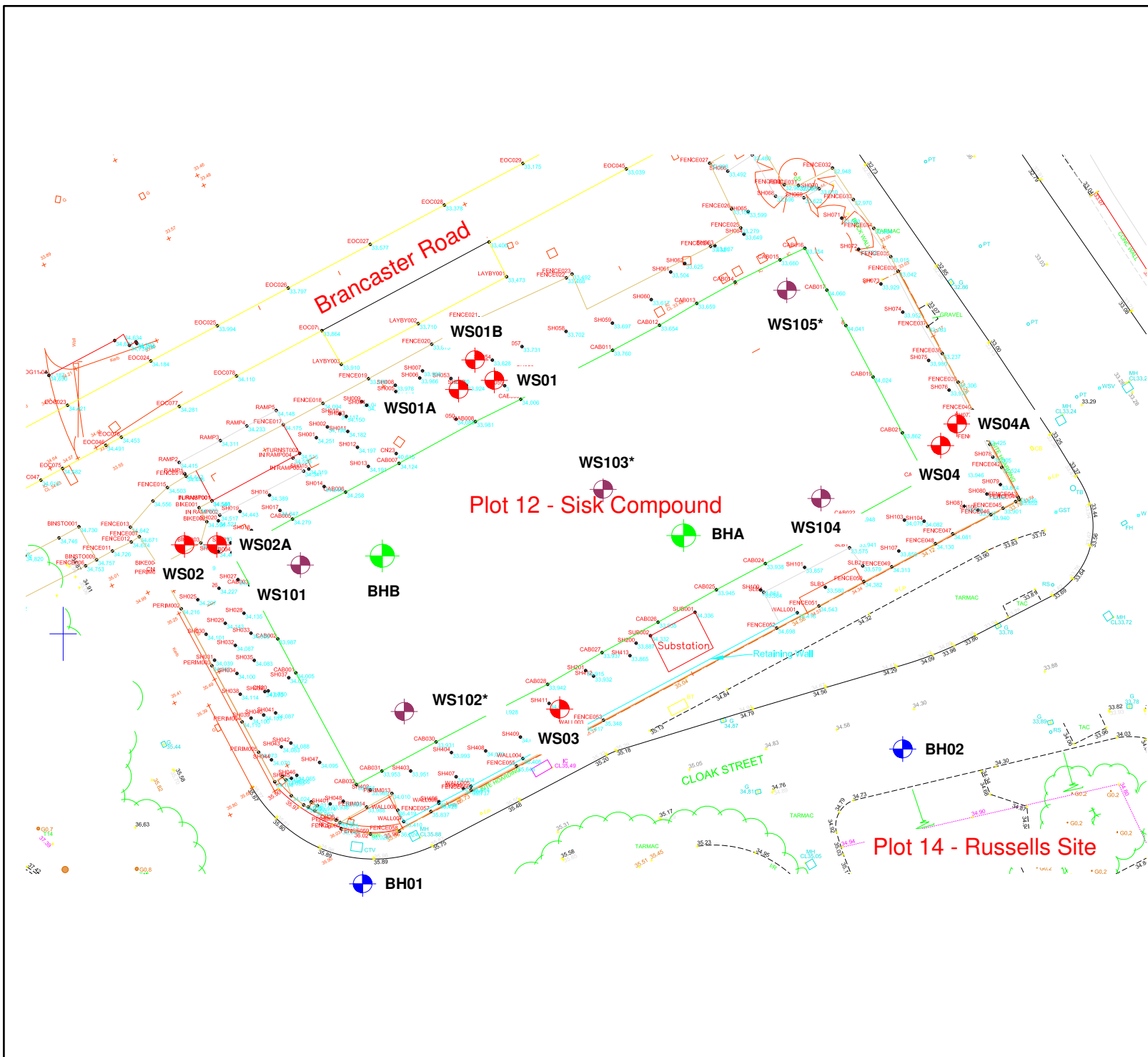
10.0 Reporting

A Completion Report will be required on completion of the works confirming that the remedial works have been completed satisfactorily. The report will contain information including the following:

- Confirmation of imported soils suitability for soft landscaped areas including environmental chemistry testing results;
- Waste transfer notes and consignment notes for soils and materials which has been disposed of off-site during construction, including from initial enabling works.
- Details and documentation of asbestos management measures utilised during the works;
- Confirmation that the remediation has been undertaken satisfactorily and in accordance with the Remediation Statement;
- Confirmation that the remediation objective has been achieved (see *Section 5.0*);
- Details of any unexpected contamination encountered on site and appropriate measures taken to respond; and
- Revised conceptual model showing no potentially significant contaminant linkages remain at the site.

Appendix A – Drawings & Specifications

- *Curtins (2022) Exploratory Hole Location Plan (additional GI), Circle Square, Plot 12, Ref. CS12-CUR-12-XX-DR-GE-80004-P01*
- *Curtins (2022) Exploratory Hole Location Plan, Circle Square Building 3, Manchester, Ref. CS12-CUR-12-XX-DR-GE-80005-P01*
- *Bruntwood (2021), Landscape Masterplan - wider context, ref. 1502a-PLA-XX-XX-DR-L-0001, dated 15.11.21*



