

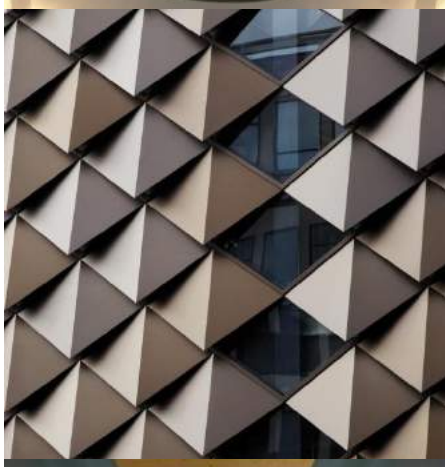





Heyrod Street

Remediation Strategy

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Client Name: Packaged Living Limited

Client Address: Time & Life Building, 1 Bruton Street, London, W1J 6TL

Site Address: 2 Heyrod Street, Manchester, M1 2WW

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

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Authors	Signature	Date
P Neesham MSci (Hons) Geo-Environmental Engineer		13 August 2021

Reviewed & Authorised	Signature	Date
R Allen BSc (Hons) MSc FGS MCIWEM C.WEM CEng Principal Engineer		13 August 2021

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1.0 Introduction

This Remediation Strategy has been prepared by Curtins for Packaged Living Limited (the Client) to provide guidance with respect to land remediation requirements for a site known as land at 2 Heyrod Street, Manchester. The site is centred on NGR SJ 852 980 and covers an area of 0.22Ha.

It is understood the development proposals include the construction of a 25-storey, part 21-storey, part 14-storey and part 7 storey residential apartment block. The block comprises 352No. build-to-rent apartments with associated amenities, ground floor commercial units, amenity spaces, car and bicycle parking and small areas of soft landscaping within the public realm.

It is understood that development proposals for the site comprise an industrial processing warehouse with a car park and hardstanding areas.

The report has been compiled following the completion of Phase 2 Intrusive Investigation works undertaken across the site between 30th April and 5th May 2021 (Ref. 1).

1.1 Particular Requirements of the Remediation Strategy

The Remediation Strategy is to account for the following;

- 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;
- Any action required to reduce the risk from contaminants on the development site (soil, liquid and gas);
- Advice on the verification and if required, validation of the gas protection measures;
- Recommendations for dealing with unexpected contamination and contaminative incidents on site; and
- Requirements for validation reporting.

Reference should also be made to Curtins Phase 2 Site Investigation Reports (Ref. 1).

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.

2.0 Ground Conditions

Ground conditions have been summarised based on the findings from the following reports:

- Curtins (2021) Heyrod Street Phase 2 Ground Investigation, Report ref. 075424-CUR-00-XX-RP-GE-002-P02 (Ref. 1)

Borehole locations are shown on drawing ref. 075424-CUR-00-XX-DR-GE-001-V01 contained within *Appendix A*. The investigation generally revealed the following:

2.1 Made Ground

2.1.1 External Areas

Made ground was encountered within all exploratory holes from ground level to depths between 1.60m and 2.20m bgl.

A surface covering of tarmacadam or concrete overlying a granular sub-base of gravelly sand. The gravel is angular to subangular fine to coarse of sandstone and concrete.

WS01 recorded brown gravelly fine to coarse sand underlying the sub-base including fragments of brick, concrete, ceramic fragments, rare ash and coal.

In WS02 made ground soils comprised brown sandy gravelly clay and clayey gravelly fine to coarse sand. These soils were underlain by very soft brown sandy gravelly clay and very loose black slightly clayey slightly gravelly fine to medium sand. Gravel typically comprised sandstone, brick, timber, coal, concrete and slate.

Below the sub-base in WS03, brown sandy cobbles of brick and concrete were recorded underlain by dark brown gravelly fine to coarse sand. Gravel is typically angular to subangular fine to coarse of brick, concrete, ash, wood fragments and coal.

2.1.2 Internal Areas

Made ground was encountered within all exploratory holes from ground level to depths between 1.40m and 1.50m bgl. A ground floor sab was encountered in all exploratory holes ranging in thickness between 0.15m and 0.20m.

In WS04, made ground comprised light brown gravelly fine to coarse sand underlain by brown slightly clayey to clayey, slightly gravelly to gravelly fine to coarse sand. Gravel is typically angular to subangular fine to coarse including brick, sandstone and concrete.

In WS05, made ground soils comprised brown gravelly fine to coarse sand underlain by dark greyish brown slightly clayey slightly silty fine to medium sand. Gravel is typically angular to subangular fine to coarse of brick, concrete and ceramic piping.

In WS06, made ground soils comprised brown slightly clayey gravelly fine to coarse sand underlain by brown clayey slightly gravelly fine to medium sand. Gravel is typically angular to subangular fine to coarse including sandstone, brick and concrete.

2.2 Superficial Deposits (Glacial Till)

Soils indicative of glacial till were encountered in all exploratory holes underlying the made ground.

The cohesive soils typically stiff brown slightly sandy slightly gravelly clay. The soils in BH01 were noted as slightly silty. Gravel typically comprised subangular to rounded fine to coarse of sandstone, mudstone and rare coal.

The base of the glacial till was encountered in BH01 at 10.60m bgl (36.17m AOD).

2.3 Residual Soils

Residual soils of the Chester Formation were encountered in BH01 underlying the cohesive glacial till. The deposit was encountered as very dense lightly orange medium to coarse sand with pockets of reddish brown sandy clay.

The base of these soils was identified in BH01 at 12.80m bgl (34.51m AOD), overlying the Chester Formation.

2.4 Chester Formation

The Chester Formation was only encountered in BH101 at 12.80m bgl (34.51m AOD).

Bedrock comprises extremely weak and medium strong fine to coarse grained sandstone. Fracture are extremely closely space to closely spaced, generally 0-10 degrees, planar, rough, clean however, steep and undulating fractures were also recorded.

Where bedrock was recorded to be non-intact deposits comprise very dense light brown gravelly fine to coarse sand. Gravel is typically angular to subangular fine to medium of sandstone.

The base of the deposit was not proven.

2.5 Groundwater

No groundwater strikes were recording during site works. The rotary borehole used water flush thereby making it difficult to record reliably at the time of the investigation works.

During the return monitoring visits, water levels in the window samples were recorded between 1.46m bgl and 4.96m bgl. In BH101, groundwater was recorded at depths between 20.60m bgl and 20.67m bgl.

2.6 Ground and Groundwater Contamination

As part of the Phase 2 Ground Investigation, a Generic Qualitative Risk Assessment (GQRA) was undertaken. The development is to comprise residential apartment blocks with associated amenities, commercial units, amenity spaces, car and bicycle parking and small areas of soft landscaping. The soft landscaping at ground level is part of the public realm and will not form garden areas for the occupants. Considering this, the site has been compared against *Commercial* Tier 1 thresholds protective of human health.

No exceedances above GAC thresholds were recorded in made ground soil samples obtained.

No suspected asbestos containing materials (ACMs) were identified on site however, laboratory screening identified asbestos fibres in a sample obtained from WS05 (0.50m bgl) detailed in *Table 2.6*

Table 2.6 *Positive Asbestos ID*

Exploratory Hole	Depth (m bgl)	Stratum	Asbestos Type	Concentration in soil (% w/w)
WS05	0.50	Made Ground	Chrysotile loose fibres	<0.001%

Olfactory contamination was encountered in two exploratory hole locations in made ground soils. A strong hydrocarbon odour was noted in WS02 between 1.60m – 2.20m bgl and a slight organic odour in WS03 between 0.67m – 2.00m bgl.

A **Low** risk rating is identified to site users. This assessment considers no exceedances being identified in any soils samples above '*Commercial*' GACs and the chrysotile loose fibres (<0.001%) at 0.50m bgl in WS05. Proposals indicated the sample is located in an area proposed to be covered by the building footprint. The building footprint will act as a barrier between site soils and the end users, breaking the source pathway receptor linkage however, the linkage remains in proposed soft landscaped areas and thus a suitable thickness of clean and inert engineered capping layer is recommended. Alternatively, if the full thickness of made ground is removed in areas of proposed landscaping, no further action will be required.

A **Moderate/Low** to construction and maintenance workers is identified from direct contact, inhalation and ingestion of contaminants within made ground soils. Considering the asbestos identified in WS05, the risk should be suitably managed during construction with input from a specialist where appropriate, suitable Health and Safety precautions including appropriate PPE should be provided to all construction and maintenance staff.

A **Low** risk rating is identified to controlled waters (groundwater) from vertical and horizontal migration of contamination. Marginally elevated concentrations were recorded in BH01 and 20.70m bgl

however, there is no indicating that elevated concentrations are a results of soils leaching to the underlying aquifer, particularly given the significant thickness of low permeability soils between the made ground and bedrock.

2.7 Ground Gas Assessment

To characterise the site's ground gas regime, ground gas monitoring was undertaken on six occasions over a period of two months with barometric pressure recorded between 997mb and 1017mb. It is considered that sufficient ground gas data has been obtained to provide a representative data set, considering a range of temporal conditions.

Methane was recorded below the instruments limit of detection through the monitoring period, with the exception of WS05 on the sixth visit recording a concentration of 0.9% $^{v}/_{v}$.

Hydrogen sulphide and carbon monoxide concentrations were recorded in BH01 on the first visit of 12ppm and 68ppm.

A maximum carbon dioxide concentration ranged between 0.1% $^{v}/_{v}$ in WS01 and 16.3% $^{v}/_{v}$ in BH01. A maximum flow of -4.3l/hr in BH01, reducing to -3.6l/hr after 5 minutes. All other monitoring wells recorded peak and steady state flow rates below the limit of detection of the monitoring instruments.

Methane and hydrogen sulphide were recorded below the instruments limit of detection. A maximum carbon dioxide concentration of 13.7% $^{v}/_{v}$ was recorded in WS04. A maximum flow of 3.2l/hr was recorded in BH02.

Consideration of the recorded soil gas flow rates, presented above, enables hazardous gas flow rates to be evaluated. Q_{hg} can be derived for both 'borehole' and 'worst possible' scenarios and a comparison made in support of an appropriate assessment of ground gas risk. For a 'borehole' scenario steady state flow rates are adopted, whilst for a 'worst possible' scenario peak flows are adopted.

2.7.1 Carbon Dioxide

Evaluation of the 'borehole' scenario (highest hazardous gas flow rate that is realistically possible, i.e. in a single borehole) records a maximum Q_{hg} of 0.1440l/hr for carbon dioxide where maximum steady state air flow rate of -3.6 l/hr was recorded, and maximum gas concentrations of 4.0% $^{v}/_{v}$ on the second monitoring visit.

Evaluation of the 'worst-case' scenario (highest hazardous gas flow rate at any time) records a maximum Q_{hg} of 0.5868l/hr for carbon dioxide where maximum steady state air flow rate of -3.6 l/hr was recorded on the second monitoring visit, and maximum gas concentrations of 16.3% $^{v}/_{v}$ on the fifth monitoring visit.

2.7.2 Methane

Evaluation of the 'borehole' scenario and 'worst case' scenario records a maximum Q_{hg} of 0.0009l/hr for methane where maximum steady state air flow rate of 0.1 l/hr was used, and maximum gas concentration of 0.9% $^{v}/_{v}$ on the final monitoring visit.

2.7.3 Conclusion

The calculated Q_{hg} for both the 'borehole' and 'worst case' scenarios would account for a Gas Screening Value (GSV) indicative of a Characteristic Situation 2 (CS2) gas regime. Therefore, gas protection measures will be required for the proposed development.

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

2.8 Radon

The BGS Radon Mapping confirms the site is situated in a lower probability radon area where <1% of homes at or above the radon action level. On this basis, radon protection measures are not considered necessary in the construction or new dwellings. Where the new development incorporates a basement the advice of a specialist Radon assessor must be obtained.

3.0 Relevant Pollutant Linkages

A conceptual site model (CSM) for the site has been developed based on the ground investigations undertaken as detailed in Curtins Ground Investigation reporting (Ref.1).

The CSM details several pollutant linkages at the site, however, based on the risk assessments undertaken, the potential pollutant linkage (PPL) listed in *Table 3.0* was identified as requiring remediation to enable the safe re-development of the site.

Table 3.0 *Potential Pollutant Linkages (Existing)*

PPL	Sources	Receptor	Potential Pathway	Remediation Recommended
1	Made Ground soils know to and/or potentially containing asbestos.	Construction Workers and Adjacent Residents	Inhalation and ingestion of asbestos within soil-derived dust from on site Made Ground.	An asbestos management plan is recommended with input from asbestos management specialists outlining measures to be put in place, this should include inspection of excavations for asbestos containing materials by suitably qualified person.
2	Import clean and inert layer for growing medium within soft landscaped areas	End Users/Maintenance Workers	Inhalation, ingestion and dermal contact with contaminants in soil and soil-derived dust from imported soils.	There are currently no soils suitable for soft landscaping on site. Clean capping within soft landscaped areas will be required to be imported.
3	Elevated carbon dioxide recorded >5% in site soils.	End Users	Migration and inhalation of ground gas and vapour.	Provide CS-2 ground gas protection measures to all new buildings.
4	Public realm ground Investigation	End Users / Construction Workers	Inhalation, ingestion and dermal contact with contaminants in soil and soil-derived dust from site.	Complete additional post demolition environmental ground investigation to assess the risk and revise report with findings.

