



Contaminated Land Remediation and Verification Plan for proposed residential development at Land Off Chapel Street, Manchester, M19 3QB.

Prepared for

Burke Developments Ltd,
Norwood,
Greenacres,
Oldham,
OL4 3EX.

Amended November 2024



Contents

1. Introduction	3
The Site:	3
Site use:	3
2. Previous Investigations	4
Phase I and Initial Phase II findings	4
The Phase II additional Intrusive Investigation	4
Further Investigations.....	5
Ground gas.....	6
3. Proposed Remediation	7
Ground Gas	7
On-site contamination	9
Impact on the Water-table	9
4. Verification of Measures.....	11
Gas Membrane:.....	11
Installation of Services:.....	11
Clean Cover System:.....	11
5. Verification Report	13
Figure 1 – Aerial Photograph	14
Figure 2 – Foundation design.....	15



1. Introduction

- 1.1. This report provides a summary of the findings from previous investigations on land off Chapel Street, Manchester and to provide a strategy for remediation and verification of the site to ensure it is safe and suitable for use and does not present any significant risk of significant harm to identified receptors.

The Site:

Site Address: 7-9 Chapel Street, Manchester, M19 3QB.

Grid reference: 387486; 394216

An aerial photograph of the site is included in Figure 1.

Site use:

- 1.2. The site was previously an industrial site consisting of metal engineering works. The buildings have now been demolished and the site cleared. The Proposed development consists of the erection of eight two storey dwellings with gardens.



2. Previous Investigations

Phase I and Initial Phase II findings

- 2.1. The site was first developed between 1849-1892 with a Mission Room in the centre of the site. By 1905-11 the site had been redeveloped with a smithy to the western section. By 1956 the site is an engineering works, later redeveloped between 1968-1981. Off site a reservoir was identified ~100m to the south of the site from 1893 until 1956 when the carpet mill was redeveloped into a saw mill and later a church. A house estate was erected on the northern section opposite the site in 2018. A large electricity sub-station was located to the south 40m away on Elbow Street from 1907.
- 2.2. The initial phase II investigation consisted of a series of trail holes across the site. These identified elevated levels of contaminations in five areas as indicated in the report and the plan in figure 2.

The Phase II additional Intrusive Investigation

- 2.3. A site visit was conducted on the 8th June 2024 to undertake an intrusive investigation. The site had been cleared at the time of the visit with previous buildings demolished. A sampling program of 18 sample locations, identified in Figure 2, spread across the site at approximately 10m centres were undertaken. Some of these were located adjacent to the previously sampled locations. Both rounds of sampling are shown on the plan in Figure 3.
- 2.4. The samples were sent to Chemtech environmental a UKAS and MCERTs laboratory and each analysed for heavy metals, Total Petroleum Hydrocarbons (TPH) and Polyaromatic Hydrocarbons (PAH), and Asbestos.
- 2.5. The demolition of the buildings on site had also seen the removal of the concrete hardstanding across the site.
- 2.6. Elevated levels of Arsenic were identified from the second round of monitoring in TP4a and TP11a, and in the first round at TP5a and 8a. TP4 & 5 were in similar locations to the southeast of the site.



- 2.7. In addition, elevated lead levels were encountered across the centre of the site (front to back) In TP5, 7-12 15 & 16 during the second investigation which mirrored the first round with the exception of the northwest corner where elevated lead was found in the first round.
- 2.8. Elevated Total Petroleum Hydrocarbons (TPH) were identified in TP6 during the first round and TP11, 13 & 15 in the second.
- 2.9. Elevated Polyaromatic Hydrocarbons levels were identified in TP1B, 3A, 5A and 6A (i.e. surface levels) during the first phase of investigation. During the second-round elevated levels were encountered in TP 4, 8-13, 16 & 18. These correspond to the first round plus some additional areas. Predominantly the central strip of the site to dorm the roadway and the western corners.

Further Investigations

- 2.10. Since the above results were obtained further made ground has been removed from site, particularly across the centre of the site covering the above TP 5, 7-12, 15-16 locations. Confirmation of site levels and foundation designs have been made.
- 2.11. On the 2nd September 2024 a further site visit was made, the aim to verify removal of additional contaminated material in the centre of the site. A total of eight samples were taken from across the side walls and base of the excavation. These were sent to Chemtech Environmental Limited laboratories for analysis. The samples were tested for the heavy metals, Polyaromatic hydrocarbons, total petroleum hydrocarbons and asbestos.
- 2.12. Anecdotally the made ground had been removed down to clean clay.
- 2.13. The full sampling results are presented in Appendix 1, the sampling locations in Figure 4. The results have been compared against the LQM/CIEH S4UL's for a residential without homegrown produce scenario & the C4SL value for Lead. Soil organic matter varied across the site from 2.4-5.5%.
- 2.14. Details of each trail pits, including photographs are shown in Appendix 2. Material comprised of clay with gravel.