PREVIOUS BOREHOLES



CABLE PERCUSSIVE BOREHOLE LOCATIONS
WITH ROTARY (CORED) FOLLOW ON



WINDOW SAMPLE BOREHOLE LOCATIONS



CABLE PERCUSSIVE BOREHOLE LOCATION
AUGUST 2020 INVESTIGATION

2022 INVESTIGATION BOREHOLES



WINDOW SAMPLE BOREHOLE LOCATIONS

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

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

Status:	INFORMATION
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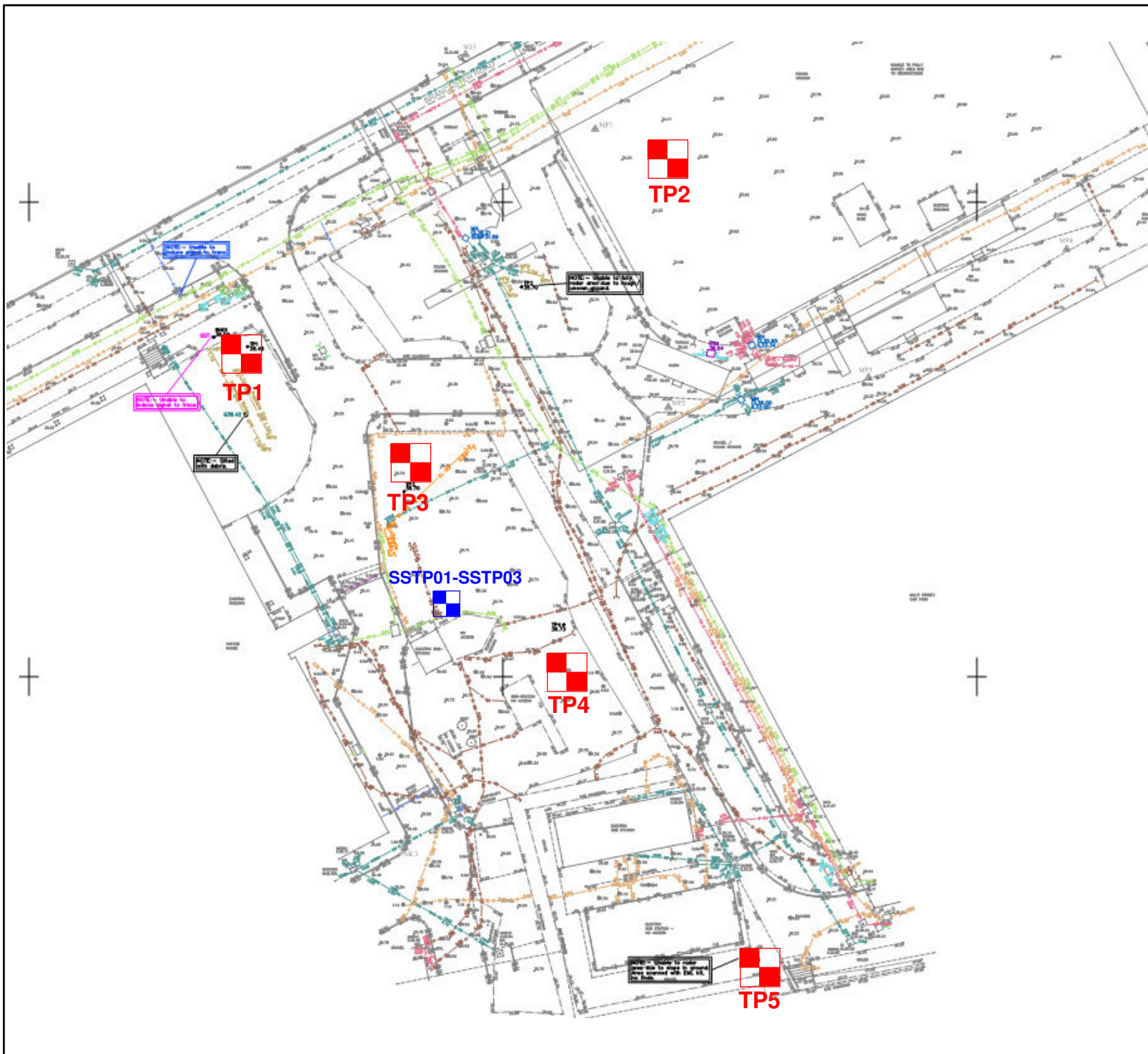
Project:	CIRCLE SQUARE, PLOT 12
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Drg Title:	EXPLORATORY HOLE LOCATION PLAN (ADDITIONAL GI)
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Scale:	NTS	Size:	A3	First Issue:	14/03/2022	Drawn:	PN	Checked:	NF
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Drg No:	CS12-CUR-12-XX-DR-GE-80004	Rev:	P01
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-  MACHINE EXCAVATED TRIAL PITS
-  SAMPLES TAKEN FROM SAME TRIAL PIT AT DIFFERENT DEPTHS SSCP01 - SSCP03

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

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

Status:

INFORMATION

Project:

CIRCLE SQUARE BUILDING 3, MANCHESTER

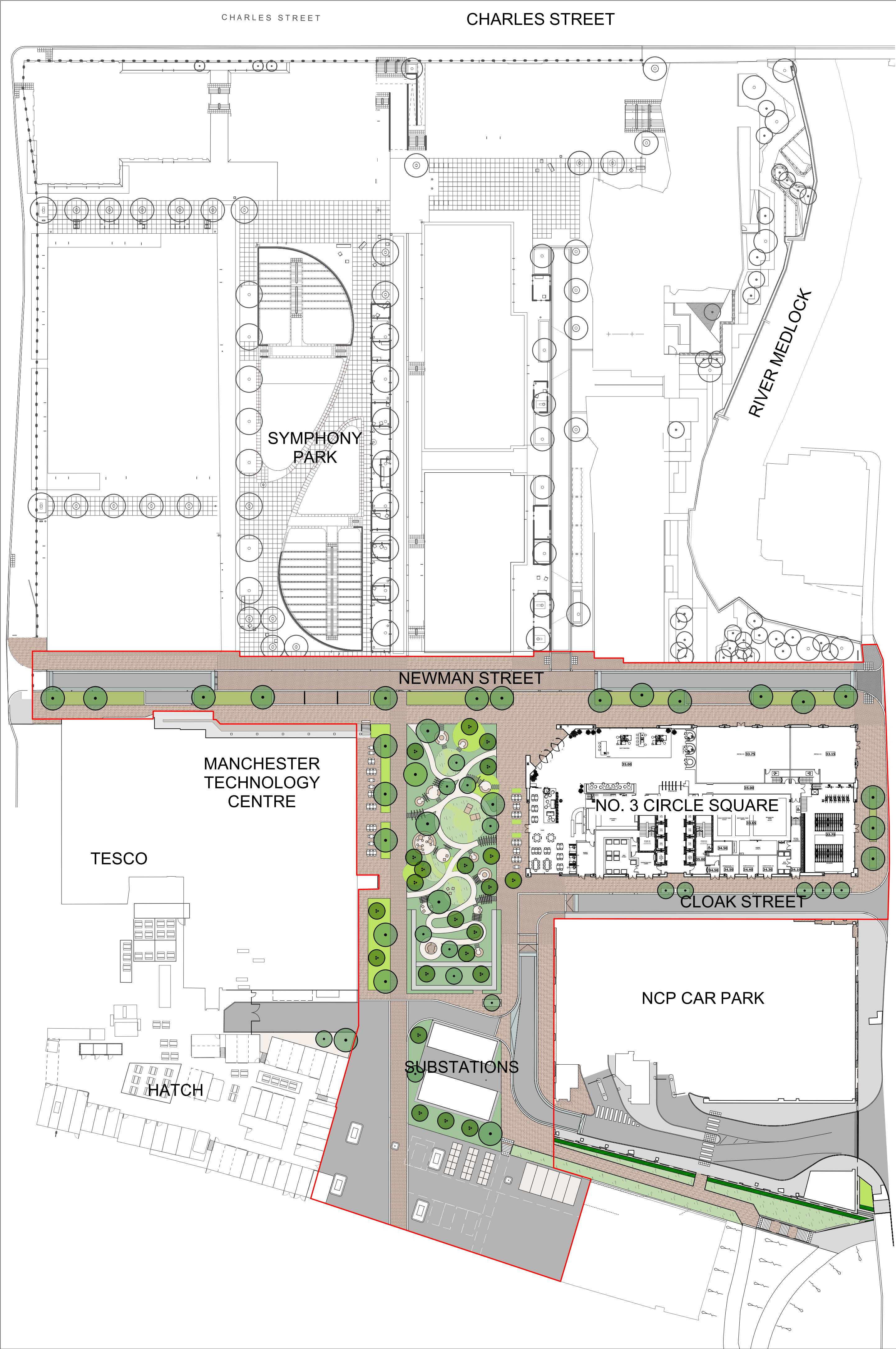
Drg Title:

EXPLORATORY HOLE LOCATION PLAN

Scale: NTS	Size: A3	First Issue: 15/11/2022	Drawn: RBJ	Checked: NF
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Drg No: CS12-CUR-12-XX-DR-GE-80005	Rev: P01
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KEY - LEVELS