The risks to groundwater and surface waters from contamination on site were identified as Low and Very Low within previous ground investigation reporting (Ref. 1).

4.0 Remedial Works

With reference to the Conceptual Site Model and the potential contaminant linkages detailed in *Table 3.0* 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**: Suitable PPE for all construction workers and suitable asbestos management measures.
- **Remedial Action 2:** Engineering capping to serve as clean layer to facilitate soft landscaped areas construction.
- **Remedial Action 3:** CS2 Ground gas protection measures.
- **Remedial Action 4:** Additional post-demolition environmental ground investigation.

It is further recommended that Curtins Engineer is contacted if any unexpected contamination/contaminative incidents are encountered during construction works or should ground conditions vary from those outlined in Section 2.0. Further advice on handling such incidents in enclosed within Section 5.0.

4.1 Remedial Action 1 – 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 environmental from potential contamination. Such risks must be adequately mitigated by law, specifically the Construction Design Management (CDM) Regulation, 2015 which require the potential risk to human health and the environment from construction activities are appropriately identified and all the necessary steps taken to eliminate / manage the risk.

It has been assumed that any future construction works on site will be undertaken in compliance with these requirements to address PPL 1 (*Table 3.0*)

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 utilizing their own additional testing and delineation if they deem it to be required.

Where, from the site investigations, material 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 fiber release to site workers.

No suspected asbestos containing materials (ACMs) were identified within the exploratory holes however, one samples from WS05 at 0.50m bgl identified loose chrysotile fibres at a concentration of <0.001%.

Table 2.6 in *Section 2.6* above should be consulted together with Curtins Exploratory Hole Plan drawing in *Appendix A* for the locations, depths and concentrations of asbestos identified during Curtins ground investigation.

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 disposable 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 an 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.

Existing made ground should not be crushed or in any way treated due to risk of asbestos fiber release.

4.2 Remedial Action 2 – Engineered Capping

The PCL at site related to the direct contact, dermal uptake, soil and dust ingestion and inhalation of imported soils to facilitate soft landscaping. (PCL2, *Table 3.0*).

It is recommended that verified imported clean capping is installed in proposed soft landscaped areas.

Remedial measures are detailed in *table 4.2* below.

Table 4.2 *Engineered Capping Details for Soft Landscaping Areas*

Location	Remedial Measures Required	Rationale
Soft Landscaped Areas	Provision of a minimum **300mm clean capping.** The capping layer may comprise a combination of topsoil and subsoil with a minimum of 150mm topsoil.	Ensure the quality of soils imported for soft landscaping are suitable for use.

The engineered capping must meet the specification outlined in *Section 5.0*.

4.3 Remedial Action 3 – Gas Protection Measures

PPL2 in *Table 3.0* relates to the inhalation exposure to site end users from elevated concentrations of carbon dioxide beneath the site.

The intrusive investigation has identified the site with an assessment by BS8485 (Ref. 6), as Characteristic Situation 2 (CS-2) requiring 3.5 points of gas protection measure, for a building type B, using a combination of two or more of the following three types of protection measures:

- The Structural Barrier or Floor Slab
- Ventilation Measures
- Gas Resistant Membrane

These gas protection measures are to be designed, verified and validated by a specialist designer/supplier/installer. For example to achieve the required protection measures could incorporate:

- Reinforced cast in-situ suspended slab with minimal penetrations – 1.5 points;
- Visqueen Low Permeability Gas Membrane – Yellow (or alternative performance) – 2 points, installed in line with Table 7 of BS8485 (Ref. 2)
- Passive sub-floor dispersal layer (very good performance) – 2.5 points; or Passive sub-floor dispersal layer (good performance) – 1.5 points.
- Appropriately and adequately sealed service entries; and
- All to membrane manufactures instructions and details.

4.4 Remedial Action 4 – Additional Post-Demolition Investigation

4.4.1 Environmental Investigation

An additional environmental ground investigation comprising three trial pits will be undertaken post-demolition in order to obtain three shallow soil samples for environmental chemical analysis of a suite of soils based on the previous historical uses of the site as identified in *Table 4.4* below.

See *Appendix A* for the proposed positions of the additional site works post-demolition.

Table 4.4 *– Environmental Chemistry Analysis Suite: Soils*

Suite Ref.	Analyte	LOD
Soils Suite A	Asbestos Screen	-
	pH Value	0.1 pH
	2:1 Water Soluble Sulphate	0.01 g/l
	Soil Organic Matter (SOM)	0.4% w/w
	Arsenic, Chromium, Chromium VI, Copper, Lead, Nickel, Selenium	0.20 - 1 mg/kg
	Zinc	0.5 mg/kg
	Boron (water soluble)	0.4 mg/kg
	Cadmium	0.1 mg/kg
	Mercury	0.1 mg/kg
	Cyanide (total)	0.5 mg/kg
	Phenols (screen)	0.3 mg/kg
	PAHs (USEPA 16)	0.1 mg/kg
	TPH (Aro/Ali Split)	1 mg/kg

These samples will be used to confirm the risks to end users within the public realm areas of the site. All results will be included within a revised version of this report once completed.

4.4.2 Geotechnical Investigation

Additional geotechnical investigation will be completed below the proposed building footprint. No additional environmental samples are to be taken as part of this investigation as these areas of the site have already been investigated.

Additional geotechnical investigation will comprise two cable percussive boreholes to rock head with rotary cored follow-on to a depth of up to 35m bgl. The investigation will be used to obtain rock cores for geotechnical laboratory analysis to inform detailed pile designs.

5.0 Engineered Capping Specification

5.1 Sourcing of Materials

5.1.1 Off-Site Sources

It is anticipated that materials are to be imported to the site for use in constructing the growing medium in 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.

5.1.2 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' or 'clean' material for re-use as a subsoil due to the presence of asbestos fibres and other contaminants at a number of locations across the site.

5.2 Imported Topsoil

Imported Topsoil will invariably be required and should be supplied and placed in accordance with the Architects' specification but generally, all topsoil will be a minimum of 150mm thick in soft landscaped areas (as part of the 300mm overall layer thicknesses as detailed in Section 4.0).

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 5.4.*

5.3 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 5.4* and compliant with the British Standard for Subsoil BS 8601:2013.

5.4 Chemical Composition of Soils

Site won and imported subsoil and topsoil should not contain concentrations of contaminants that present an unacceptable risk to the health of future site occupants.

The Contractor shall be responsible for demonstrating that both site won and imported material is 'clean' and therefore suitable for use in 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 5.4a *Environmental chemistry testing frequency for imported and re-used soils*

Source	Testing Frequency
Imported Topsoil/Subsoil (Greenfield)	**Verification:** One sample every 200m^3 used (or a minimum of 3 No. samples whichever is greater) in accordance with Table 3 of Clause 5.5.3 of Planning Guidance in Relation to Ground Contamination: Guidance Note for Applicants, Developers, Land Owners and Consultants, Manchester City Council (2016). To include on site sampling not just sampling at source.
Imported Topsoil/Subsoil (Remediated/ Brownfield/Unknown)	**Verification:** One sample every 150m^3 used (or a minimum of 3 No. samples whichever is greater) in accordance with Table 3 of Clause 5.5.3 of Planning Guidance in Relation to Ground Contamination: Guidance Note for Applicants, Developers, Land Owners and Consultants, Manchester City Council (2016). To include on site sampling not just sampling at source.
Re-used/ Site Won Natural Soils	**Verification:** one sample every 150m^3 used (or a minimum of 3 No. samples whichever is greater).

The environmental chemistry testing requirements are as *Table 5.4b*. Additions to the suite and frequency of sampling maybe 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 5.4b *Environmental chemistry analysis suite for imported soils.*

Suite Reference	Environmental Chemistry Analysis
Greenfield or Manufactured Soils Imported to Site and Site Won Soils for Use as Clean Capping	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 - 16 USEPA speciation)

Suite Reference	Environmental Chemistry Analysis
	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 Home Grown Produce'* screening criteria; refer to *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 outlined may be made for specific soil sources whereby the Soil Organic Matter is proving to be routinely above 6%.

5.5 Verification and Validation of Capping/Growing Media

Confirmatory analysis outlined previously is required to verify the suitability of any imported and site won topsoil, and where required, subsoil.

Evidence that the specified depth of capping/growing media has been provided will be required including evidence of the underlying geotextile/anti-dig break layer**.**

Evidence should include hand excavated trial pits advanced in areas where material has been placed to prove a sufficient depth is provided and geotextile/anti-dig layer is present.

The pits shall be excavated to the base of the interface between the imported material and the geotextile/ anti dig layer.

A photographic record of the hand excavated trial pits would also be required.

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

6.1 Unexpected Contamination

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) Await Engineers instructions with respect to re-commencement of the works and or removal of suspect material to a suitably licensed disposal facility (following guidance outlined in *Section 5.1* above).

e) Local Authority and if relevant the Environment Agency are to be kept fully informed of any site such occurrences.

6.2 Contaminative Incidents

The site has previously been occupied by terraced housing. The terraced housing was partially demolished by 1933 and the remaining houses demolished by 1978. The warehouse structures currently present on site were constructed in 1981 with an extension added by 1991.

No obstructions were noted during the ground investigation however, 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. It is possible that unknown/unrecorded substructures may exist which if ruptured may release materials that could contaminate the surrounding soils and groundwater 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.

7.0 Verification and Validation

7.1 Verification of Clean Capping

Validation visits shall be undertaken by an appropriately qualified and experienced person throughout the construction phase to ensure that the requirements of this Remediation Strategy have been implemented at the site. It is anticipated records will be taken during the work as identified below:

- Placement of the requisite depths of clean capping soft landscaping soils (areas without hardstanding).

Documentation of general works including asbestos management procedures during the works and records of contaminative incidents and any unexpected contamination.

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

Verification through either hand excavated trial pits or comparison of reduced and final level surveys will all be included within the Completion report to confirm the provision of requisite depth of clean capping.

7.2 Verification of Gas Protection Measures

The installed protection measures are to be verified as having been installed in accordance with the approved mitigation measure design details. The verification of the satisfactory installation forms part of the overall system of mitigation and should be in accordance with CIRIA C735 (Ref. 3). CIRIA C735 (Ref. 3) provides formal guidance of the procedures for verification of the gas risk, design, construction and verification as interconnected assessment of the site-specific gas risk assessment.

CIRIA C735 (Ref. 3) provides a summary of the requirements for inspections and reporting, similar in detail to previous guidance. The aspects for verification and timing of inspection are subject to the specific slab design.

The aspect that must be confirmed on each plot inspection are as detailed, but not limited to the below:

- Development of a Validation Plan by specialist;
- Product Verification: Confirmation that suitable products have been installed to consist of photographs of products types, labels on packaging and delivery tickets;

- General Conditions: The membrane is to be inspected to ensure there are no tears, punctures or rips;
- Jointing: Checking the overlaps between membranes are correctly sealed, with correct tapes and sufficient overlaps;
- Wall Cavity Inspection: Confirming the propriety gas membranes or gas DPC spans the external walls; and
- Service Entry Points: Verification of the presence of preformed top hats sealed to the pipe and membrane.

An inspection statement form is to be completed for each area of the building with a photographic record.

To verify the gas protection measures, it is assumed that the following will be undertaken:

- An appropriately experienced and qualified workforce is employed to install gas protection systems. Installers should hold relevant qualifications such as Cskills Awards L2 NVQ diploma for the installation of gas membranes.

Based on this assumption, the relatively low risk categorisation of the site (Characteristic Situation 2) and given only a single building is to be installed with protection measures, in accordance with CIRIA C735 (Ref. 3) much of the verification may be carried out by on site staff (appropriately trained and experienced) with independent inspection from a third party/Curtins to review and compile all records.

The following verification records should therefore be obtained by the specialist installer contractor/on site staff:

- Photographic log of installation and testing if undertaken, of gas protection measures (floor slab and gas membrane); and
- Internal inspection and verification records including any discrepancies and non-conformities in accordance with CIRIA C735 (Ref. 3).

The above records should be reviewed by an independent third party/Curtins which should include visits to site to provide a secondary visual verification.

The frequency and timing of visits by Curtins shall be determined following confirmation of the construction phase programme; however, it is anticipated that visits will be undertaken:

- During the placement of the floor slab (structural barrier to gases); and
- During placement of the gas membrane (membrane barrier to gases).

Where alternate protection measures are adopted as outlined in *Section 4.3* or specialised installation staff are not used a revision to this plan/schedule will likely be required and validation visits potentially increased.

Upon completion of the development a final statement confirming the installation of gas membranes will be provided for discharge for any contamination land conditions.

8.0 Reporting

A Completion Report will be required upon completion of the works confirming that the remedial works have been completed satisfactorily. The report will containing the following:

- Confirmation that the clean soils have been installed as specified within soft landscaped areas including capping thickness validation records and photographs;
- Confirmation of imported capping materials suitability including environmental chemistry testing results;
- Detail and documentation of asbestos management measures utilised during the works;
- Photographic log of installation and testing if undertaken for gas protection measures (floor slab and gas membrane);
- Internal inspection and verification records including any discrepancies and non-conformities in accordance with CIRIA C735
- 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 4.0)*;
- 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 on site.