- 2.15. The results of the samples identified no asbestos fibres, no elevated levels of heavy metals, no elevated levels of total Petroleum Hydrocarbons.
- 2.16. No elevated levels of Polyaromatic hydrocarbons were identified with the exception of the very front entrance to the site (300mm from the boundary) under the proposed entrance road. when compared against the residential with home grown produce criterion.
- 2.17. No odour was identified at the time of the visit. (previously odours had been identified in tis area of hydrocarbon and an amount of tar impregnated wooden timbers was removed as part of the excavation of the area).

Ground gas

- 2.18. The preliminary desk study report identified infilled ground in the vicinity of the site from historically filled reservoirs, the last infilled in the 1950's, 70yrs previously. The report concluded that it was unlikely ground gas would still be produced after such an elapse of time and the risk from ground gas affecting the site was low.
- 2.19. Additional research identified a recent planning application for a mill/engineering site to the south and on/adjacent to the former reservoir, redeveloped in the early 1950's. (Planning application 113618/FO/2016 & CDN/17/0092). Gas monitoring undertaken at this site identified no ground gas, no elevated levels of methane or carbon dioxide and a site characteristic gas situation of CS1 / Green was determined.



3. Proposed Remediation

- 3.1. The proposed remediation plan has been formulated following the works undertaken on site, and detailed above and in accordance with the Councils technical guidance note.

Ground Gas

- 3.2. Research into nearby development sites has identified no ground gas emissions, however the original phase I report did recommend precautionary ground gas protection measures.
- 3.3. In addition, the further work undertaken in September resulted in the removal of the hydrocarbon contamination identified on site. Excavations to remove contaminated soil from below the building footprints was undertaken in September and clean clay was identified below the made ground across the site. The excavated areas were backfilled with clean imported hardcore.
- 3.4. However, the precautionary inclusion of gas protection measures is still considered appropriate. Given the findings detailed in report 2813-1 ground gas protection measures for a characteristic situation CS2 have been identified. The membrane installed to include protection against the ingress of VOC vapours as well as Methane and Carbon Dioxide.
- 3.5. Since the last report foundation designs have been changed and the dwelling will now be built with a beam and block floor. A minimum 200mm clear void cavity will be left below the floor and sufficient air bricks will be provided to an equivalent 2000mm²/m. With a Visqueen Ultimate HC BLOK membrane installed over the beam and block floor, insulation and screen above.
- 3.6. The above design specification has been considered in respect to BS8485:2015 and for the proposed development, type A private dwelling the design provides

a gas protection score of 4.5 suitable for a CS3 level of protection, thus exceeding the identified requirement of CS2 for the site.

Element	Details	Gas Protection Score
Structural Barrier	Beam & Block	0.0
Passive sub-floor dispersal layer	>200mm clear void	2.5
Gas resistant membrane	Visqueen Ultimate HC Blok, installed by specialist company	2.0
Total		4.5 (CS3)

- 3.7. Further to comments from the Council on the suitability and qualifications of the membrane installers. The membrane is to be installed by a specialist independent company, who will install the membrane to the manufacturer's specifications. The membrane will be installed by suitably qualified and experienced operatives.
- 3.8. An independent verification of the gas membrane installation will be undertaken by Geoshield who will provide a separate verification report.
- 3.9. Minimal service penetrations will be included within the floor but where these do occur appropriate top-hat seals will be included. The membrane will be installed in accordance with the manufacturer's specifications including overlapping and sealing of the membrane sheets and lapping the membrane across the external cavity.



On-site contamination

- 3.10. The previous investigation identified slightly elevated levels of contamination within the ground around the proposed garden areas. As detailed within the reports.
- 3.11. It is proposed that a clean cover system be installed within the garden amenity areas of the site to break any pathway between residual contamination and human receptors. This will be provided using a minimum of 600mm of clean imported material into the rear garden areas for each property, 450mm to the front and any other soft landscaping areas.
- 3.12. The clean material will be placed over a geotextile “no dig barrier” to prevent movement of particles and to warn of potential contamination below.
- 3.13. Material for cover systems shall be purchased from a reputable supplier, the material will comprise of suitable growing medium for the site, with test certification to demonstrate it is free from contamination, the test certification should be provided at a ratio of 1 sample to every 50m³ of material if the origin of the material is brown field or unknown and 1 sample every 100m³ if the source is green field. Subject to the source, supplier and date of any testing consideration will also be given to sampling of material once on site to confirm the lack of any contamination.
- 3.14. This sampling will be undertaken prior to the material being laid within garden areas, enabling the material to be confirmed as clean before being installed.
- 3.15. In addition, any service trenches are to be backfilled with clean imported hardcore and not the excavated material. Mains water pipework will be installed using a MDPE barrier pipe to prevent any potential ingress of any contamination into the water supply.