	PROPOSED LEVELS
	EXISTING LEVELS RETAINED
	PROPOSED GRADIENTS

KEY - HARDWORKS

	CONCRETE SETT PAVING Location: To pedestrian and occasional vehicle areas within streets Size: 300x100x80mm Laying: Reverse Stretcher Bond Type / Colour: Kellen / Volcanoo Finish: Washed finish Notes: Flexible Construction
	CONCRETE SETT PAVING Location: To pedestrian and light vehicle areas within streets Size: 100x300x80mm, 150x300x80mm, 300x200x80mm Laying: Reverse Stretcher Bond Type / Colour: Kellen / Volcanoo Finish: Washed finish Notes: Flexible Construction
	CONCRETE SETT PAVING Location: To occasional heavy vehicle areas within streets Size: 300x100x80mm Laying: 45°Herringbone - Longitudinal Type / Colour: Kellen / Volcanoo Finish: Washed finish Notes: Flexible Construction
	TARMACADAM To vehicle areas To engineers details and specification
	TARMACADAM To pedestrian areas (Cloak Street footpath) To engineers details and specification
	GRANITE SETTS Location: Edging bands within vehicular carriageway Size: 100x100x100mm setts Laying: Rigidly Laid Type / Colour: Hardscape Kobra Granite Setts, or Acceptable Equivalent Finish: Rigidly Laid
	RESIN BOUND GRAVEL Location: To Symphony Gardens paths Laying: 50mm thick Type / Colour: Sureset Mulberry Finish: As supplied Notes: Permeable
	GRANITE TACTILE CORDUROY PAVING Location: At bottom and top of steps Size: 400mm x 400mm x 80mm (D) Laying: Stack Bond Type / Colour: Kobra grey (contrasting to surrounding paving) Notes: N/A
	GRANITE TACTILE BLISTER PAVING Location: Crossings Size: 400mm x 400mm x 80mm (D) Laying: Stack Bond Type / Colour: Kobra grey (contrasting to surrounding paving) Notes: N/A
	GRANITE STEPPING STONES Location: Symphony Gardens Size: 900 x 200 x 50mm (TBC) Laying: Concrete haunching Type / Colour: Hardscape Kobra Granite (TBC) Finish: Fine Picked (TBC)
	GRANITE STEPS WITH CORTEN RETAINING EDGE Location: Symphony Gardens Size: 1000 x 200 x 50mm (TBC) Laying: Concrete haunching Type / Colour: Hardscape Kobra Granite (TBC) Finish: Fine Picked (TBC) Edging: Corten steel edge to retain levels and feather into adjacent planting. Details TBC
	UPSTAND GRANITE KERB Location: Sitewide - to vehicular carriageway Laid: 60mm upstand Size: 255 (w) x 900 (l) x 240mm Colour: Hardscape Kobra Granite Finish: Picked
	FLUSH GRANITE KERB Location: Sitewide - to vehicular carriageway Laid: Flush Size: 255 (w) x 900 (l) x 180mm Colour: Hardscape Kobra Granite Finish: Picked
	FLUSH METAL EDGING Location: Symphony Gardens Paths Laid: Flush Size: 6 (w) x 1000 (l) x 100mm Material: Corten Steel Metal Edging

KEY - FURNITURE

	BESPOKE TIMBER BENCHES Location: Symphony Gardens Size: TBC Material: Treated FSC Timber Supplier: TBC
	BESPOKE TIMBER SEATS Location: Symphony Gardens Size: TBC Material: Treated FSC Timber Supplier: TBC
	BESPOKE TIMBER TABLES AND SEATS Location: Symphony Gardens Size: TBC Material: Treated FSC Timber Supplier: TBC
	BESPOKE TIMBER SUNLOUNGERS Location: Symphony Gardens Size: TBC Material: Treated FSC Timber Supplier: TBC
	FREESTANDING METAL TABLES AND CHAIRS Location: Spill out from buildings Size: TBC Material: Powder coated steel TBC Supplier: TBC

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- NOTES:**
1. Do not scale from this drawing.
 2. Always work to noted dimensions.
 3. All dimensions are in millimetres unless otherwise stated.
 4. All setting out, levels and dimensions to be agreed on site.
 5. The dimensions of all materials must be checked on site before being laid out.
 6. This drawing must be read with the relevant specification clauses and detail drawings.
 7. Order of construction and setting out to be agreed on site.

KEY - SOFTWORKS

	MATURE TREE PLANTING Location: Sitewide Size: 45-65cm girth mature single-stem specimens. Individual trees will vary in size. Full planting plan and specification TBC
	SEMI-MATURE TREE PLANTING Location: Sitewide Size: 20-45cm girth mature single-stem specimens. Individual trees will vary in size. Full planting plan and specification TBC
	MULTI-STEM TREE PLANTING Location: Sitewide Size: Multi-stem ornamental specimens. Individual trees will vary in size. Full planting plan and specification TBC
	EXISTING HEDGE PLANTING Location: To south of MSCP
	BIODIVERSE PLANTING Location: Sitewide Notes: 300mm topsoil over 150mm subsoil Full planting plan and specification TBC
	ORNAMENTAL PLANTING Location: Sitewide Notes: 300mm topsoil over 150mm subsoil Full planting plan and specification TBC
	SUDS PLANTING Location: Newman Street and Princess Street planting beds Notes: 300mm topsoil over 150mm subsoil Full planting plan and specification TBC
	WILDFLOWER LAWN Location: Symphony Gardens Notes: Pregrown wildflower turf laid on 150mm subsoil Full planting plan and specification TBC
	MOWN PATHS THROUGH WILDFLOWER LAWN Location: Symphony Gardens Notes: Pregrown wildflower turf laid on 150mm subsoil Full planting plan and specification TBC

Revision	Date	Description	Drawn	Apprv.
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Planit I.E. Limited
E: info@planit-ie.com W: planit-ie.com

MANCHESTER
2 Back Grafton St, Altrincham, WA14 1DY
T: 0161 928 9281

LEEDS
No.1 Aire Street, Leeds Station, Leeds, LS1 4PR
T: 0113 824 6413

LIVERPOOL
Tempest 5.3, 12 Tithebarn Street, Liverpool, L2 2DT
T: 0151 363 1230

LONDON
Unit 6 Waterside, 44-48 Wharf Road, London, N1 7UX
T: 0207 253 5678

STANDISH
Standish Gatehouse, Stonehouse, Gloucestershire, GL10 3BZ
T: 0145 360 7080

Client Bruntwood

Project No 3 Circle Square, Manchester

Drg Title Landscape Masterplan wider context

Created on 15-12-21 Created by CL Approved by LH

Scale 1:500 Size A1 Workstage Information

Drg No 1502a-PLA-XX-XX-DR-L-0001 Suitability S1 Revision P01

Appendix B – ‘Residential Without Plant Uptake’ Screening Criteria for Imported Materials