References

1. Curtins, *Phase 2 Site Investigation for Heyrod Street,* ref. 075424-CUR-00-XX-RP-GE-0002-P02, July 2021.

2. British Standards Institution (2015*) Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings* (report no. BS8485).

3. CIRIA (2014*) Good Practice on the Testing and Verification of Protection Systems for Buildings Against Hazardous Gases* (report C735).

Appendix A – Drawings

- Proposed Development Plans
- Exploratory Hole Location Plan Curtins drawing ref. 075424-CUR-00-XX-DR-GE-001-V01
- Post-Demolition Investigation Plan Curtins drawing ref. 075424-CUR-00-XX-DR-GE-003-V01

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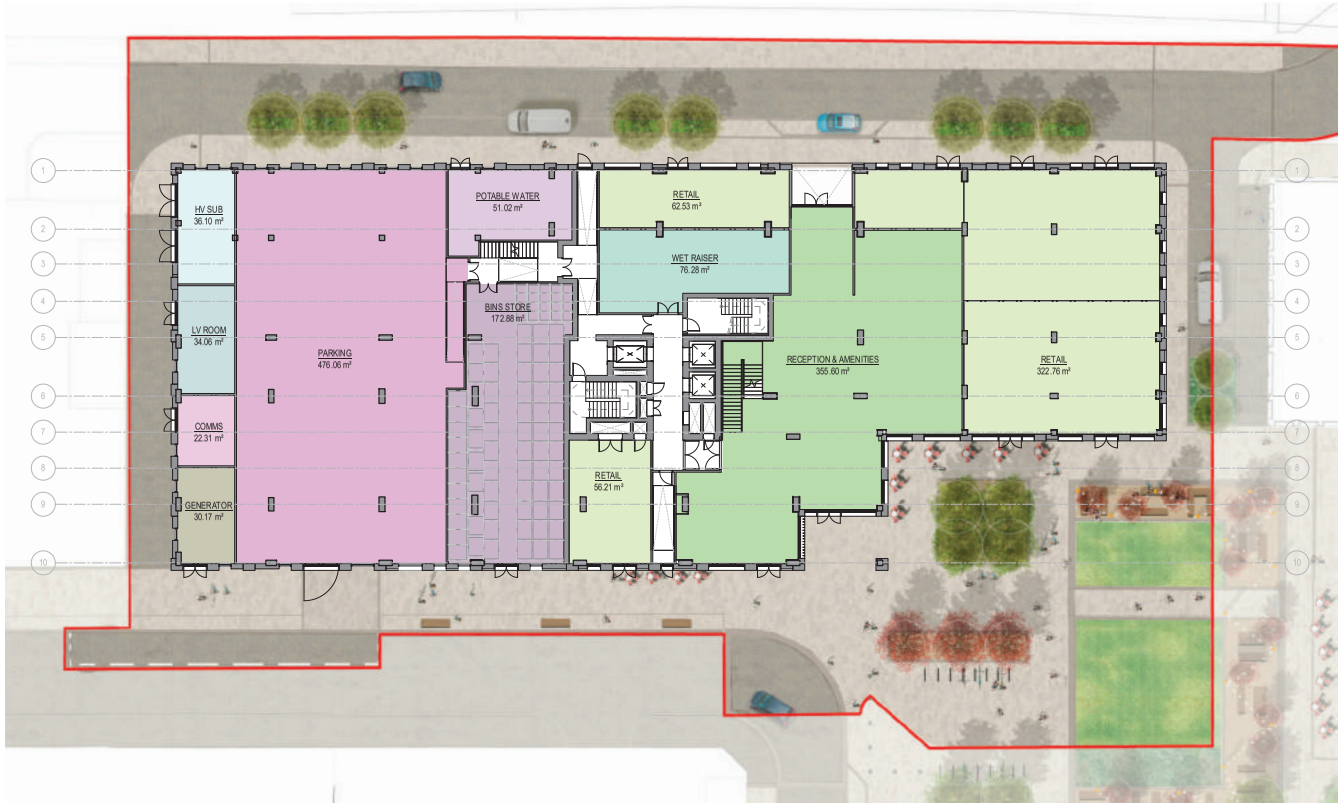

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REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN

PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING
Backed by FIERA REAL ESTATE

CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Ground Floor GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	058-190002	SCALE @ A1 :	1 : 200
		DATE DRAWN :	05/08/15
SUITAB. CODE:		DRAWN BY:	JO
REVISION:	1	CHECKED BY:	MP

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
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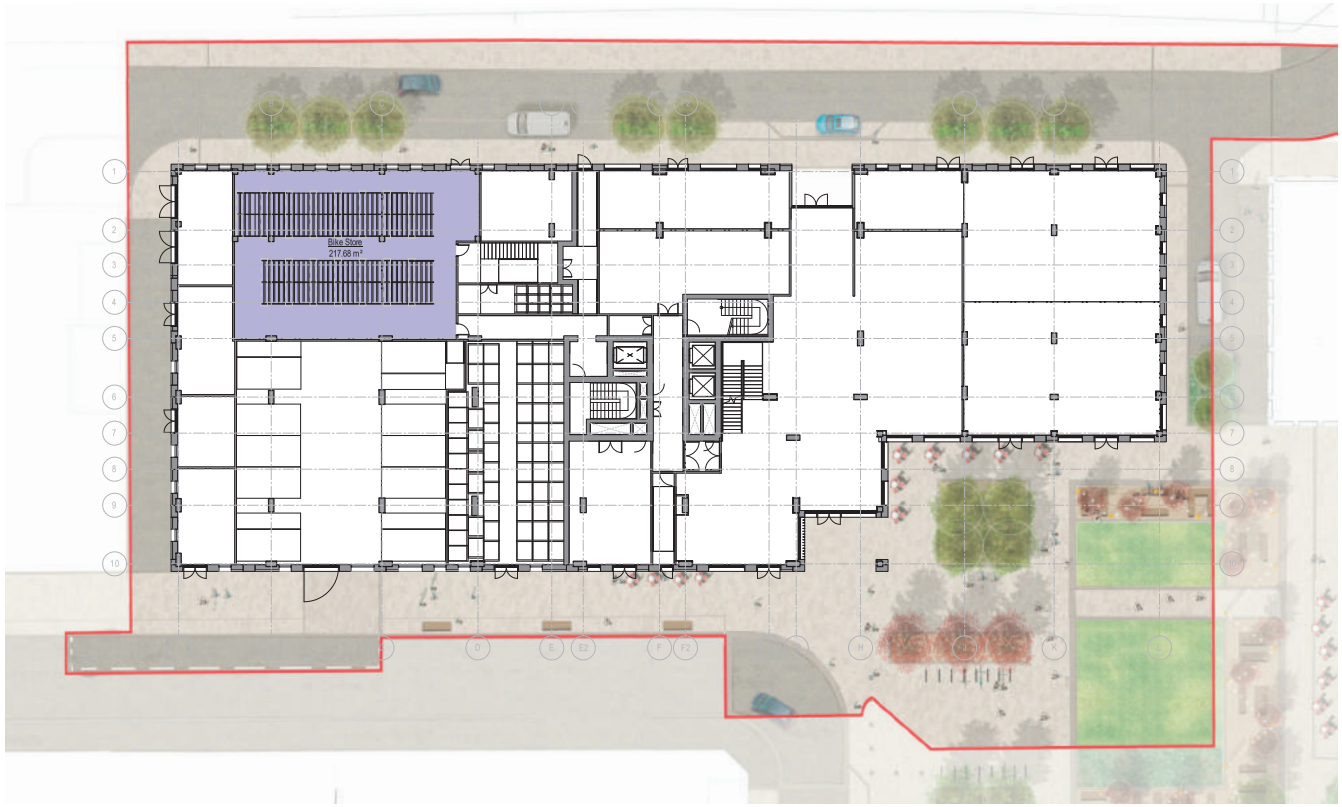

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SHEET IDENTIFICATION

TITLE

Mezzanine GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER
058-190002

SCALE @ A1 : **1 : 200**

DATE DRAWN : **03/25/20**

SUITAB. CODE:

DRAWN BY: **JO**

REVISION: **1**

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PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	0B	DR	A	12-002

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SHEET IDENTIFICATION

TITLE

Level 08 - 09 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	**058-190002**
SCALE @ A1 :	**1 : 200**
DATE DRAWN :	**07/16/19**
SUITAB. CODE:	
DRAWN BY:	**JO**
REVISION:	**1**
CHECKED BY:	**MP**

PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	08	DR	A	12-006

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SHEET IDENTIFICATION

TITLE

Level 14 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER **058-190002**

SCALE @ A1: **1 : 200**

DATE DRAWN: **07/16/19**

SUITAB. CODE:

DRAWN BY: **JO**

REVISION: **1**

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PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
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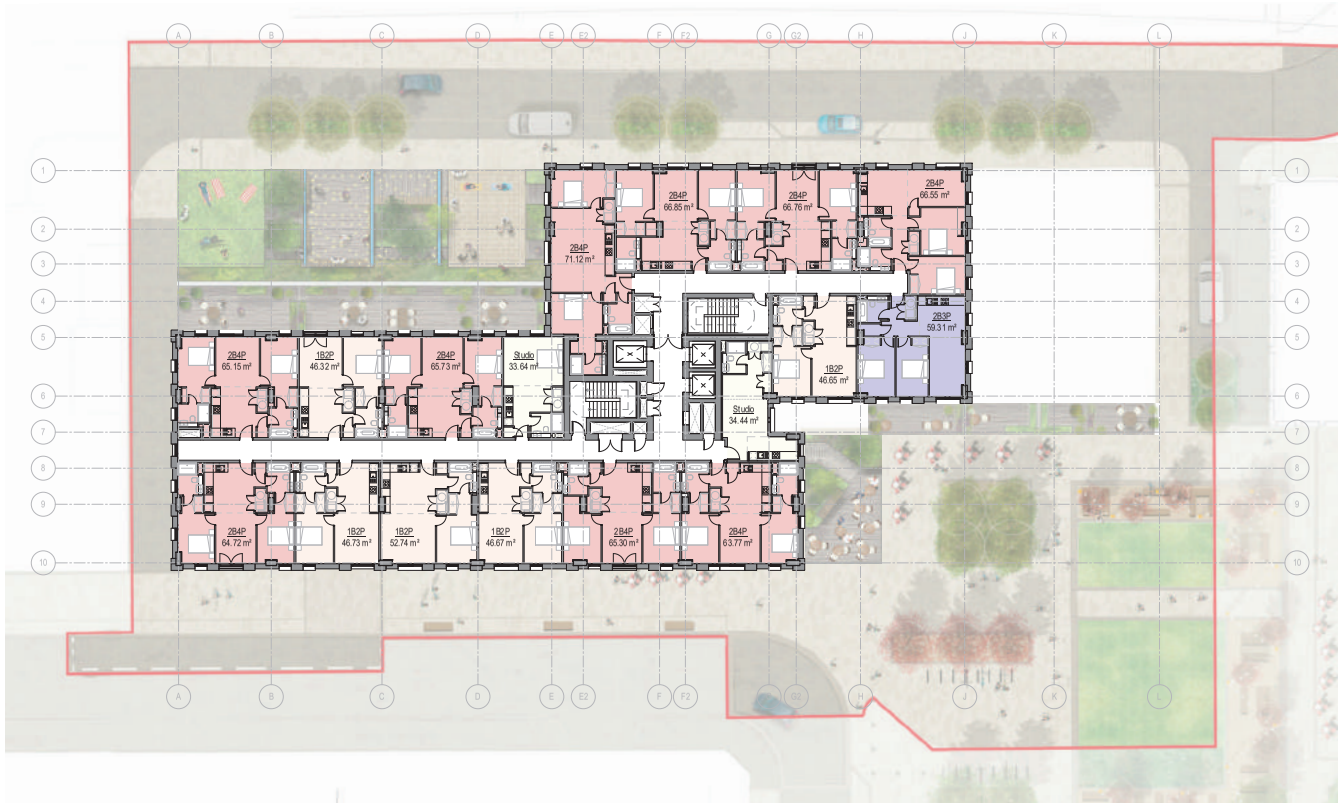

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SHEET IDENTIFICATION

TITLE

Level 10 - 13 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	058-190002	SCALE @ A1 :	1 : 200
		DATE DRAWN :	02/25/20
SUITAB. CODE :		DRAWN BY :	JO
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PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	10	DR	A	12-007

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SHEET IDENTIFICATION

TITLE

Level 07 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	058-190002	SCALE @ A1 :	1 : 200
		DATE DRAWN :	12/02/2019
SUITAB. CODE:		DRAWN BY:	JO
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PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
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CLIENT

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SHEET IDENTIFICATION

TITLE

Level 01 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	**058-190002**	SCALE @ A1 :	**1 : 200**
		DATE DRAWN :	**08/22/19**
SUITAB. CODE:		DRAWN BY:	**JO**
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PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	01	DR	A	12-003

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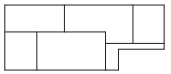
KEY PLAN



PROJECT

Heyrod Street

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CLIENT

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Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Level 02 - 06 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER	**058-190002**
SCALE @ A1 :	**1 : 200**
DATE DRAWN :	**03/27/20**
SUITAB. CODE:	
DRAWN BY:	**JO**
REVISION:	**1**
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PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	02	DR	A	12-004