Impact on the Water-table

- 3.16. No ground water has been identified during any of the works on site to date, while the weather has been relatively wet over the course of the year. Works on site have removed the majority of contamination from the site and a solid clean clay layer has been identified below the made ground across the site.



3.17. The impact on the water-table is therefore considered to be minimal.

Watching Brief

3.18. The previous reports have recommended that a watching brief be undertaken during the construction of the site to identify the presence of any unforeseen contamination.

3.19. All operatives on site have been given instruction to be vigilant, particularly during ground works for the signs of any contamination, unusual odours, colouring, staining or differing ground conditions. In addition, the site is regularly visited by both building control officers and the company offering the NHBC warranty for the development.

3.20. On discovery of any potential unforeseen contamination work will cease in that area of the site until advice has been sort, and a full investigation has been undertaken as required. Full details of the findings and work undertaken, sampling and remedial action will be recorded and details provided to the Local Authority.

3.21. Marytin Environmental Solutions will maintain an overview of the site and any excavations.



4. Verification of Measures

4.1. The following verification actions will be undertaken as part of the development.

Gas Membrane:

4.2. To be installed by a specialist company, with suitably qualified operatives (NVQ level 2 in gas protection installation or equivalent) and full verification of the installed membrane to be undertaken by an independent company (Geoshield) with a separate report produced confirming the membrane has been installed as per the manufacturer's instructions, with any repairs undertaken to a suitable standard.

Installation of Services:

4.3. Photographs of all trenches, back filling to be taken with appropriate paperwork for incoming aggregate. Photographic evidence of MDPE barrier pipework installation to be provided along with order/delivery notes.

Clean Cover System:

4.4. The clean cover system will be verified in two ways.

4.5. Firstly, material will be tested in accordance to the above sampling ratio depending on the source of the material. If allocated material can be secured, identified, allocated and separated before arrival to site analysis of the soil will be undertaken off-site in accordance to the Councils technical guidance document.

4.6. In the event that this is not possible analysis will be undertaken on-site. Imported material will be delivered and held in a secure, impervious area until sampling is undertaken and results obtained. The material will not be placed within garden areas until a confirmation that the material is clean has been received.

4.7. Once confirmed as contamination free the material will be placed over the geotextile no dig layer to a depth of 450/600mm as detailed above. Photographic evidence of the geotextile layer being installed will be obtained.



- 4.8. Testing of the imported material will consist of analysis of an appropriate number of representative samples from the material, in accordance with the above sampling ratio detailed in paragraph 3.13.
- 4.9. Obtained samples will be sent for analysis at a MCerts and UKAS accredited laboratory. Samples will be tested for the presence of heavy metals, Total Petroleum Hydrocarbons, Polyaromatic Hydrocarbons and asbestos.
- 4.10. Sample results will be compared to those produced by the CIEH/LQM for a residential with homegrown produce scenario.
- 4.11. Once cleared for use the material will be placed within the rear garden areas/soft landscaping areas as required. verification of cover depth will be undertaken by Martin Environmental Solutions. One check will be undertaken in each garden/soft landscaping area. These checks will comprise of a randomised trail hole to confirm the depth of cover material above the installed geotextile layer. Photographic evidence will be provided for each garden.



5. Verification Report

5.1. The verification report to be completed will include:

- Description of the site,
- Plans detailing the site location, boundary and dwellings and soft landscaping areas,
- Overview of site history and works undertaken, including waste transfer notes for any excavated material,
- Details and justification of any changes from the original planned remediation (above),
- Details of any unforeseen contamination encountered and the works undertaken to address it,
- Confirmation of remediation works undertaken,
- Confirmation of the gas membrane installation, include separate verification report and details of the installers,
- Photographic evidence of service trenches, delivery/order/transfer notes of clean hardcore used for backfill,
- Evidence of barrier pipework installation – delivery notes, photographic evidence,
- Details of the imported material, including the amount, original source location/type, supplying company, invoices/delivery notes, initial analysis results from the supplier, on-site analysis results and any actions taken if required,
- Details of sampling undertaken and copy of sampling results, interpretation of sampling results.
- Photographic evidence of geotextile “no dig” layer,
- Details of verification checks, in soft landscaping areas, depth of material and photographic evidence.
- Confirmation that the remediation objectives have been achieved.

Figure 1 – Aerial Photograph



Figure 2 – Foundation design