Adopted Soil Generic Assessment Criteria
Sandy loam with 6% SOM



Contaminants	Residential <u>with</u> home grown produce	Residential <u>without</u> home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}
Metals						
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11,000	45	240,000	21,000	46,000
Cadmium	10⁽¹³⁾ 22	85⁽¹³⁾ 150	1.8 3.9	230 410	120 220	560 880
Chromium III	910	910	18,000	8,600	1,500	33,000
Chromium VI	6 21	6 21	1.8 170	33 49	7.7 21	220 250
Lead	200	310	80	2,300	630	1,300
Mercury (<i>elemental</i>)	1	1	26	26	16	26⁽⁸⁾ [30]
Mercury (<i>inorganic</i>)	170	240	80	3600	120	240
Nickel	130⁽¹⁰⁾	180⁽¹⁰⁾	53⁽¹¹⁾	980⁽¹⁰⁾	230	800
Vanadium	410	1200	91	9000	2000	5000
Copper	2400	7100	520	68000	12000	44000
Zinc	3700	40000	620	730000	81000	170000
Semi-Metals and non-metals						
Arsenic	32⁽¹²⁾ 37	35⁽¹²⁾ 40	43⁽¹²⁾ 49	640⁽¹²⁾ 640	79 79	170 170
Antimony		550		7500	1500	3300
Selenium	350	600	120	13000	1100	1800
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
<i>Aliphatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₃₋₅ - EC ₆	160	160	3900	12000	600000	180000
EC ₃₋₆ - EC ₈	530	530	13000	40000	620000	320000
EC ₃₋₈ - EC ₁₀	150	150	1700	11000	13000	21000
EC ₁₀ - EC ₁₂	760	770	7300	47000	13000	24000
EC ₁₂ - EC ₁₆	4300	4400	13000	90000	13000	26000
EC ₃₋₁₆ - EC ₃₅	110000	110000	270000	1800000	250000	490000
EC ₃₅ - EC ₄₄	110000	110000	270000	1800000	250000	490000
<i>Aromatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₃₋₅ - EC ₇	300	1400	57	86000	56000	92000
EC ₃₋₇ - EC ₈	660	3900	120	180000	56000	100000
EC ₃₋₈ - EC ₁₀	190	270	51	17000	5000	9300
EC ₁₀ - EC ₁₂	380	1200	74	34000	5000	10000
EC ₁₂ - EC ₁₆	660	2500	130	38000	5000	10000
EC ₃₋₁₆ - EC ₂₁	930	1900	260	28000	3800	7800
EC ₂₁ - EC ₃₅	1700	1900	1600	28000	3800	7900
EC ₃₅ - EC ₄₄	1700	1900	1600	28000	3800	7900
Aliph + Arom EC >44-70	1900	1900	3000	28000	3800	7900
Aromatic						
Benzene	0.33 0.87	1.0 3.3	0.07 0.18	95 98	73 140	110 230
Ethyl benzene	350	840	90	2800⁽⁸⁾ [66000]	2800⁽⁸⁾ [25000]	2800⁽⁸⁾ [27000]
Toluene	610	2700	120	4400⁽⁸⁾ [190000]	4400⁽⁸⁾ [56000]	4400⁽⁸⁾ [100000]
Xylene ⁽⁹⁾	230	290	160	2600⁽⁸⁾ [32000]	2600⁽⁸⁾ [43000]	2600⁽⁸⁾ [31000]
Phenol	420	520	280	3200⁽¹⁴⁾ (38000)	3200⁽¹⁴⁾ (10000)	3200⁽¹⁴⁾ (9300)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	13	13	24	1100	4900	3000
Acenaphthylene	920	6000	160	100000	15000	30000
Acenaphthene	1100	6000	200	100000	15000	30000
Fluorene	860	4500	160	71000	9900	20000
Phenanthrene	440	1500	90	23000	3100	6300
Anthracene	11000	37000	2200	540000	74000	150000
Fluoranthene	890	1600	290	23000	3100	6400
Pyrene	2000	3800	620	54000	7400	15000
Benz(a)anthracene	13	15	13	180	29	62
Chrysene	27	32	19	350	57	120
Benzo(b)fluoranthene	3.7	4.0	3.9	45	7.2	16.0
Benzo(k)fluoranthene	100	110	130	1200	190	440
Benzo(a)pyrene	3.0 5.0	3.2 5.3	3.5 5.7	36 77	5.7 10	13 21
Indeno(123cd)pyrene	41	46	39	510	82	180
Dibenzo(ah)anthracene	0.3	0.32	0.43	3.6	0.58	1.4
Benzo(ghi)perylene	350	360	640	4000	640	1600
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	0.0014	0.0015	0.0018	0.12	3.5	5.4
Trichloroethene (TCE)	0.075	0.08	0.21	5.7	120	120
1,1,1,2 Tetrachlorethane	6.4	8.2	4.4	560	1400	2100
Tetrachlorethane (PCE)	0.90	0.92	3.6	95	1400	1500
1,1,1 Trichlorethane	39	40	240	3000	140000	100000

Notes

- All values above are in mg/kg
- Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs**
- Soil organic matter (SOM) is assumed to be 6% - DEFAULT VALUE
- Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
- For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
- For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
- For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³
- Based on vapour saturation limit as suggested by EA / [] model value
- Lowest of o-, m- and p-xylene
- Based on comparison of inhalation exposure with inhalation TDI
- Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
- Based on a comparison of oral and dermal soil exposure with oral Index Dose only
- Averaged over and based on lifetime exposure
- Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
- NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 2.5% SOM



Contaminants	Residential <u>with</u> home grown produce	Residential <u>without</u> home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}
Metals						
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11,000	45	240,000	21,000	46,000
Cadmium	10⁽¹³⁾ 22	85⁽¹³⁾ 150	1.8 3.9	230 410	120 220	560 880
Chromium III	910	910	18,000	8,600	1,500	33,000
Chromium VI	6 <u>21</u>	6 <u>21</u>	1.8 <u>170</u>	33 <u>49</u>	7.7 <u>21</u>	220 <u>250</u>
Lead	<u>200</u>	<u>310</u>	<u>80</u>	<u>2,300</u>	<u>630</u>	<u>1,300</u>
Mercury (elemental)	1	1	26	26	16	26 ⁽⁸⁾ [30]
Mercury (inorganic)	170	240	80	3600	120	240
Nickel	130 ⁽¹⁰⁾	180 ⁽¹⁰⁾	53 ⁽¹¹⁾	980 ⁽¹⁰⁾	230	800
Vanadium	410	1200	91	9000	2000	5000
Copper	2400	7100	520	68000	12000	44000
Zinc	3700	40000	620	730000	81000	170000
Semi-Metals and non-metals						
Arsenic	32⁽¹²⁾ 37	35⁽¹²⁾ 40	43⁽¹²⁾ 49	640⁽¹²⁾ 640	79 <u>79</u>	170 <u>170</u>
Antimony		550		7500	1500	3300
Selenium	350	600	120	13000	1100	1800
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
<i>Aliphatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₅ - EC ₆	78	78	1700	5900	590000	130000
EC ₆ - EC ₈	230	230	5600	17000	610000	220000
EC ₈ - EC ₁₀	65	65	770	4800	13000	18000
EC ₁₀ - EC ₁₂	330	330	4400	23000	13000	23000
EC ₁₂ - EC ₁₆	2400	2400	13000	82000	13000	25000
EC ₁₆ - EC ₃₅	92000	92000	270000	1700000	250000	480000
EC ₃₅ - EC ₄₄	92000	92000	270000	1700000	250000	480000
<i>Aromatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₅ - EC ₇	140	690	27	46000	56000	84000
EC ₇ - EC ₈	290	1800	51	110000	56000	95000
EC ₈ - EC ₁₀	83	110	21	8100	5000	8500
EC ₁₀ - EC ₁₂	180	590	31	28000	5000	9700
EC ₁₂ - EC ₁₆	330	2300	57	37000	5100	10000
EC ₁₆ - EC ₂₁	540	1900	110	28000	3800	7700
EC ₂₁ - EC ₃₅	1500	1900	820	28000	3800	7800
EC ₃₅ - EC ₄₄	1500	1900	820	28000	3800	7800
Aliph + Arom EC >44-70	1800	1900	2100	28000	3800	7800
<i>Aromatic</i>						
Benzene	0.16	0.49	0.035	50	72	100
Ethyl benzene	150	380	39	1200⁽⁸⁾ [35000]	1200⁽⁸⁾ [24000]	1200⁽⁸⁾ [22000]
Toluene	270	1300	51	1900⁽⁸⁾ [110000]	1900⁽⁸⁾ [56000]	1900⁽⁸⁾ [95000]
Xylene ⁽⁹⁾	98	120	70	1200⁽⁸⁾ [14000]	1200⁽⁸⁾ [42000]	1200⁽⁸⁾ [23000]
Phenol	290	420	140	1500⁽¹⁴⁾ (35000)	1500⁽¹⁴⁾ (10000)	1500⁽¹⁴⁾ (8300)
<i>Polycyclic Aromatic Hydrocarbons (PAH)</i>						
Naphthalene	5.6	5.6	10	460	4900	1900
Acenaphthylene	420	4600	69	97000	15000	30000
Acenaphthene	510	4700	85	97000	15000	30000
Fluorene	400	3800	67	68000	9900	20000
Phenanthrene	220	1500	38	22000	3100	6200
Anthracene	5400	35000	950	540000	74000	150000
Fluoranthene	560	1600	130	23000	3100	6300
Pyrene	1200	3800	270	54000	7400	15000
Benz(a)anthracene	11	14	6.5	170	29	56
Chrysene	22	31	9.4	350	57	110
Benzo(b)fluoranthene	3.3	4.0	2.1	44	7.2	15
Benzo(k)fluoranthene	93	110	75	1200	190	410
Benzo(a)pyrene	2.7	3.2	2	35	5.7	12
Indeno(123cd)pyrene	36	46	21	510	82	170
Dibenzo(ah)anthracene	0.28	0.32	0.27	3.6	0.57	1.3
Benzo(ghi)perylene	340	360	470	4000	640	1500
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	0.00087	0.001	0.001	0.077	3.5	5
Trichloroethene (TCE)	0.034	0.036	0.091	2.6	120	91
1,1,1,2 Tetrachlorethane	2.8	3.5	1.9	250	1400	1800
Tetrachlorethane (PCE)	0.39	0.4	1.5	42	1400	1100
1,1,1 Trichlorethane	18	18	110	1300	140000	76000