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1	28/09/2020	Employer's requirements		

KEY PLAN

PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

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CALLISONRTKL

Suite 12A, Manchester One, Portland Street

Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Level 15 - 20 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER **058-190002**

SCALE @ A1: **1 : 200**

DATE DRAWN: **02/12/20**

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PROJECT	ORGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	15	DR	A	12-009

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Area Apartment		
Name	Area	Count
ZZ_01		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	463.07 m²	7
3B5P	85.60 m²	1
Studio	33.64 m²	1
	1008.02 m²	17
ZZ_02		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	596.43 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	1175.82 m²	20
ZZ_03		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	596.03 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	1175.42 m²	20
ZZ_04		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	596.03 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	1175.42 m²	20
ZZ_05		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	596.03 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	1175.42 m²	20
ZZ_06		
1B2P	186.56 m²	4
2B3P	239.16 m²	4
2B4P	596.03 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	1175.42 m²	20
ZZ_07		
1B2P	93.11 m²	2
2B3P	181.24 m²	3
2B4P	529.50 m²	8
3B5P	85.60 m²	1
Studio	68.08 m²	2
	957.53 m²	16
ZZ_08		
1B2P	92.97 m²	2
2B3P	121.93 m²	2
2B4P	595.96 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	964.54 m²	16
ZZ_09		
1B2P	92.97 m²	2
2B3P	121.93 m²	2
2B4P	595.96 m²	9
3B5P	85.60 m²	1
Studio	68.08 m²	2
	964.54 m²	16
ZZ_10		
1B2P	239.11 m²	5
2B3P	59.31 m²	1
2B4P	595.96 m²	9
Studio	68.08 m²	2
	962.46 m²	17
ZZ_11		
1B2P	239.11 m²	5
2B3P	59.31 m²	1
2B4P	595.96 m²	9
Studio	68.08 m²	2
	962.46 m²	17

Area Apartment		
Name	Area	Count
ZZ_12		
1B2P	239.11 m²	5
2B3P	59.31 m²	1
2B4P	595.96 m²	9
Studio	68.08 m²	2
	962.46 m²	17
ZZ_13		
1B2P	239.11 m²	5
2B3P	59.31 m²	1
2B4P	595.96 m²	9
Studio	68.08 m²	2
	962.46 m²	17
ZZ_14		
1B2P	146.00 m²	3
2B3P	59.31 m²	1
2B4P	467.52 m²	7
Studio	68.08 m²	2
	740.91 m²	13
ZZ_15		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_16		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_17		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_18		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_19		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_20		
1B2P	93.32 m²	2
2B3P	118.12 m²	2
2B4P	467.52 m²	7
Studio	68.08 m²	2
	747.04 m²	13
ZZ_21		
1B2P	139.75 m²	3
2B3P	58.87 m²	1
2B4P	196.24 m²	3
	394.85 m²	7
ZZ_22		
1B2P	139.75 m²	3
2B3P	58.87 m²	1
2B4P	196.24 m²	3
	394.85 m²	7
ZZ_23		
1B2P	139.75 m²	3
2B3P	58.87 m²	1
2B4P	196.24 m²	3
	394.85 m²	7
ZZ_24		
1B2P	139.75 m²	3
2B3P	58.87 m²	1
2B4P	196.24 m²	3
	394.85 m²	7
Grand total: 352	20424.53 m²	352



Mix Aparment		
Name	Area	Count
1B2P	3619.74 m²	77
2B3P	3100.82 m²	52
2B4P	11606.50 m²	175
3B5P	770.38 m²	9
Studio	1327.09 m²	39
Grand total: 352	20424.53 m²	352

2 0 2 4 6 8 10
SCALE 1:200 m

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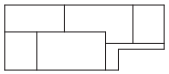
REV No.	DATE	DESCRIPTION	DWN	CHK
1	28/09/2020	Employer's requirements		

KEY PLAN



PROJECT

Heyrod Street

Heyrod St, Manchester M1 2NQ

CLIENT

PACKAGED LIVING
Backed by FIERA REAL ESTATE

CALLISONRTKL
Suite 12A, Manchester One, Portland Street
Manchester, M1 3FL, United Kingdom.

SHEET IDENTIFICATION

TITLE

Level 21 - 24 GA Plan

STATUS

Employer's Requirements

PROJECT NUMBER
058-190002

SCALE @ A1 : **1 : 200**
DATE DRAWN : **12/02/2019**
SUITAB. CODE :
DRAWN BY : **JO**
REVISION : **1**
CHECKED BY : **MP**

PROJECT	ORIGN	ZONE	LEVEL	TYPE	ROLE	NUMBER
190002	CRL	ZZ	21	DR	A	12-010

28/09/2020 20:42:32

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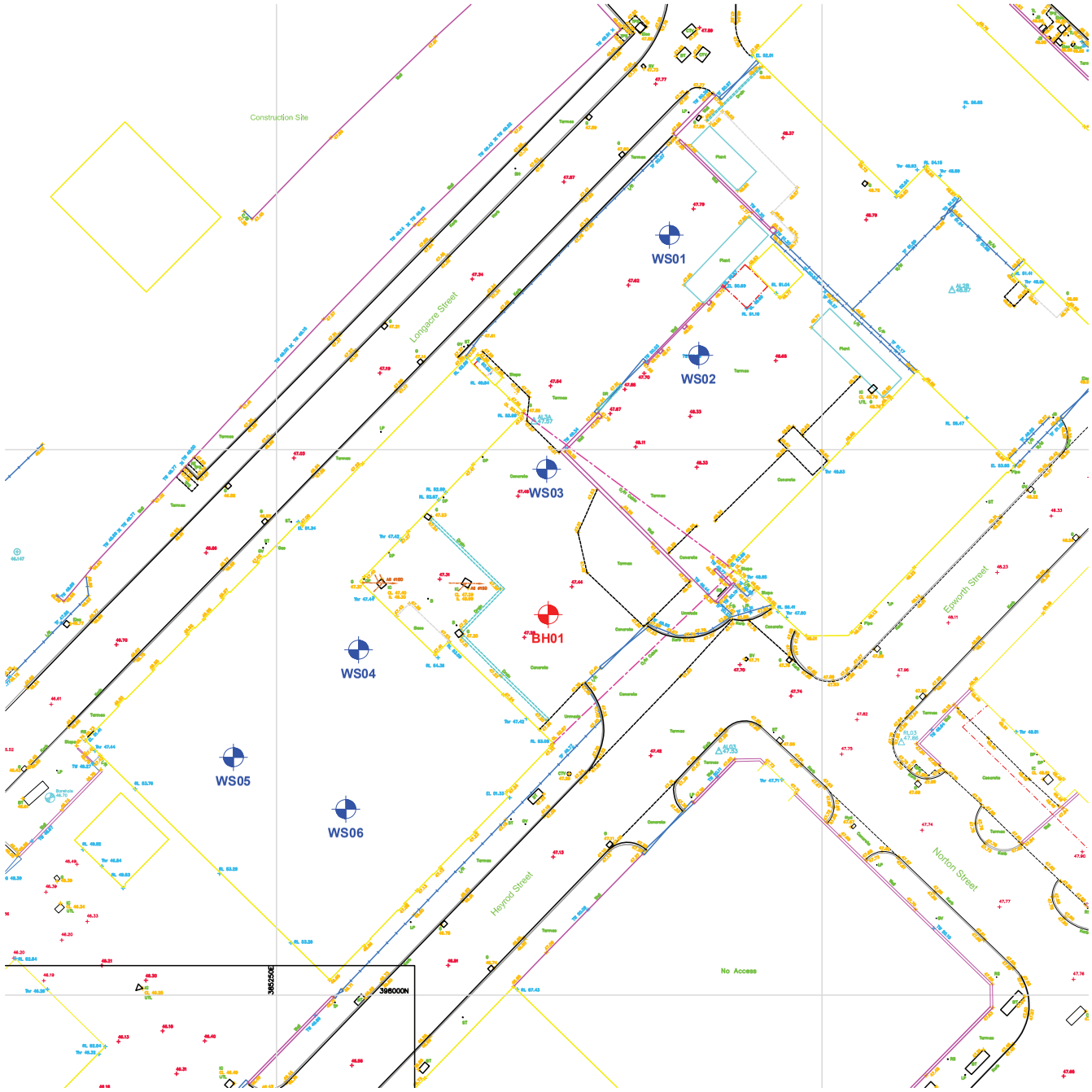

GEOBORE S ROTARY BOREHOLE LOCATION

WINDOW SAMPLE BOREHOLE LOCATION

Rev:	Description:	Date:	By:	Chkd:

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

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

Status:

INFORMATION

Project:

HEYROD STREET

Drg Title:

EXPLORATORY HOLE LOCATION PLAN

Scale:	Size:	First Issue:	Drawn:	Checked:
NTS	A3	22/06/2021	MH	RA

Drg No: **B075424-CUR-00-XX-DR-GE-002** Rev: **V01**

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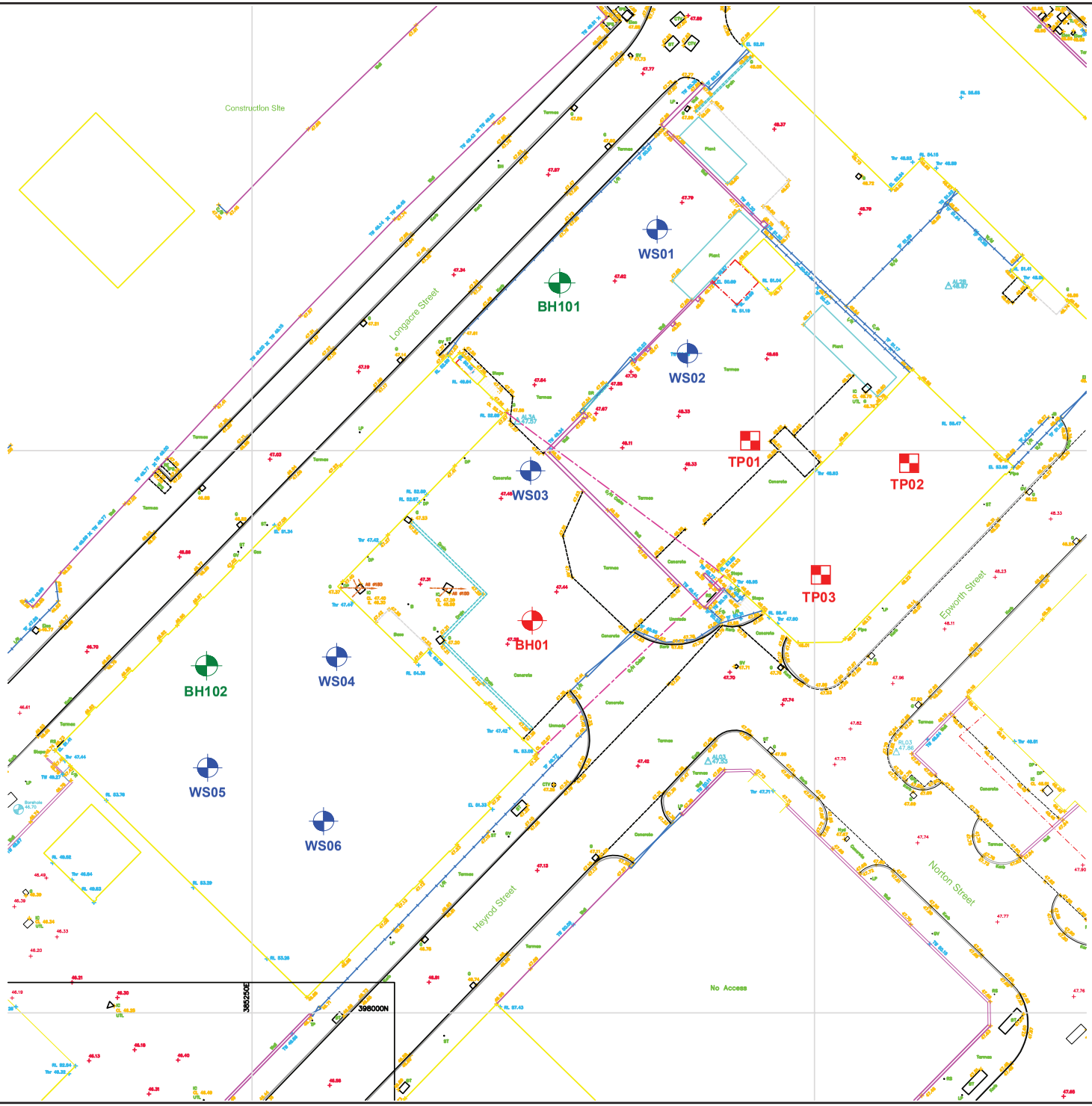

GEOBORE S ROTARY BOREHOLE LOCATION

WINDOW SAMPLE BOREHOLE LOCATION

PROPOSED POST-DEMOLITION POSITIONS:

MACHINE EXCAVATED TRIAL PIT LOCATION

CABLE PERCUSSIVE WITH ROTARY CORE FOLLOW-ON BOREHOLE LOCATION

Rev:	Description:	Date:	By:	Chkd:

curtins

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

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

Status: INFORMATION

Project: **HEYROD STREET**

Drg Title: **POST-DEMOLITION INVESTIGATION PLAN**

Scale:	Size:	First Issue:	Drawn:	Checked:
NTS	A3	13/08/21	ZH	RA

Drg No: **B075424-CUR-00-XX-DR-GE-003** Rev: **V01**

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Appendix B – Exploratory Hole Logs

Rotary Core Log

Borehole No. **BH01**

Sheet 1 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										MADE GROUND: Brown gravelly fine to coarse sand. Occasional cobbles of brick and concrete. Gravel is fine to coarse angular to subangular brick, concrete and rare clinker.
							1.27	46.04		Stiff brown with rare grey mottling slightly silty slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded sandstone and mudstone.
										Continued on next sheet

1 2 3 4 5 6

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

AGS

Rotary Core Log

Borehole No. **BH01**

Sheet 2 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							10.60	36.70		Very dense light orange medium and coarse SAND. Pockets of reddish brown sandy clay.
										Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Rotary Core Log

Borehole No. **BH01**

Sheet 3 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
							12.80	34.51		
		12.80 - 14.00	14.2	93	91	43				Extremely weak light brown fine to coarse grained SANDSTONE. *12.80m to 14.00m Fractures extremely closely spaced to closely spaced 0-10 degrees planar, rough, sand infill on fracture surfaces.* *13.05m Brown clay infill on fracture surface.* *13.28m 1 No. Fracture, 0-10 degrees, undulating, rough, clean.* *13.74m 1 No. Fracture, 0-10 degrees, stepped, rough, clean.*
		14.00 - 15.50	NI 15.2 NI	100	58	33				*14.00m to 14.05m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subrounded sandstone.* *14.05m to 15.00m Fractures extremely closely spaced to medium spaced 0-10 degrees planar, rough, clean.* *14.30m 1 No. Fracture 30 degrees, planar, rough, clean.* *15.00m to 16.00m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone.*
		15.50 - 17.00	13	100	64	54	16.24	31.06		*16.00m to 16.55m Fractures 0-10 degrees, very closely spaced to closely spaced, planar, rough, clean.* *16.15m 1 No. Fracture, 90 degrees, 7 cm length planar, rough, clean.* Very weak light brown fine to coarse grained SANDSTONE. *16.55m to 17.62m Fractures extremely closely spaced to closely spaced 30 to 45 degrees, planar, rough, clean.* *16.73m 1 No. Fracture 0-10 degrees, planar, rough, clean.*
		17.00 - 18.50	NI 7.9	100	91	53				*17.00m to 17.24m Extremely weak.* *17.62m to 17.67m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone.* *17.67m to 18.30m Fractures very closely spaced to closely spaced, planar, rough, sand infill on fracture surfaces.*

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Rotary Core Log

Borehole No. **BH01**

Sheet 4 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
			NI							
		18.50 - 20.00		100	95	49				18.15m to 18.37m Extremely weak. 18.3m to 18.35m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone. 18.35m to 21.84m Fractures extremely closely spaced to medium spaced,0-10 degrees, planar, rough, clean. 19.30m to 19.33m Extremely weak. 19.55m to 19.60m Extremely weak.
		20.00 - 21.50	14	100	100	40				20.15m 1 No. Fracture undulating, rough, clean. 20.46m 2 No. Fractures, 30 degrees, cross-cutting, planar rough, clean. 20.98m 1 No. Fracture, 90 degrees, planar, rough, clean. 21.42m 1 No. Fracture, 30 degrees, planar, rough, clean.
		21.50 - 23.00	NI 6.7 NI	100	85	50				21.60m to 22.00m Extremely weak. 21.84m to 21.91m Non-intact. Recovered as light brown sandy gravel. Gravel is fine to coarse angular to subangular sandstone. 21.91m to 22.80m Fractures 0-10 degrees closely spaced, planar, rough, clean. 22.80m to 22.95m Non-intact. Recovered as light brown medium and coarse gravel and cobbles of fine to coarse grained sandstone.
		23.00 - 24.50	19.3	100	100	13				22.95m to 23.60m Extremely weak. 22.95m to 24.87m Fractures 0-10 degrees extremely closely spaced to closely spaced, planar, rough, clean.

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Rotary Core Log

Borehole No. **BH01**

Sheet 5 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										24.19m to 24.84m Extremely weak.
		24.50 - 26.00	NI 5.8 NI	100	93	75	25.00	22.30		*24.87m to 24.93m Non-intact. Recovered as light brown medium ang coarse angular to subangular gravel of fine to coarse grained sandstone.* *24.93m to 25.45m Fractures 0-10 degrees, closely spaced to medium spaced, planar, rough, sand infill on fracture surfaces.* Weak light brown fine and medium grained SANDSTONE. Rare coarse clasts of sandstone and mudstone. *25.45m to 25.49m Non-intact. Recovered as light brown medium and coarse sand.* *25.49m to 29.05m Fractures 0-10 degrees very closely spaced to medium spaced planar, rough, clean.*
		26.00 - 27.50	6.2	100	100	82				*26.00m to 27.37m Medium strong.* *26.20m Sand infill on fracture surface.*
		27.50 - 29.00		93	93	85				*27.41m to 27.48m Weak reddish brown medium and coarse grained sandstone. Fresh.*
		29.00 - 30.50	NI 8.8 NI	100	82	50	29.22	18.08		*29.05m to 29.22m Non-intact. Recovered as brown sandy clay.* Very weak light brown medium and coarse grained SANDSTONE. Generally fresh. *29.22m to 29.90m Fracture set 1: 0-10 degrees, closely spaced to medium spaced, planar, rough, sand infill on fracture surfaces. Fracture set 2: 0-30 degrees, closely spaced, planar, rough, clean, sand infill on fracture surfaces.* *29.90m to 30.00m Non-intact. Recovered as medium and*

25 26 27 28 29 30

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Rotary Core Log

Borehole No. **BH01**

Sheet 6 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
										coarse sand.
										30.00m to 35.07m Fractures 0-10 degrees, very closely spaced to medium spaced, planar, rough, clean.
										30.04m to 30.48m Closely spaced thinly bedded weak fine and medium grained sandstone.
		30.50 - 32.00		100	100	79				*31.00m to 31.50m Weak fine to coarse grained sandstone.*
										31.50m to 31.60m Very weak reddish brown mudstone.
										31.90m 1 No. Fracture, undulating, rough, clean.
		32.00 - 33.50	6.5	100	100	67				*32.10m to 32.64m Weak light brown fine to coarse sandstone. Fresh.*
										32.52m to 32.55m Extremely weak reddish brown mudstone.
										33.50m 1 No. Fracture 60 degrees, planar, rough, clean.
		33.50 - 35.00		100	100	71				*33.50m to 33.90m Medium strong*
										33.90m to 35.00m Weak.
										35.00m to 35.50m Extremely weak.
			NI							*35.07m to 35.13m Non-intact. Recovered as gravelly medium and coarse sand. Gravel is medium and coarse angular to subangular sandstone.*
		35.00 - 36.50	7.3	100	91	73				*35.13m to 36.50m Fractures 0-10 degrees, very closely spaced to medium spaced, planar, rough, clean.*

31 32 33 34 35 36

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 1	**Date:** 30/04/2021 to 04/05/2021	**Description:** BH01 Logging Photographs 0.40m to 8.00m bgl.	





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 2	**Date:** 04/05/2021	**Description:** BH01 Logging Photographs 8.00m to 14.00m bgl.	





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 3	**Date:** 04/05/2021	**Description:** BH01 Logging Photographs 14.00m to 20.00m bgl.	





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 4	**Date:** 04/05/2021	**Description:** BH01 Logging Photographs 14.00m to 20.00m bgl.	





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 5	**Date:** 04/05/2021	**Description:** BH01 Logging Photographs 14.00m to 20.00m bgl.	





Client Name: Packaged Living	Project Name: Heyrod Street	Project No: B075424

No.	Date:	Description:
6	05/05/2021	BH01 Logging Photographs 32.00m to 38.00m bgl.





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 7	**Date:** 05/05/2021	**Description:** BH01 Logging Photographs 38.00m to 41.16m bgl.	





Client Name: Packaged Living		Project Name: Heyrod Street	Project No: B075424
No. 7	**Date:** 05/05/2021	**Description:** BH01 Logging Photographs 44.00m to 45.50m bgl.	



Rotary Core Log

Borehole No. **BH01**

Sheet 7 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
		36.50 - 38.00	NI	87	87	85				*36.50m to 36.70m No recovery.*
			3.1							*36.70m to 37.98m Fractures 0-10 degrees, medium spaced, planar, rough, clean.*
		38.00 - 39.50	NI	93	65	47	38.12	9.18		*37.98m to 38.12m Non-intact. Recovered as sandy gravel. Gravel is fine to coarse angular to subangular sandstone.*
			12.1							Weak reddish brown fine to coarse grained SANDSTONE. Fresh.
			>25							*38.12m to 38.78m Fractures 0-10 degrees, very closely spaced to closely spaced planar, rough, clean.*
			12.5							*38.48m 1 No. Fracture 20 degrees, planar, rough, clean.*
			NI							*38.78m to 39.00m Fractures extremely closely spaced to very closely spaced 0-10 degrees, rough, sand infill.*
		39.50 - 41.00	5.7	100	96	83				*38.78m to 39.00m Very weak.*
										39.00m to 39.32m Fractures 0-10 degrees very closely spaced to closely spaced planar, rough, clean.
										39.30m to 39.32m Reddish brown mudstone.
										39.32m to 39.40m Non-intact. Recovered as gravelly fine to coarse sand. Gravel is fine and medium angular to subrounded sandstone.
										39.40m to 41.16m Fractures 0-10 degrees extremely closely spaced to medium spaced planar, rough, clean,
		41.00 - 42.50		11	11	7				*41.16m to 44.00m No recovery.*

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Rotary Core Log

Borehole No. **BH01**

Sheet 8 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Depth (m)	Type / FI	Coring TCR	Coring SCR	Coring RQD	Depth (m)	Level (m)	Legend	Stratum Description
		42.50 - 44.00	NR	0	0	0				
		44.00 - 45.50	NI 5.9 NI 8.2	100	67	59				*44.00m SPT recovered as light brown medium and coarse sand.* *44.00m to 44.14m Non-intact. Recovered as reddish brown fine to coarse sand.* *44.14m to 44.31m 1 No. Fracture, 0-10 degrees, planar, clean, rough.* *44.31m to 44.65m Non-intact. Recovered as reddish brown sandy gravel. Gravel is fine to coarse angular to subangular sandstone.* *44.65m to 45.50m Fractures 0-10 degrees, very closely spaced to closely spaced, undulating, rough, clean* *45.30m 1 No. Fracture 0-10 degrees, stepped, rough, clean.*
							45.50	1.80		End of borehole at 45.50 m

43 44 45 46 47 48

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

AGS

Borehole Log

Borehole No. **BH01**

Sheet 1 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								MADE GROUND: Brown gravelly fine to coarse sand. Occasional cobbles of brick and concrete. Gravel is fine to coarse angular to subangular brick, concrete and rare clinker.
					1.27	46.04		Stiff brown with rare grey mottling slightly silty slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to rounded sandstone and mudstone.
		2.00		N=20 (1,3/4,4,5,7)				
		3.50		N=31 (5,8/7,7,7,10)				
		5.00		N=26 (1,2/4,6,8,8)				
								Continued on next sheet

1 2 3 4 5 6

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

AGS

Borehole Log

Borehole No. **BH01**

Sheet 2 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		8.00		50 (8,14/50 for 125mm)				
					10.60	36.70		Very dense light orange medium and coarse SAND. Pockets of reddish brown sandy clay.
		11.00		50 (25 for 120mm/50 for 95mm)				

7 8 9 10 11 12

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

AGS

Borehole Log

Borehole No. **BH01**

Sheet 3 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		12.50		50 (25 for 90mm/50 for 80mm)	12.80	34.51		Extremely weak light brown fine to coarse grained SANDSTONE.
								12.80m to 14.00m Fractures extremely closely spaced to closely spaced 0-10 degrees planar, rough, sand infill on fracture surfaces.
								13.05m Brown clay infill on fracture surface.
								13.28m 1 No. Fracture, 0-10 degrees, undulating, rough, clean.
								13.74m 1 No. Fracture, 0-10 degrees, stepped, rough, clean.
								14.00m to 14.05m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subrounded sandstone.
								14.05m to 15.00m Fractures extremely closely spaced to medium spaced 0-10 degrees planar, rough, clean.
								14.30m 1 No. Fracture 30 degrees, planar, rough, clean.
								15.00m to 16.00m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone.
								16.00m to 16.55m Fractures 0-10 degrees, very closely spaced to closely spaced, planar, rough, clean.
								16.15m 1 No. Fracture, 90 degrees, 7 cm length planar, rough, clean.
					16.24	31.06		Very weak light brown fine to coarse grained SANDSTONE.
								16.55m to 17.62m Fractures extremely closely spaced to closely spaced 30 to 45 degrees, planar, rough, clean.
								16.73m 1 No. Fracture 0-10 degrees, planar, rough, clean.
								17.00m to 17.24m Extremely weak.
								17.62m to 17.67m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone.
								17.67m to 18.30m Fractures very closely spaced to closely spaced, planar, rough, sand infill on fracture surfaces.