Notes

- All values above are in mg/kg
- Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs
- Soil organic matter (SOM) is assumed to be 2.5% - DEFAULT VALUE
- Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
- For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
- For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
- For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³
- Based on vapour saturation limit as suggested by EA / [] model value
- Lowest of o-, m- and p-xylene
- Based on comparison of inhalation exposure with inhalation TDI
- Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
- Based on a comparison of oral and dermal soil exposure with oral Index Dose only
- Averaged over and based on lifetime exposure
- Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
- NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 1% SOM



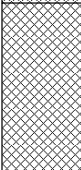
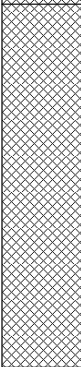
Contaminants	Residential <u>with</u> home grown produce	Residential <u>without</u> home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}
Metals						
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11,000	45	240,000	21,000	46,000
Cadmium	10⁽¹³⁾ 22	85⁽¹³⁾ 150	1.8 3.9	230 410	120 220	560 880
Chromium III	910	910	18,000	8,600	1,500	33,000
Chromium VI	6 <u>21</u>	6 <u>21</u>	1.8 <u>170</u>	33 <u>49</u>	7.7 <u>21</u>	220 <u>250</u>
Lead	<u>200</u>	<u>310</u>	80	<u>2,300</u>	630	<u>1,300</u>
Mercury (<i>elemental</i>)	1	1	26	26	16	26⁽⁸⁾ [30]
Mercury (<i>inorganic</i>)	170	240	80	3600	120	240
Nickel	130 ⁽¹⁰⁾	180 ⁽¹⁰⁾	53 ⁽¹¹⁾	980 ⁽¹⁰⁾	230	800
Vanadium	410	1200	91	9000	2000	5000
Copper	2400	7100	520	68000	12000	44000
Zinc	3700	40000	620	730000	81000	170000
Semi-Metals and non-metals						
Arsenic	32⁽¹²⁾ 37	35⁽¹²⁾ 40	43⁽¹²⁾ 49	640⁽¹²⁾ 640	79 <u>79</u>	170 <u>170</u>
Antimony		550		7500	1500	3300
Selenium	350	600	120	13000	1100	1800
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
<i>Aliphatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₅₋₅ - EC ₆	42	42	730	3200	570000	95000
EC ₆₋₆ - EC ₈	100	100	2300	7800	600000	150000
EC ₈₋₈ - EC ₁₀	27	27	320	2000	13000	14000
EC ₁₀₋₁₀ - EC ₁₂	130	130	2200	9700	13000	21000
EC ₁₂₋₁₂ - EC ₁₆	1100	1100	11000	59000	13000	25000
EC ₁₆₋₁₆ - EC ₃₅	65000	65000	260000	1600000	250000	450000
EC ₃₅₋₃₅ - EC ₄₄	65000	65000	260000	1600000	250000	450000
<i>Aromatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₅₋₅ - EC ₇	70	370	13	26000	56000	76000
EC ₇₋₇ - EC ₈	130	860	22	56000	56000	87000
EC ₈₋₈ - EC ₁₀	34	47	8.6	3500	5000	7200
EC ₁₀₋₁₀ - EC ₁₂	74	250	13	16000	5000	9200
EC ₁₂₋₁₂ - EC ₁₆	140	1800	23	36000	5100	10000
EC ₁₆₋₁₆ - EC ₂₁	260	1900	46	28000	3800	7600
EC ₂₁₋₂₁ - EC ₃₅	1100	1900	370	28000	3800	7800
EC ₃₅₋₃₅ - EC ₄₄	1100	1900	370	28000	3800	7800
Aliph + Arom EC >44-70	1600	1900	1200	28000	3800	7800
Aromatic						
Benzene	0.08	0.3	0.017	28	72	90
Ethyl benzene	65	170	16	520⁽⁸⁾ [17000]	520⁽⁸⁾ [24000]	520⁽⁸⁾ [17000]
Toluene	120	610	22	860⁽⁸⁾ [59000]	860⁽⁸⁾ [56000]	860⁽⁸⁾ [87000]
Xylene ⁽⁹⁾	41	53	28	480⁽⁸⁾ [69000]	480⁽⁸⁾ [41000]	480⁽⁸⁾ [17000]
Phenol	180	310	66	760⁽¹⁴⁾ (31000)	760⁽¹⁴⁾ (10000)	760⁽¹⁴⁾ (7600)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	2.3	2.3	4.1	190	4900	1200
Acenaphthylene	170	2900	28	83000	15000	29000
Acenaphthene	210	3000	34	84000	15000	29000
Fluorene	170	2800	27	63000	9900	20000
Phenanthrene	95	1300	15	22000	3100	6200
Anthracene	2400	31000	380	520000	74000	150000
Fluoranthene	280	1500	52	23000	3100	6300
Pyrene	620	3700	110	54000	7400	15000
Benz(a)anthracene	7.2	11	2.9	170	29	49
Chrysene	15	30	4.1	350	57	93
Benzo(b)fluoranthene	2.6	3.9	0.99	44	7.1	13
Benzo(k)fluoranthene	77	110	37	1200	190	370
Benzo(a)pyrene	2.2	3.2	0.97	35	5.7	11
Indeno(123cd)pyrene	27	45	9.5	500	82	150
Dibenzo(ah)anthracene	0.24	0.31	0.14	3.5	0.57	1.1
Benzo(ghi)perylene	320	360	290	3900	640	1400
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	0.00064	0.00077	0.00055	0.059	3.5	4.8
Trichloroethene (TCE)	0.016	0.017	0.041	1.2	120	70
1,1,1,2 Tetrachlorethane	1.2	1.5	0.79	110	1400	1500
Tetrachlorethane (PCE)	0.18	0.18	0.65	19	1400	810
1,1,1 Trichlorethane	8.8	9	48	660	140000	57000

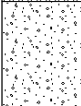
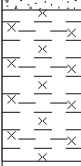
Notes

- All values above are in mg/kg
- Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs**
- Soil organic matter (SOM) is assumed to be 1% - DEFAULT VALUE
- Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
- For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
- For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
- For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³
- Based on vapour saturation limit as suggested by EA / [] model value
- Lowest of o-, m- and p-xylene
- Based on comparison of inhalation exposure with inhalation TDI
- Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
- Based on a comparison of oral and dermal soil exposure with oral Index Dose only
- Averaged over and based on lifetime exposure
- Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
- NA: Not applicable

Appendix C – Additional Site Investigation Information

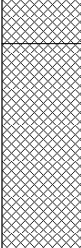
- *Curtins Borehole Logs TP1 – TP5*
- *August 2022 - Environmental Chemistry Analysis for Soils, Envirolab Testing Certificate 22-08121-1*
- *November 2022 - Environmental Chemistry Analysis for Soils, Envirolab Testing Certificate 22-11109-1*

				Trial Pit Log			Trialpit No TP1 Sheet 1 of 1			
Project Name: Circle Square Building 3 (Formerly Plot 12)				Project No. B080355.300		Co-ords: 384323.06 - 397334.78 Level: 36.48		Date 17/08/2022		
Location: Circle Square, Manchester				Dimensions (m): Depth 1.70			Scale 1:20		Logged RBJ	
Client: Bruntwood Circle Square 12 Ltd										
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
	Depth	Type	Results							
	0.80	ES		0.17	36.31		Grass over dark brown slightly gravelly very silty fine to medium sand with occasional rootlets.			1
				0.29	36.19		MADE GROUND: Dark grey asphalt.			
							MADE GROUND: Grey medium to coarse angular to sub-angular gravel of dolomite.			
				0.74	35.74		MADE GROUND: Brown very gravelly fine to medium sand. Gravel is medium to coarse and sub-rounded to well-rounded sandstone, siltstone and brick.			
				1.70	34.78		End of pit at 1.70 m			
										2
										3
										4
Remarks: Locations cleared with GPR survey and co-ordinates and levels taken. No Groundwater Encountered. Services present in trial pit with a clay pipe from 0.74m to 1.00m bgl along the western edge and a black plastic pipe 0.64m to 0.80m bgl along the eastern edge.										
Stability:										

				Trial Pit Log			Trialpit No TP3 Sheet 1 of 1		
Project Name: Circle Square Building 3 (Formerly Plot 12)				Project No. B080355.300		Co-ords: 384339.58 - 397319.49 Level: 36.70		Date 17/08/2022	
Location: Circle Square, Manchester				Dimensions (m): Depth 2.20			Scale 1:20 Logged RBJ		
Client: Bruntwood Circle Square 12 Ltd									
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.40	ES		0.13	36.57		Grass over dark brown slightly gravelly very silty fine to medium sand with occasional rootlets.		
				0.40	36.30		MADE GROUND: Dark grey asphalt.		
							MADE GROUND: Brown silty very gravelly fine to medium sand. Gravel is medium to coarse and sub-rounded to well-rounded sandstone, siltstone, timber, plastic and brick.		
	1.90	D		1.50	35.20		Light brown very gravelly fine to medium SAND. Gravel is medium to coarse and rounded to well-rounded of sandstone and siltstone.		
				1.80	34.90		Stiff brown slightly silty CLAY.		
2.20				34.50	End of pit at 2.20 m				
Remarks: Locations cleared with GPR survey and co-ordinates and levels taken. No Groundwater Encountered.									
Stability:									



				Trial Pit Log				Trialpit No TP4 Sheet 1 of 1			
Project Name:		Circle Square Building 3 (Formerly Plot 12)		Project No.		B080355.300		Co-ords: 384356.42 - 397305.48 Level: 36.73		Date 17/08/2022	
Location:		Circle Square, Manchester				Dimensions (m):				Scale 1:20 Logged RBJ	
Client:		Bruntwood Circle Square 12 Ltd				Depth 2.10					
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
	Depth	Type	Results								
	0.30	ES		0.10	36.62		Grass over dark brown slightly gravelly very silty fine to medium sand with occasional rootlets.				
				1.10	35.62		MADE GROUND: Brown silty very gravelly fine to medium sand. Gravel is medium to coarse and sub-rounded to well-rounded sandstone, siltstone, plastic, timber, glass and brick.				
	2.00	D					2.10	34.62		MADE GROUND: Brown slightly sandy very gravelly clay. Gravel is medium to coarse and sub-angular to sub-rounded of brick and concrete.	
				End of pit at 2.10 m							
Remarks: Locations cleared with GPR survey and co-ordinates and levels taken. No Groundwater Encountered.											
Stability:											
AGS											

				Trial Pit Log			Trialpit No TP5 Sheet 1 of 1		
Project Name: Circle Square Building 3 (Formerly Plot 12)				Project No. B080355.300		Co-ords: 384375.48 - 397269.90 Level: 36.56		Date 17/08/2022	
Location: Circle Square, Manchester				Dimensions (m): Depth 1.00			Scale 1:20		Logged RBJ
Client: Bruntwood Circle Square 12 Ltd									
Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
	Depth	Type	Results						
	0.25	ES		0.18	36.38		MADE GROUND: Grey coarse angular gravel of limestone.		
				0.45	36.11		MADE GROUND: Brown very gravelly fine to medium sand. Gravel is medium to coarse and rounded to well-rounded of sandstone and brick.		
							MADE GROUND: Brown slightly silty slightly gravelly clay (reworked). Gravel is medium and sub-angular of brick.		
	0.90	D		1.00	35.56		----- End of pit at 1.00 m		
1 2 3 4									
Remarks: Locations cleared with GPR survey and co-ordinates and levels taken. No Groundwater Encountered. Presence of an historic wall along south of the trial pit from 0.20m to base.									
Stability:									



FINAL ANALYTICAL TEST REPORT

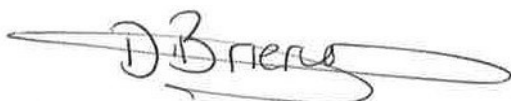
Envirolab Job Number: 22/08121
Issue Number: 1

Date: 31 August, 2022

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

Project Manager: Niall Farnworth/Rebecca Baksh-Jones
Project Name: Circle Square Building 3
Project Ref: B080355
Order No: EBMA3497
Date Samples Received: 18/08/22
Date Instructions Received: 19/08/22
Date Analysis Completed: 31/08/22

Approved by:



Danielle Brierley
Deputy Client Services Supervisor

Envirolab Job Number: 22/08121

Client Project Name: Circle Square Building 3

Client Project Ref: B080355

Lab Sample ID	22/08121/1	22/08121/2	22/08121/3	22/08121/4	22/08121/5			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP1	TP2	TP3	TP4	TP5					
Depth to Top	0.80	0.50	0.40	0.30	0.25					
Depth To Bottom										
Date Sampled	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4A	4AB	4AB	4A	4A					
% Stones >10mm _A	<0.1	<0.1	<0.1	<0.1	<0.1			% w/w	0.1	A-T-044
pH _D ^{M#}	6.49	10.87	9.59	10.20	8.91			pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.05	0.32	0.20	0.23	0.05			g/l	0.01	A-T-026s
Cyanide (total) _A ^{M#}	<1	<1	<1	<1	<1			mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	<0.2	<0.2			mg/kg	0.2	A-T-050s
Organic Matter _D ^{M#}	0.4	5.0	14.8	1.2	0.2			% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	2	15	11	3	5			mg/kg	1	A-T-024s
Boron (water soluble) _D	<1.0	1.6	<1.0	<1.0	<1.0			mg/kg	1	A-T-027s
Cadmium _D ^{M#}	1.4	1.4	2.2	1.7	2.5			mg/kg	0.5	A-T-024s
Copper _D ^{M#}	16	37	46	18	13			mg/kg	1	A-T-024s
Chromium _D ^{M#}	34	29	21	27	30			mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	<1	<1			mg/kg	1	A-T-040s
Lead _D ^{M#}	23	92	175	19	11			mg/kg	1	A-T-024s
Mercury _D	<0.17	3.54	0.85	0.55	<0.17			mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	25	22	22	25	25			mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	1	<1	1	<1			mg/kg	1	A-T-024s
Zinc _D ^{M#}	33	148	114	56	46			mg/kg	5	A-T-024s