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Borehole Log

Borehole No. **BH01**

Sheet 4 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								18.15m to 18.37m Extremely weak.
								18.3m to 18.35m Non-intact. Recovered as light brown gravelly fine to coarse sand. Gravel is fine and medium angular to subangular sandstone.
								18.35m to 21.84m Fractures extremely closely spaced to medium spaced,0-10 degrees, planar, rough, clean.
								19.30m to 19.33m Extremely weak.
								19.55m to 19.60m Extremely weak.
								20.15m 1 No. Fracture undulating, rough, clean.
								20.46m 2 No. Fractures, 30 degrees, cross-cutting, planar rough, clean.
								20.98m 1 No. Fracture, 90 degrees, planar, rough, clean.
								21.42m 1 No. Fracture, 30 degrees, planar, rough, clean.
								21.60m to 22.00m Extremely weak.
								21.84m to 21.91m Non-intact. Recovered as light brown sandy gravel. Gravel is fine to coarse angular to subangular sandstone.
								21.91m to 22.80m Fractures 0-10 degrees closely spaced, planar, rough, clean.
								22.80m to 22.95m Non-intact. Recovered as light brown medium and coarse gravel and cobbles of fine to coarse grained sandstone.
								22.95m to 23.60m Extremely weak.
								22.95m to 24.87m Fractures 0-10 degrees extremely closely spaced to closely spaced, planar, rough, clean.
								Continued on next sheet

19 20 21 22 23 24

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Borehole Log

Borehole No. **BH01**

Sheet 5 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					25.00	22.30		*24.19m to 24.84m Extremely weak.* *24.87m to 24.93m Non-intact. Recovered as light brown medium ang coarse angular to subangular gravel of fine to coarse grained sandstone.* *24.93m to 25.45m Fractures 0-10 degrees, closely spaced to medium spaced, planar, rough, sand infill on fracture surfaces.* Weak light brown fine and medium grained SANDSTONE. Rare coarse clasts of sandstone and mudstone. *25.45m to 25.49m Non-intact. Recovered as light brown medium and coarse sand.* *25.49m to 29.05m Fractures 0-10 degrees very closely spaced to medium spaced planar, rough, clean.* *26.00m to 27.37m Medium strong.* *26.20m Sand infill on fracture surface.* *27.41m to 27.48m Weak reddish brown medium and coarse grained sandstone. Fresh.* *29.05m to 29.22m Non-intact. Recovered as brown sandy clay.*
					29.22	18.08		Very weak light brown medium and coarse grained SANDSTONE. Generally fresh. *29.22m to 29.90m Fracture set 1: 0-10 degrees, closely spaced to medium spaced, planar, rough, sand infill on fracture surfaces. Fracture set 2: 0-30 degrees, closely spaced, planar, rough, clean, sand infill on fracture surfaces.* *29.90m to 30.00m Non-intact. Recovered as medium and*

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Borehole Log

Borehole No. **BH01**

Sheet 6 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								coarse sand.
								30.00m to 35.07m Fractures 0-10 degrees, very closely spaced to medium spaced, planar, rough, clean.
								30.04m to 30.48m Closely spaced thinly bedded weak fine and medium grained sandstone.
								31.00m to 31.50m Weak fine to coarse grained sandstone.
								31.50m to 31.60m Very weak reddish brown mudstone.
								31.90m 1 No. Fracture, undulating, rough, clean.
								32.10m to 32.64m Weak light brown fine to coarse sandstone. Fresh.
								32.52m to 32.55m Extremely weak reddish brown mudstone.
								33.50m 1 No. Fracture 60 degrees, planar, rough, clean.
								33.50m to 33.90m Medium strong
								33.90m to 35.00m Weak.
								35.00m to 35.50m Extremely weak.
								35.07m to 35.13m Non-intact. Recovered as gravelly medium and coarse sand. Gravel is medium and coarse angular to subangular sandstone.
								35.13m to 36.50m Fractures 0-10 degrees, very closely spaced to medium spaced, planar, rough, clean.

31 32 33 34 35 36

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Borehole Log

Borehole No. **BH01**

Sheet 7 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								36.50m to 36.70m No recovery.
								36.70m to 37.98m Fractures 0-10 degrees, medium spaced, planar, rough, clean.
								37.98m to 38.12m Non-intact. Recovered as sandy gravel. Gravel is fine to coarse angular to subangular sandstone.
					38.12	9.18		Weak reddish brown fine to coarse grained SANDSTONE. Fresh.
								38.12m to 38.78m Fractures 0-10 degrees, very closely spaced to closely spaced planar, rough, clean.
								38.48m 1 No. Fracture 20 degrees, planar, rough, clean.
								38.78m to 39.00m Fractures extremely closely spaced to very closely spaced 0-10 degrees, rough, sand infill.
								38.78m to 39.00m Very weak.
								39.00m to 39.32m Fractures 0-10 degrees very closely spaced to closely spaced planar, rough, clean.
								39.30m to 39.32m Reddish brown mudstone.
								39.32m to 39.40m Non-intact. Recovered as gravelly fine to coarse sand. Gravel is fine and medium angular to subrounded sandstone.
								39.40m to 41.16m Fractures 0-10 degrees extremely closely spaced to medium spaced planar, rough, clean,
								41.16m to 44.00m No recovery.

37 38 39 40 41 42

Continued on next sheet

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

Borehole Log

Borehole No. **BH01**

Sheet 8 of 8

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385271.30 - 398034.90	Hole Type RC
Location: Heyrod Street, Manchester		Level: 47.31	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 30/04/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		44.00		50 (25 for 50mm/50 for 40mm)				*44.00m SPT recovered as light brown medium and coarse sand.* *44.00m to 44.14m Non-intact. Recovered as reddish brown fine to coarse sand.* *44.14m to 44.31m 1 No. Fracture, 0-10 degrees, planar, clean, rough.* *44.31m to 44.65m Non-intact. Recovered as reddish brown sandy gravel. Gravel is fine to coarse angular to subangular sandstone.* *44.65m to 45.50m Fractures 0-10 degrees, very closely spaced to closely spaced, undulating, rough, clean* *45.30m 1 No. Fracture 0-10 degrees, stepped, rough, clean.*
					45.50	1.80		End of borehole at 45.50 m

43 44 45 46 47 48

Remarks

Borehole undertaken within previously undertaken archaeological trial trench. No groundwater strikes recorded during progression of exploratory hole due to use of water flush.

AGS

Borehole Log

Borehole No. **WS01**

Sheet 1 of 1

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385285.40 - 398066.80	Hole Type WS
Location: Heyrod Street, Manchester		Level: 47.70	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 04/05/2021 - 04/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.05	47.65		MADE GROUND: Black tarmacadam.
					0.16	47.54		MADE GROUND: Light brown gravelly medium and coarse sand. Gravel is fine to coarse angular to subangular sandstone and concrete.
		1.20		N=4 (1,1/1,1,1,1)				MADE GROUND: Brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick, concrete, ceramic fragments, rare ash, and coal. Occasional cobbles of brick.
					1.60	46.10		Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		2.00		N=18 (2,3/4,6,4,4)				
		3.00		N=28 (5,5/6,6,7,9)				
		4.00		N=27 (4,6/5,5,7,10)				
		5.00		N=26 (5,7/5,8,6,7)				
					5.45	42.25		End of borehole at 5.45 m

1 2 3 4 5 6

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

AGS

Borehole Log

Borehole No. **WS02**

Sheet 1 of 1

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385288.10 - 398059.20	Hole Type WS
Location: Heyrod Street, Manchester		Level: 48.59	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 04/05/2021 - 04/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.10	48.49		MADE GROUND: Black tarmacadam.
					0.30	48.29		MADE GROUND: Light brown gravelly medium and coarse sand. Gravel is fine to coarse angular to subangular sandstone and concrete.
		1.20		N=4 (1,1/1,1,1,1)	1.20	47.39		MADE GROUND: Brown sandy gravelly clay and clayey gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick, concrete, slate, sandstone and coal. Rare to occasional cobbles of brick and concrete.
					1.60	46.99		MADE GROUND: Very soft brown sandy gravelly clay. Gravel is fine and medium angular to subangular sandstone and rare brick.
		2.00		N=6 (1,2/1,2,2,1)	2.20	46.39		MADE GROUND: Very loose black slightly clayey slightly gravelly fine and medium sand. Gravel is fine to coarse angular to subangular timber, sandstone, coal and brick. Strong hydrocarbon odour.
		3.00		N=27 (4,4/6,7,7,7)				Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		4.00		N=30 (5,6/6,7,7,10)				
		5.00		N=32 (4,6/6,7,8,11)				
					5.45	43.14		End of borehole at 5.45 m

1 2 3 4 5 6

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

Borehole Log

Borehole No. **WS03**

Sheet 1 of 1

Project Name: Heyrod Street	Project No. B075424	Co-ords: 385276.10 - 398047.30	Hole Type WS
Location: Heyrod Street, Manchester		Level: 47.61	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 04/05/2021 - 04/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.16	47.45		MADE GROUND: Concrete.
					0.28	47.33		MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular sandstone and concrete.
								MADE GROUND: Brown sandy cobbles of brick and concrete.
					0.67	46.94		MADE GROUND: Dark brown and dark greyish brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick, concrete, ash, wood fragments and rare coal. Slight organic odour.
		1.20		N=4 (1,1/1,1,1,1)				
		2.00		N=19 (3,3/5,4,4,6)	2.00	45.61		Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		3.00		N=23 (3,4/4,5,7,7)				
		4.00		N=28 (4,6/6,6,7,9)				
		5.00		N=21 (5,5/4,6,5,6)				
					5.45	42.16		End of borehole at 5.45 m

1 2 3 4 5 6

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

AGS

Borehole Log

Borehole No. **WS04**

Sheet 1 of 1

Project Name: Heyrod Street	Project No. B075424	Co-ords: -	Hole Type WS
Location: Heyrod Street, Manchester		Level:	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 05/05/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			MADE GROUND: Concrete.
					0.30			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular sandstone and concrete.
					0.80			MADE GROUND: Brown slightly clayey gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick, concrete and sandstone. Frequent cobbles of brick.
		1.20		N=7 (1,2/1,2,2,2)				MADE GROUND: Loose brown clayey slightly gravelly fine and medium sand. Gravel is fine and medium angular to subrounded sandstone, brick and coal.
					1.50			Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		2.00		N=20 (3,4/4,4,5,7)				
		3.00		N=20 (4,3/4,5,7,4)				
		4.00		N=23 (3,4/5,5,5,8)				
		5.00		N=20 (3,5/4,4,7,5)				
					5.45			End of borehole at 5.45 m

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

Borehole Log

Borehole No. **WS05**

Sheet 1 of 1

Project Name: Heyrod Street	Project No. B075424	Co-ords: -	Hole Type WS
Location: Heyrod Street, Manchester		Level:	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 04/05/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.15			MADE GROUND: Concrete.
								MADE GROUND: Brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick, concrete and ceramic pipe fragments. Frequent brick cobbles.
					1.05			MADE GROUND: Loose dark greyish dark brown slightly clayey slightly silty fine and medium sand.
		1.20		N=17 (5,5/4,2,6,5)				
					1.40			Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		2.00		N=23 (4,5/5,6,6,6)				
		3.00		N=25 (6,6/6,7,7,5)				
		4.00		N=31 (5,6/6,8,9,8)				
		5.00		N=29 (5,5/4,7,9,9)				
					5.45			End of borehole at 5.45 m

1 2 3 4 5 6

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

AGS

Borehole Log

Borehole No. **WS06**

Sheet 1 of 1

Project Name: Heyrod Street	Project No. B075424	Co-ords: -	Hole Type WS
Location: Heyrod Street, Manchester		Level:	Scale 1:30
Client: Packaged Living (FREOF V Heyrod) LLP		Dates: 05/05/2021 - 05/05/2021	Logged By MH

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.15			MADE GROUND: Concrete.
					0.22			MADE GROUND: Light brown gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular sandstone and concrete.
					0.70			MADE GROUND: Brown slightly clayey gravelly fine to coarse sand. Gravel is fine to coarse angular to subangular brick and concrete. Occasional cobbles of brick and concrete.
		1.20		N=3 (1,1/1,1,0,1)				MADE GROUND: Loose brown clayey slightly gravelly fine and medium sand. Gravel is fine and medium angular to subrounded sandstone, brick and coal.
					1.50			Stiff brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel is fine and medium angular to subrounded sandstone, mudstone and rare coal.
		2.00		N=20 (4,4/5,4,6,5)				
		3.00		N=25 (4,4/6,6,6,7)				
		4.00		N=27 (5,4/4,6,7,10)				
		5.00		N=25 (6,6/4,4,8,9)				
					5.45			End of borehole at 5.45 m

1 2 3 4 5 6

Remarks

Hand excavated service clearance pit to 1.20m bgl. No groundwater strikes recorded during progression of exploratory hole.