Envirolab Job Number: 22/08121

Client Project Name: Circle Square Building 3

Client Project Ref: B080355

Lab Sample ID	22/08121/1	22/08121/2	22/08121/3	22/08121/4	22/08121/5			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP1	TP2	TP3	TP4	TP5					
Depth to Top	0.80	0.50	0.40	0.30	0.25					
Depth To Bottom										
Date Sampled	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4A	4AB	4AB	4A	4A					
Asbestos in Soil (inc. matrix)										
Asbestos in soil _D [#]	NAD	NAD	NAD	NAD	NAD					A-T-045
Asbestos Matrix (visual) _D	-	-	-	-	-					A-T-045
Asbestos Matrix (microscope) _D	-	-	-	-	-					A-T-045
Asbestos ACM - Suitable for Water Absorption Test? _D	N/A	N/A	N/A	N/A	N/A					A-T-045

Envirolab Job Number: 22/08121

Client Project Name: Circle Square Building 3

Client Project Ref: B080355

Lab Sample ID	22/08121/1	22/08121/2	22/08121/3	22/08121/4	22/08121/5			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP1	TP2	TP3	TP4	TP5					
Depth to Top	0.80	0.50	0.40	0.30	0.25					
Depth To Bottom										
Date Sampled	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4A	4AB	4AB	4A	4A					
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	0.52	0.39	0.11	0.01			mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	0.04	0.05	0.02	<0.01			mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.02	0.92	0.82	0.23	0.05			mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	2.46	2.81	0.65	0.15			mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04	2.58	3.13	0.74	0.14			mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05	2.73	3.34	0.77	0.14			mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	1.64	1.58	0.49	0.06			mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	0.95	1.22	0.28	<0.07			mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	<0.06	2.41	2.78	0.71	0.16			mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	0.32	0.35	0.09	<0.04			mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	<0.08	5.28	5.94	1.42	0.33			mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	0.37	0.27	0.10	0.01			mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	<0.03	1.78	1.97	0.53	0.09			mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	0.29	0.08	0.06	<0.03			mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	<0.03	3.31	3.15	0.97	0.26			mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	<0.07	4.81	5.53	1.37	0.33			mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	<0.08	30.4	33.4	8.54	1.73			mg/kg	0.01	A-T-019s

Envirolab Job Number: 22/08121

Client Project Name: Circle Square Building 3

Client Project Ref: B080355

Lab Sample ID	22/08121/1	22/08121/2	22/08121/3	22/08121/4	22/08121/5			Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP1	TP2	TP3	TP4	TP5					
Depth to Top	0.80	0.50	0.40	0.30	0.25					
Depth To Bottom										
Date Sampled	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22	17-Aug-22					
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES					
Sample Matrix Code	4A	4AB	4AB	4A	4A					
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	<1	<1	<1			mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<1	<1	<1			mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1	2	2	2	<1			mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	<1	9	3	4	<1			mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	<1	289	31	102	1			mg/kg	1	A-T-055s
Total Aliphatics _A	<1	278	32	98	1			mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	<1	2	1	3	<1			mg/kg	1	A-T-055s
Aro >C10-C12 _A	<1	2	<1	1	<1			mg/kg	1	A-T-055s
Aro >C12-C16 _A	<1	12	8	6	<1			mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	<1	49	40	25	<1			mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	<1	250	159	91	4			mg/kg	1	A-T-055s
Total Aromatics _A	<1	292	183	114	4			mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	<1	570	215	212	5			mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01	<0.01	<0.01			mg/kg	0.01	A-T-022s

REPORT NOTES

General

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The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

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

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

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

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

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

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

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

Asbestos:

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

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

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

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Subscript "A" indicates analysis has dependant options against results. Testing dependant on results appear in the comments area of your sample receipt.

EPH CWG results have humics mathematically subtracted through instrument calculation

TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these

humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

Envirolab Deviating Samples Report

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

Client:	Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG	Project No:	22/08121
Project:	Circle Square Building 3	Date Received:	19/08/2022 (am)
Clients Project No:	B080355	Cool Box Temperatures (°C):	17.4

NO DEVIATIONS IDENTIFIED

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

Envirolab Analysis Dates

Lab Sample ID	22/08121/1	22/08121/2	22/08121/3	22/08121/4	22/08121/5
Client Sample No					
Client Sample ID/Depth	TP1 0.80m	TP2 0.50m	TP3 0.40m	TP4 0.30m	TP5 0.25m
Date Sampled	17/08/22	17/08/22	17/08/22	17/08/22	17/08/22
A-T-019s	31/08/2022	31/08/2022	31/08/2022	31/08/2022	31/08/2022
A-T-022s	25/08/2022	25/08/2022	25/08/2022	25/08/2022	25/08/2022
A-T-024s	25/08/2022	25/08/2022	25/08/2022	25/08/2022	25/08/2022
A-T-026s	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022
A-T-027s	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022
A-T-031s	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022
A-T-032 OM	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022
A-T-040s	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022
A-T-042sTCN	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022
A-T-044	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022
A-T-045	22/08/2022	22/08/2022	22/08/2022	22/08/2022	22/08/2022
A-T-050s	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022
A-T-055s	25/08/2022	25/08/2022	25/08/2022	25/08/2022	25/08/2022
Calc-As Recd	25/08/2022	25/08/2022	25/08/2022	25/08/2022	25/08/2022

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

End of Report

FINAL ANALYTICAL TEST REPORT

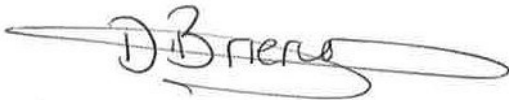
Envirolab Job Number: 22/11109
Issue Number: 1

Date: 15 November, 2022

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

Project Manager: Matthew Holroyd/Niall Farnworth
Project Name: Circle Square, Building 3
Project Ref: B080355
Order No: 1857
Date Samples Received: 10/11/22
Date Instructions Received: 11/11/22
Date Analysis Completed: 15/11/22

Approved by:



Danielle Brierley
Deputy Client Services Supervisor

Envirolab Job Number: 22/11109

Client Project Name: Circle Square, Building 3

Client Project Ref: B080355

Lab Sample ID	22/11109/1	22/11109/2	22/11109/3					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	SSTP01	SSTP02	SSTP03							
Depth to Top	0.40	0.90	1.50							
Depth To Bottom										
Date Sampled	10-Nov-22	10-Nov-22	10-Nov-22							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4ABE	4A	4A							
% Stones >10mm _A	<0.1	<0.1	<0.1					% w/w	0.1	A-T-044

Envirolab Job Number: 22/11109

Client Project Name: Circle Square, Building 3

Client Project Ref: B080355

Lab Sample ID	22/11109/1	22/11109/2	22/11109/3					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	SSTP01	SSTP02	SSTP03							
Depth to Top	0.40	0.90	1.50							
Depth To Bottom										
Date Sampled	10-Nov-22	10-Nov-22	10-Nov-22							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4ABE	4A	4A							
Speciated PCB-EC7 & WHO12										
PCB BZ 28 _A ^{M#}	<0.003	<0.003	<0.003					mg/kg	0.003	A-T-004s
PCB BZ 52 _A ^{M#}	<0.002	<0.002	<0.002					mg/kg	0.002	A-T-004s
PCB BZ 81 _A ^{M#}	<0.005	<0.005	<0.005					mg/kg	0.005	A-T-004s
PCB BZ 101 _A ^{M#}	<0.004	<0.004	<0.004					mg/kg	0.004	A-T-004s
PCB BZ 105 _A ^{M#}	<0.005	<0.005	<0.005					mg/kg	0.005	A-T-004s
PCB BZ 114 _A ^{M#}	<0.005	<0.005	<0.005					mg/kg	0.005	A-T-004s
PCB BZ 118 _A ^{M#}	<0.007	<0.007	<0.007					mg/kg	0.007	A-T-004s
PCB BZ 123 _A ^{M#}	<0.005	<0.005	<0.005					mg/kg	0.005	A-T-004s
PCB BZ 126 _A ^{M#}	<0.005	<0.005	<0.005					mg/kg	0.005	A-T-004s
PCB BZ 138 _A ^{M#}	<0.006	<0.006	<0.006					mg/kg	0.006	A-T-004s
PCB BZ 153 _A ^{M#}	<0.004	<0.004	<0.004					mg/kg	0.004	A-T-004s
PCB BZ 156 _A ^{M#}	<0.005	<0.005	<0.005					mg/kg	0.005	A-T-004s
PCB BZ 157 _A ^{M#}	<0.005	<0.005	<0.005					mg/kg	0.005	A-T-004s
PCB BZ 167 _A ^{M#}	<0.005	<0.005	<0.005					mg/kg	0.005	A-T-004s
PCB BZ 169 _A ^{M#}	<0.005	<0.005	<0.005					mg/kg	0.005	A-T-004s
PCB BZ 180 _A ^{M#}	<0.004	<0.004	<0.004					mg/kg	0.004	A-T-004s
PCB BZ 189 _A ^{M#}	<0.005	<0.005	<0.005					mg/kg	0.005	A-T-004s
PCB BZ 77 _A ^{M#}	<0.005	<0.005	<0.005					mg/kg	0.005	A-T-004s
Total Speciated PCB-EC7 & WHO12 _A ^{M#}	<0.007	<0.007	<0.007					mg/kg	0.003	A-T-004s

Envirolab Job Number: 22/11109

Client Project Name: Circle Square, Building 3

Client Project Ref: B080355

Lab Sample ID	22/11109/1	22/11109/2	22/11109/3					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	SSTP01	SSTP02	SSTP03							
Depth to Top	0.40	0.90	1.50							
Depth To Bottom										
Date Sampled	10-Nov-22	10-Nov-22	10-Nov-22							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	4ABE	4A	4A							
TPH CWG with Clean Up										
Ali >C5-C6 _A [#]	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	<1	<1					mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<1					mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	1	6	<1					mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	2	3	<1					mg/kg	1	A-T-055s
Ali >C21-C35 _A ^{M#}	31	5	<1					mg/kg	1	A-T-055s
Total Aliphatics _A	34	14	<1					mg/kg	1	Calc-As Recd
Aro >C5-C7 _A [#]	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	1	<1	<1					mg/kg	1	A-T-055s
Aro >C10-C12 _A	<1	<1	<1					mg/kg	1	A-T-055s
Aro >C12-C16 _A	10	5	<1					mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	36	2	<1					mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	102	5	<1					mg/kg	1	A-T-055s
Total Aromatics _A	148	11	<1					mg/kg	1	Calc-As Recd
TPH (Ali & Aro >C5-C35) _A	183	25	<1					mg/kg	1	Calc-As Recd
BTEX - Benzene _A [#]	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s

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The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

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

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

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

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

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

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

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

Asbestos:

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

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

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

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample, 9 = INCINERATOR ASH.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Subscript "A" indicates analysis has dependant options against results. Testing dependant on results appear in the comments area of your sample receipt.

EPH CWG results have humics mathematically subtracted through instrument calculation

TPH results "with Cleanup" indicates results cleaned up with Silica during extraction

EPH CWG GCxGC ID from TPH CWG

Where we have identified humic substances in any ID's from TPH CWG with Clean Up please note that the concentration of these

humic substances is not included in the quantified results and are included in the ID for information.

Please contact us if you need any further information.

Envirolab Deviating Samples Report

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

Client:	Curtins Consulting (Manchester), Merchant Exchange, 17-19 Whitworth Street , Manchester, UK, M1 5WG	Project No:	22/11109
Project:	Circle Square, Building 3	Date Received:	11/11/2022 (am)
Clients Project No:	B080355	Cool Box Temperatures (°C):	16.7

NO DEVIATIONS IDENTIFIED

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

Envirolab Analysis Dates

Lab Sample ID	22/11109/1	22/11109/2	22/11109/3
Client Sample No			
Client Sample ID/Depth	SSTP01 0.40m	SSTP02 0.90m	SSTP03 1.50m
Date Sampled	10/11/22	10/11/22	10/11/22
A-T-004s	15/11/2022	15/11/2022	15/11/2022
A-T-022s	15/11/2022	15/11/2022	15/11/2022
A-T-044	14/11/2022	14/11/2022	14/11/2022
A-T-055s	15/11/2022	15/11/2022	15/11/2022
Calc-As Recd	15/11/2022	15/11/2022	15/11/2022

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

End of Report

Our Locations

Birmingham

2 The Wharf
Bridge Street
Birmingham
B1 2JS
T. 0121 643 4694
birmingham@curtins.com

Bristol

Quayside
40-58 Hotwell Road
Bristol
BS8 4UQ
T. 0117 302 7560
bristol@curtins.com

Cambridge

50 Cambridge Place
Cambridge
CB2 1NS
T. 01223 631 799
cambridge@curtins.com

Cardiff

3 Cwrt-y-Parc
Earlswood Road
Cardiff
CF14 5GH
T. 029 2068 0900
cardiff@curtins.com

Douglas

Varley House
29-31 Duke Street
Douglas
Isle of Man
IM1 2AZ
T. 01624 624 585
douglas@curtins.com

Dublin

39 Fitzwilliam Square
Dublin 2
Ireland
T. 00353 1 507 9447
dublin@curtins.com

Edinburgh

1a Belford Road
Edinburgh
EH4 3BL
T. 0131 225 2175
edinburgh@curtins.com

Glasgow

Queens House
29 St Vincent Place
Glasgow
G1 2DT
T. 0141 319 8777
glasgow@curtins.com

Kendal

28 Lowther Street
Kendal
Cumbria
LA9 4DH
T. 01539 724 823
kendal@curtins.com

Leeds

Rose Wharf
Ground Floor
Leeds
L29 8EE
T. 0113 274 8509
leeds@curtins.com

Liverpool

51-55 Tithebarn Street
Liverpool
L2 2SB
T. 0151 726 2000
liverpool@curtins.com

London

40 Compton Street
London
EC1V 0BD
T. 020 7324 2240
london@curtins.com

Manchester

Merchant Exchange
17-19 Whitworth Street West
Manchester
M1 5WG
T. 0161 236 2394
manchester@curtins.com

Nottingham

56 The Ropewalk
Nottingham
NG1 5DW
T. 0115 941 5551
nottingham@curtins.com