AGS

Appendix C – Chemical Analysis Results

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

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 21/04938
Issue Number: 1 **Date:** 19 May, 2021

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

Project Manager: Matthew Holroyd
Project Name: Heyrod Street
Project Ref: B075424
Order No: EBMA2866
Date Samples Received: 06/05/21
Date Instructions Received: 07/05/21
Date Analysis Completed: 19/05/21

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 21/04938

Client Project Name: Heyrod Street

Client Project Ref: B075424

Lab Sample ID	21/04938/1	21/04938/2	21/04938/3	21/04938/4	21/04938/5	21/04938/6	21/04938/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS05	WS06	WS06	WS04	WS03	WS02			
Depth to Top	0.70	0.50	0.40	1.00	0.40	0.70	2.30			
Depth To Bottom										
Date Sampled	04-May-21	04-May-21	05-May-21	05-May-21	05-May-21	04-May-21	04-May-21			
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6A	7	6A	6A	6A	6A	3			
% Stones >10mm$_A$	10.8	<0.1	2.7	1.9	5.7	37.8	<0.1	% w/w	0.1	A-T-044
pH$_D$[M#]	8.11	8.44	8.00	7.56	7.98	7.91	8.42	pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$[M#]	0.02	1.31	0.36	0.37	1.73	0.11	<0.01	g/l	0.01	A-T-026s
Cyanide (total)$_A$[M#]	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	0.2	A-T-050s
Organic matter$_D$[M#]	5.4	1.2	4.7	34.2	14.1	4.0	1.3	% w/w	0.1	A-T-032 OM
Arsenic$_D$[M#]	15	6	17	72	10	27	<1	mg/kg	1	A-T-024s
Boron (water soluble)$_D$	<1.0	1.5	1.8	1.4	2.3	<1.0	<1.0	mg/kg	1	A-T-027s
Cadmium$_D$[M#]	0.7	<0.5	1.4	1.2	0.8	1.6	0.9	mg/kg	0.5	A-T-024s
Copper$_D$[M#]	55	43	154	126	61	2540	43	mg/kg	1	A-T-024s
Chromium$_D$[M#]	30	9	44	26	46	57	33	mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-040s
Lead$_D$[M#]	161	258	708	167	181	349	15	mg/kg	1	A-T-024s
Mercury$_D$	1.13	0.82	0.42	0.79	0.49	0.78	<0.17	mg/kg	0.17	A-T-024s
Nickel$_D$[M#]	27	10	39	36	28	28	40	mg/kg	1	A-T-024s
Selenium$_D$[M#]	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-024s
Zinc$_D$[M#]	57	72	155	67	104	246	67	mg/kg	5	A-T-024s

Envirolab Job Number: 21/04938

Client Project Name: Heyrod Street

Client Project Ref: B075424

Lab Sample ID	21/04938/1	21/04938/2	21/04938/3	21/04938/4	21/04938/5	21/04938/6	21/04938/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS05	WS06	WS06	WS04	WS03	WS02			
Depth to Top	0.70	0.50	0.40	1.00	0.40	0.70	2.30			
Depth To Bottom										
Date Sampled	04-May-21	04-May-21	05-May-21	05-May-21	05-May-21	04-May-21	04-May-21			
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6A	7	6A	6A	6A	6A	3			
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_D^{\#}$	NAD	Chrysotile	NAD	NAD	NAD	NAD	NAD			A-T-045
Asbestos Matrix (microscope)$_D$	-	Loose Fibres	-	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_D$	N/A	N/A	N/A	N/A	N/A	N/A	N/A			A-T-045
Asbestos in Soil Quantification % (Hand Picking & Weighing)										
Asbestos in soil % composition (hand picking and weighing)$_D$	-	<0.001	-	-	-	-	-	% w/w	0.001	A-T-054

Envirolab Job Number: 21/04938

Client Project Name: Heyrod Street

Client Project Ref: B075424

Lab Sample ID	21/04938/1	21/04938/2	21/04938/3	21/04938/4	21/04938/5	21/04938/6	21/04938/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS05	WS06	WS06	WS04	WS03	WS02			
Depth to Top	0.70	0.50	0.40	1.00	0.40	0.70	2.30			
Depth To Bottom										
Date Sampled	04-May-21	04-May-21	05-May-21	05-May-21	05-May-21	04-May-21	04-May-21			
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6A	7	6A	6A	6A	6A	3			
PAH-16MS (MSD order)										
Naphthalene$_A^{M\#}$	<0.03	0.33	<0.03	<0.03	<0.03	0.03	0.13	mg/kg	0.03	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	mg/kg	0.01	A-T-019s
Acenaphthene$_A^{M\#}$	<0.01	0.75	0.07	<0.01	0.05	0.02	0.08	mg/kg	0.01	A-T-019s
Fluorene$_A^{M\#}$	<0.01	0.45	0.04	<0.01	0.03	0.04	0.06	mg/kg	0.01	A-T-019s
Phenanthrene$_A^{M\#}$	0.12	4.28	0.61	<0.03	0.36	0.22	0.17	mg/kg	0.03	A-T-019s
Anthracene$_A^{M\#}$	0.03	0.77	0.14	<0.02	0.08	0.09	0.02	mg/kg	0.02	A-T-019s
Fluoranthene$_A^{M\#}$	0.21	2.54	1.01	<0.08	0.51	0.34	<0.08	mg/kg	0.08	A-T-019s
Pyrene$_A^{M\#}$	0.26	2.32	0.94	<0.07	0.47	0.41	<0.07	mg/kg	0.07	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.17	1.10	0.48	<0.04	0.23	0.30	<0.04	mg/kg	0.04	A-T-019s
Chrysene$_A^{M\#}$	0.21	1.16	0.63	<0.06	0.29	0.31	<0.06	mg/kg	0.06	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.22	0.77	0.54	<0.05	0.27	0.30	<0.05	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	0.27	0.24	<0.07	0.12	0.11	<0.07	mg/kg	0.07	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.20	0.72	0.55	<0.04	0.24	0.32	<0.04	mg/kg	0.04	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.11	0.22	0.26	<0.03	0.13	0.14	<0.03	mg/kg	0.03	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	0.07	0.05	<0.04	<0.04	<0.04	<0.04	mg/kg	0.04	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.13	0.21	0.24	<0.05	0.13	0.14	<0.05	mg/kg	0.05	A-T-019s
Total PAH-16MS (MSD order)$_A^{M\#}$	1.66	16	5.80	<0.08	2.91	2.79	0.46	mg/kg	0.03	A-T-019s

Envirolab Job Number: 21/04938

Client Project Name: Heyrod Street

Client Project Ref: B075424

Lab Sample ID	21/04938/1	21/04938/2	21/04938/3	21/04938/4	21/04938/5	21/04938/6	21/04938/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS05	WS06	WS06	WS04	WS03	WS02			
Depth to Top	0.70	0.50	0.40	1.00	0.40	0.70	2.30			
Depth To Bottom										
Date Sampled	04-May-21	04-May-21	05-May-21	05-May-21	05-May-21	04-May-21	04-May-21			
Sample Type	Soil - ES	Solid	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES			
Sample Matrix Code	6A	7	6A	6A	6A	6A	3			
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<1	<1	<1	<1	<1	6	<1	mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	<1	<1	<1	<1	26	<1	mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	<1	2	<1	<1	<1	2	<1	mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	1	2	<1	<1	1	11	<1	mg/kg	1	A-T-055s
Ali >C21-C35$_A^{M\#}$	7	36	14	2	8	72	4	mg/kg	1	A-T-055s
Total Aliphatics$_A$	8	40	14	2	9	118	4	mg/kg	1	A-T-055s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	1	1	1	<1	1	2	<1	mg/kg	1	A-T-055s
Aro >C10-C12$_A$	<1	3	<1	<1	<1	9	<1	mg/kg	1	A-T-055s
Aro >C12-C16$_A$	2	29	2	<1	2	5	<1	mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	5	103	8	1	3	13	<1	mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	33	217	39	7	14	40	4	mg/kg	1	A-T-055s
Total Aromatics$_A$	41	353	51	9	21	70	4	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	49	393	65	11	30	188	7	mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	0.01	A-T-022s

Envirolab Job Number: 21/04938

Client Project Name: Heyrod Street

Client Project Ref: B075424

Lab Sample ID	21/04938/8	21/04938/9	21/04938/10					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS02	WS03	WS02							
Depth to Top	0.60	1.70	1.80							
Depth To Bottom										
Date Sampled	04-May-21	04-May-21	04-May-21							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	6A	6A							
% Stones >10mm$_A$	17.9	3.9	2.9					% w/w	0.1	A-T-044
pH$_D$$^{M\#}$	8.04	8.15	8.09					pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.03	0.25	0.19					g/l	0.01	A-T-026s
Cyanide (total)$_A$$^{M\#}$	<1	<1	3					mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2	<0.2	0.4					mg/kg	0.2	A-T-050s
Organic matter$_D$$^{M\#}$	11.4	15.3	25.0					% w/w	0.1	A-T-032 OM
Arsenic$_D$$^{M\#}$	31	145	36					mg/kg	1	A-T-024s
Boron (water soluble)$_D$	<1.0	1.7	2.2					mg/kg	1	A-T-027s
Cadmium$_D$$^{M\#}$	1.5	2.3	1.5					mg/kg	0.5	A-T-024s
Copper$_D$$^{M\#}$	126	18900	148					mg/kg	1	A-T-024s
Chromium$_D$$^{M\#}$	27	162	70					mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1					mg/kg	1	A-T-040s
Lead$_D$$^{M\#}$	300	1480	308					mg/kg	1	A-T-024s
Mercury$_D$	1.35	1.63	2.11					mg/kg	0.17	A-T-024s
Nickel$_D$$^{M\#}$	34	52	39					mg/kg	1	A-T-024s
Selenium$_D$$^{M\#}$	<1	<1	<1					mg/kg	1	A-T-024s
Zinc$_D$$^{M\#}$	163	1570	81					mg/kg	5	A-T-024s

Envirolab Job Number: 21/04938

Client Project Name: Heyrod Street

Client Project Ref: B075424

Lab Sample ID	21/04938/8	21/04938/9	21/04938/10					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS02	WS03	WS02							
Depth to Top	0.60	1.70	1.80							
Depth To Bottom										
Date Sampled	04-May-21	04-May-21	04-May-21							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	6A	6A							
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_{D}^{\#}$	NAD	NAD	NAD							A-T-045
Asbestos ACM - Suitable for Water Absorption Test?$_{D}$	N/A	N/A	N/A							A-T-045

Envirolab Job Number: 21/04938

Client Project Name: Heyrod Street

Client Project Ref: B075424

Lab Sample ID	21/04938/8	21/04938/9	21/04938/10					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS02	WS03	WS02							
Depth to Top	0.60	1.70	1.80							
Depth To Bottom										
Date Sampled	04-May-21	04-May-21	04-May-21							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	6A	6A							
PAH-16MS (MSD order)										
Naphthalene$_A^{M\#}$	0.50	0.06	276					mg/kg	0.03	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	0.12					mg/kg	0.01	A-T-019s
Acenaphthene$_A^{M\#}$	0.27	0.05	177					mg/kg	0.01	A-T-019s
Fluorene$_A^{M\#}$	0.19	0.06	100					mg/kg	0.01	A-T-019s
Phenanthrene$_A^{M\#}$	3.94	0.28	220					mg/kg	0.03	A-T-019s
Anthracene$_A^{M\#}$	0.67	0.09	28.3					mg/kg	0.02	A-T-019s
Fluoranthene$_A^{M\#}$	7.38	0.30	24.2					mg/kg	0.08	A-T-019s
Pyrene$_A^{M\#}$	7.92	0.26	15.1					mg/kg	0.07	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	3.14	0.14	2.24					mg/kg	0.04	A-T-019s
Chrysene$_A^{M\#}$	3.84	0.13	2.04					mg/kg	0.06	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	1.88	0.13	0.96					mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.67	<0.07	0.34					mg/kg	0.07	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	1.59	0.12	0.76					mg/kg	0.04	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.56	0.06	0.32					mg/kg	0.03	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.13	<0.04	0.09					mg/kg	0.04	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	0.51	0.08	0.31					mg/kg	0.05	A-T-019s
Total PAH-16MS (MSD order)$_A^{M\#}$	33.2	1.76	848					mg/kg	0.03	A-T-019s

Envirolab Job Number: 21/04938

Client Project Name: Heyrod Street

Client Project Ref: B075424

Lab Sample ID	21/04938/8	21/04938/9	21/04938/10					Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS02	WS03	WS02							
Depth to Top	0.60	1.70	1.80							
Depth To Bottom										
Date Sampled	04-May-21	04-May-21	04-May-21							
Sample Type	Soil - ES	Soil - ES	Soil - ES							
Sample Matrix Code	6A	6A	6A							
TPH CWG										
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	0.03					mg/kg	0.01	A-T-022s
Ali >C8-C10$_A$	<1	3	<10					mg/kg	1	A-T-055s
Ali >C10-C12$_A^{M\#}$	<1	1	36					mg/kg	1	A-T-055s
Ali >C12-C16$_A^{M\#}$	2	4	76					mg/kg	1	A-T-055s
Ali >C16-C21$_A^{M\#}$	2	6	41					mg/kg	1	A-T-055s
Ali >C21-C35$_A^{M\#}$	14	44	80					mg/kg	1	A-T-055s
Total Aliphatics$_A$	19	58	232					mg/kg	1	A-T-055s
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	0.03					mg/kg	0.01	A-T-022s
Aro >C8-C10$_A$	3	3	84					mg/kg	1	A-T-055s
Aro >C10-C12$_A$	18	3	1180					mg/kg	1	A-T-055s
Aro >C12-C16$_A$	28	10	2670					mg/kg	1	A-T-055s
Aro >C16-C21$_A^{M\#}$	67	43	1680					mg/kg	1	A-T-055s
Aro >C21-C35$_A^{M\#}$	249	109	307					mg/kg	1	A-T-055s
Total Aromatics$_A$	365	167	5920					mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35)$_A$	384	225	6150					mg/kg	1	A-T-055s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	0.03					mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	0.35					mg/kg	0.01	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	0.54					mg/kg	0.01	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	0.62					mg/kg	0.01	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-022s

REPORT NOTES

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

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

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

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

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

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
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

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: Heyrod Street

Clients Project No: B075424

Project No: 21/04938

Date Received: 07/05/2021 (am)

Cool Box Temperatures (°C): 6.0

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.

Appendix D – 'Residential with Plant Uptake' Screening Criteria for Imported Capping Materials

Adopted Soil Generic Assessment Criteria
Sandy loam with 6% SOM

curtins

Contaminants	Residential with home grown produce	Residential without 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 *(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* 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						
Aliphatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_6	*160*	*160*	*3900*	*12000*	*600000*	*180000*
$EC_{>6}$ - EC_8	*530*	*530*	*13000*	*40000*	*620000*	*320000*
$EC_{>8}$ - 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*
$EC_{>16}$ - EC_{35}	*110000*	*110000*	*270000*	*1800000*	*250000*	*490000*
$EC>_{35}$ - EC_{44}	*110000*	*110000*	*270000*	*1800000*	*250000*	*490000*
Aromatic risk banded hydrocarbons - TPHCWG method						
$EC>_5$ - EC_7	*300*	*1400*	*57*	*86000*	*56000*	*92000*
$EC>_7$ - EC_8	*660*	*3900*	*120*	*180000*	*56000*	*100000*
$EC_{>8}$ - 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*
$EC_{>16}$ - 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*
Tetrachlorethene (PCE)	*0.90*	*0.92*	*3.6*	*95*	*1400*	*1500*
1,1,1 Trichlorethane	*39*	*40*	*240*	*3000*	*140000*	*100000*

Notes

1. All values above are in mg/kg
2. **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
3. Soil organic matter (SOM) is assumed to be 6% - DEFAULT VALUE
4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
5. 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
6. 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
7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m^{-3}
8. Based on vapour saturation limt as suggested by EA / [ ] model value
9. Lowest of o-, m- and p-xylene
10. Based on comparison of inhalation exposure with inhalation TDI
11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only
13. Averaged over and based on lifetime exposure
14. 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)
15. NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 2.5% SOM

curtins

Contaminants	Residential with home grown produce	Residential without 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 *(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* 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						
Aliphatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - 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*
Aromatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - 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
Aromatic						
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*)
Polycyclic Aromatic Hydrocarbons (PAH)						
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*
Tetrachlorethene (PCE)	*0.39*	*0.4*	*1.5*	*42*	*1400*	*1100*
1,1,1 Trichlorethane	*18*	*18*	*110*	*1300*	*140000*	*76000*

Notes

1. All values above are in mg/kg
2. **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
3. Soil organic matter (SOM) is assumed to be 2.5% - DEFAULT VALUE
4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
5. 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
6. 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
7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m^{-3}
8. Based on vapour saturation limt as suggested by EA / [ ] model value
9. Lowest of o-, m- and p-xylene
10. Based on comparison of inhalation exposure with inhalation TDI
11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only
13. Averaged over and based on lifetime exposure
14. 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)
15. NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 1% SOM

curtins

Contaminants	Residential with home grown produce	Residential without 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 *(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* 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						
Aliphatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_6	*42*	*42*	*730*	*3200*	*570000*	*95000*
$EC_{>6}$ - EC_8	*100*	*100*	*2300*	*7800*	*600000*	*150000*
$EC_{>8}$ - EC_{10}	*27*	*27*	*320*	*2000*	*13000*	*14000*
EC_{10}-EC_{12}	*130*	*130*	*2200*	*9700*	*13000*	*21000*
EC_{12}-EC_{16}	*1100*	*1100*	*11000*	*59000*	*13000*	*25000*
$EC_{>16}$ - EC_{35}	*65000*	*65000*	*260000*	*1600000*	*250000*	*450000*
$EC_{>35}$ - EC_{44}	*65000*	*65000*	*260000*	*1600000*	*250000*	*450000*
Aromatic risk banded hydrocarbons - TPHCWG method						
$EC_{>5}$ - EC_7	*70*	*370*	*13*	*26000*	*56000*	*76000*
$EC_{>7}$ - EC_8	*130*	*860*	*22*	*56000*	*56000*	*87000*
$EC_{>8}$ - EC_{10}	*34*	*47*	*8.6*	*3500*	*5000*	*7200*
EC_{10} - EC_{12}	*74*	*250*	*13*	*16000*	*5000*	*9200*
EC_{12} - EC_{16}	*140*	*1800*	*23*	*36000*	*5100*	*10000*
$EC_{>16}$ - EC_{21}	*260*	*1900*	*46*	*28000*	*3800*	*7600*
$EC_{>21}$ - EC_{35}	*1100*	*1900*	*370*	*28000*	*3800*	*7800*
$EC_{>35}$ - 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*
Tetrachlorethene (PCE)	*0.18*	*0.18*	*0.65*	*19*	*1400*	*810*
1,1,1 Trichlorethane	*8.8*	*9*	*48*	*660*	*140000*	*57000*

Notes

1. All values above are in mg/kg
2. **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
3. Soil organic matter (SOM) is assumed to be 1% - DEFAULT VALUE
4. Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
5. 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
6. 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
7. For classrooms consider increasing the dust loading fator in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m^{-3}
8. Based on vapour saturation limt as suggested by EA / [ ] model value
9. Lowest of o-, m- and p-xylene
10. Based on comparison of inhalation exposure with inhalation TDI
11. Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
12. Based on a comparison of oral and dermal soil exposure with oral Index Dose only
13. Averaged over and based on lifetime exposure
14. 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)
15. NA: Not applicable

Appendix E – Ground Gas Monitoring Results

Curtins
Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
Tel: 0161 236 2394
Fax: 0161 228 7902

GAS MONITORING LOG SHEET

Project:	Heyrod Street	**Date:**	14/05/2021
Job Number:	B075424	**Visit:**	1
Client:	Packaged Living	**Weather:**	Overcast
Barometric State:	Rising	**Ground Conditions:**	Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
WS01	1006	0.0	0.0	0.0	0.0	0.1	0.1	20.4	1	1	-	3.57	**1**
WS02	1005	0.0	0.0	0.0	0.0	0.0	0.0	20.7	1	4	-	2.35	1
WS05	1004	0.0	0.0	0.0	0.0	3.7	3.7	17.4	0	0	-	5.09	1
WS06	1004	0.0	0.0	0.0	0.0	1.2	1.2	17.0	0	0	-	1.40	1
BH01	1004	-2.7	-2.3	0.0	0.0	5.2	5.2	12.2	12	68	-	-	1,2

Notes

1 - Unable to determine groundwater level due to instrument failure.
2 - Steady state air flow rate recorded after 3 minutes.

Logged by

MH

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

Curtins
Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
Tel: 0161 236 2394
Fax: 0161 228 7902

GAS MONITORING LOG SHEET

Project:	Heyrod Street	**Date:**	18/05/2021
Job Number:	B075424	**Visit:**	2
Client:	Packaged Living	**Weather:**	Sunny/Cloudy
Barometric State:	Steady	**Ground Conditions:**	Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
WS01	1008	0.0	0.0	0.0	0.0	0.0	0.0	20.90	2	1	1.42	3.58	1
WS02	1008	0.0	0.0	0.0	0.0	0.0	0.0	20.80	2	1	1.46	2.38	1
WS05	1006	0.0	0.0	0.0	0.0	4.1	4.1	17.10	0	1	4.96	5.05	
WS06	1006	0.0	0.0	0.0	0.0	1.3	1.3	17.20	0	0	Dry	1.42	
BH01	1008	-4.3	-3.6	0.0	0.0	4.0	4.0	14.10	10	41	20.64	35.34	1,2

Notes

1 - Monitoring well developed.
2 - Steady state air flow rate recorded after 8 minutes. Steady state gas concentrations recorded after 5 minutes.

Logged by

MH

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

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Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
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GAS MONITORING LOG SHEET

Project:	Heyrod Street	**Date:**	24/05/2021
Job Number:	B075424	**Visit:**	3
Client:	Packaged Living	**Weather:**	Sunny
Barometric State:	Rising	**Ground Conditions:**	Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
WS01	998	0.0	0.0	0.0	0.0	0.0	0.0	20.8	1	1	3.12	3.58	
WS02	998	0.1	0.0	0.0	0.0	0.1	0.1	20.6	1	2	1.58	2.38	
WS05	998	0.0	0.0	0.0	0.0	4.8	4.8	16.2	1	2	4.61	5.04	
WS06	997	0.0	0.0	0.0	0.0	1.7	1.7	16.1	0	0	Dry	1.42	
BH01	997	0.0	0.0	0.0	0.0	0.1	0.1	21.0	0	1	20.60	35.02	1

Notes

1 - Bailer dropped into monitoring well, could not be recovered.

Logged by

MH

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

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Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
Tel: 0161 236 2394
Fax: 0161 228 7902

GAS MONITORING LOG SHEET

Project:	Heyrod Street	**Date:**	10/06/2021
Job Number:	B075424	**Visit:**	4
Client:	Packaged Living	**Weather:**	Sunny
Barometric State:	Falling	**Ground Conditions:**	Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
WS01	1015	0.0	0.0	0.0	0.0	0.1	0.1	20.7	0	1	2.83	3.85	
WS02	1017	0.0	0.0	0.0	0.0	0.2	0.2	20.4	1	4	1.76	2.40	
WS05	1015	0.0	0.0	0.0	0.0	7.3	7.3	11.6	3	2	4.60	5.08	
WS06	1013	0.0	0.0	0.0	0.0	0.9	0.9	19.2	2	2	Dry	1.41	
BH01	1015	0.0	0.0	0.0	0.0	2.2	2.2	18.0	1	2	20.67	33.90	

Notes

Logged by

MH

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

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Fax: 0161 228 7902

GAS MONITORING LOG SHEET

Project:	Heyrod Street	**Date:**	17/06/2021
Job Number:	B075424	**Visit:**	5
Client:	Packaged Living	**Weather:**	Overcast
Barometric State:	Rising	**Ground Conditions:**	Dry

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
WS01	1007	0.0	0.0	0.0	0.0	0.0	0.0	20.7	1	1	2.73	3.57	
WS02	1008	0.0	0.0	0.0	0.0	0.4	0.4	20.2	0	2	1.81	2.44	
WS05	1006	0.0	0.0	0.0	0.0	8.6	8.6	9.5	2	1	4.44	5.09	
WS06	1006	0.0	0.0	0.0	0.0	0.8	0.8	19.6	2	1	Dry	1.40	
BH01	1008	0.0	0.0	0.0	0.0	16.3	16.2	7.7	1	2	20.65	34.12	1

Notes

1 - Returned 10 minutes after recording water level, CO2 concentrations recorded at 5.2% v/v after 7 minutes of monitoring. O2 concentration of 16%.

Logged by

MH

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

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Merchant Exchange, 17-19 Whitworth Street West, Manchester, M1 5WG
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Fax: 0161 228 7902

GAS MONITORING LOG SHEET

Project:	Heyrod Street	**Date:**	25/06/2021
Job Number:	B075424	**Visit:**	6
Client:	Packaged Living	**Weather:**	Light Rain
Barometric State:	Steady	**Ground Conditions:**	Wet

Borehole Reference	Barometric Pressure mb	Flow l/hr		Methane %		Carbon Dioxide %		Oxygen %	Hydrogen Sulphide ppm	Carbon Monoxide ppm	Water Level m bgl	Borehole Base m bgl	Note
		Max	SS	Max	SS	Max	SS						
WS01	1012	0.0	0.0	0.0	0.0	0.0	0.0	20.8	2	2	-	2.56	
WS02	1012	0.0	0.0	0.9	0.9	0.7	0.7	19.5	2	2	21.4	1.92	
WS05	1012	0.0	0.0	0.0	0.0	9.3	9.3	8.7	1	2	-	4.44	
WS06	1011	0.0	0.0	0.0	0.0	1.5	1.5	17.5	0	0	-	Dry	
BH01	1012	0.5	0.5	0.0	0.0	11.6	11.6	11.0	2	1	-	20.67	

Notes

1 - Returned 10 minutes after recording water level, CO2 concentrations recorded at 5.2% v/v after 7 minutes of monitoring. O2 concentration of 16%.

Logged by

MH

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

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
11 Pembroke Lane
Dublin 2
Ireland
D02 CX82
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
Units 24 & 25 Riverside Place
K Village
Lound Road
Kendal
LA9 7FE
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

Registered in England and Wales number: 2054159
Registered office: 51-55 Tithebarn Street, Liverpool, L2 2SB