

Carley Daines and Partners Limited

Consulting Civil and Structural Engineers

11 Bridgewater Road, Walkden, Worsley, Manchester M28 3JE
Tel: 0161 799 2720 Fax: 0161 790 3474
Email: mail@carleydaines.co.uk Web: www.carleydaines.co.uk

SITE ADJACENT TO DALTON AVENUE

FALLOWFIELD
MANCHESTER M14 7NR



PHASE 3 REMEDIATION STATEMENT

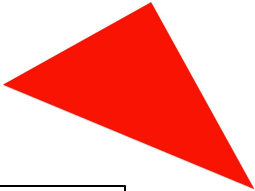
UNDERTAKEN FOR
MSV HOUSING

Ref:23-B-13509/Dalton Avenue

Revision A

April 2024

Principal: **D.J. Middleton BEng(Hons) CEng MStructE**
Company Number: **11006567**
Address **11 Bridgewater Road, Walkden, Worsley, Manchester M28 3JE**
VAT Number: **285 0439 91**



Report Title:	Dalton Avenue, Fallowfield, Manchester, M14 7NR
Report Reference:	23-B-13509
Revision:	A – 31.05.24
Client:	MSV Housing
Issue Date:	30th April 2024
Authorised By:	D.J. Middleton

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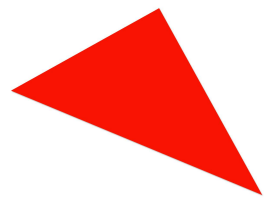
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1.0 INTRODUCTION

This report has been prepared at MSV Housing's request following the undertaking of the Phase 1 and 2 Site Investigations.

The site is located adjacent to Dalton Avenue, Fallowfield, at approximate National Grid Reference 384370, 394810 and at post code M14 7NR.

2.0 PROPOSED DEVELOPMENT

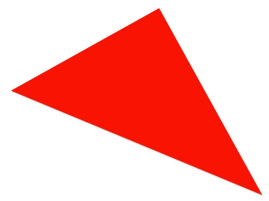
Plans that have been made available to us indicate that the site is to be developed with 8 flats in 4 individual blocks plus associated access, drainage, services and parking infrastructure.

3.0 PHASE 1 INVESTIGATION

Phase 1 and Phase 2 investigations have been undertaken by Messrs Carley Daines and Partners Ltd. The final Phase 2 report is dated 2nd October 2023.

A summary of the Phase 1 investigation is as follows:-

- The site is almost rectangular in shape, with maximum dimensions of approximately 50m x 13m. The site is enclosed on the north, west and south sides by terraced housing fronting onto Dalton Avenue and Thornton Avenue. To the east is a school with open ground and playing fields closest to the site.
- The site is presently occupied by two adjoining buildings used for light industry or vehicle maintenance.
- The site has an area of 500m² and is level at an altitude of 32mAOD.
- The future development requires demolition of the existing buildings.
- Much of the surrounding area is primarily residential comprising older terraced housing.
- The Coal Authority Report indicates that the site is outside a known mining area.
- There are numerous areas of infilled ground, both directly adjacent to the site and nearby that could contain uncontrolled and potentially contaminated material.



4.0 PHASE 2 SITE INVESTIGATION

The Phase 2 Ground Investigation was based on 3 boreholes to a maximum depth of 5.0m yielding soil samples for laboratory testing.

Testing was carried out on soil samples selected from trial pits and window sample holes. Tests were undertaken for the following contaminants:

- Heavy metals/metals
- PAH (USEPA16)
- Asbestos
- TPH

Contamination testing indicated some exceedances were encountered in respect of Lead, PAH and TPH and believed to be typical of light engineering and motor trade activities with a possible source being spilt fuels and oil.

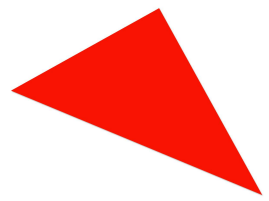
The report recommended that gas monitoring be undertaken.

5.0 REMEDIATION STRATEGY

5.1 IN-GROUND CONTAMINATION

Following a review of the Phase 2 Site Investigation, and comparison with published sources, it is our opinion that the identified elevated levels of soil contamination are sufficient to pose a threat to future health but should not be considered to be as very high or dangerous levels.

Generally, it is widely accepted that there is a significant factor of safety built into maximum soil contamination levels, and the recorded levels are typically elevated above safe levels, rather than being many orders of magnitude greater.



The site post development will be almost totally covered by hard surfacing and buildings, and in these areas there will be no mechanism for a direct contact pollutant linkage. Therefore, the risk to end-users of the site will be negligible.

Elsewhere, the small areas of soft landscaping will not form private gardens and will not be suitable for home grown produce.

Therefore, a full 600mm thick clean capping layer is not proposed to these areas and a 450mm clean capping is considered to be sufficient.

We would recommend that the capping layer should consist of:

- An upper layer of 150mm of clean inert topsoil
- A lower layer of 300mm of clean inert subsoil

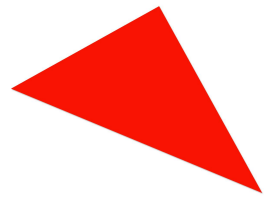
However, the potential for higher or differing levels of contamination exists on site away from sample positions and therefore a watching brief should be maintained to record any unexpected or obviously elevated levels of additional contamination.

The watching brief should be undertaken by this firm or other suitably qualified equivalent professional firm. In the event that contamination is identified or suspected, notification should be by the contractor's on-site personnel as soon as possible.

6.0 GROUND GASES

The monitoring boreholes were installed with ground gas monitoring wells, with response zones set within the made ground.

The assessment of potential ground gas generation was based on the observation of trends and changes in gas evolution by the direct measurement of ground gases from gas wells. The works



included measurement of methane, carbon dioxide, oxygen, hydrogensulphide, carbon monoxide, gas flows and barometric pressure.

The potential pathways into the building are:

- Horizontal and vertical migration through the ground into the building via cracks in the floor slab or around services.
- Lateral migration could occur from the adjacent infilled sites through the shallow made ground deposits and drainage annulus within service trenches.

Gas monitoring has been undertaken to confirm this low to moderate risk.

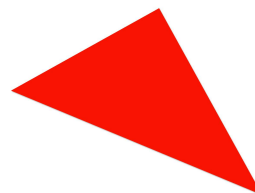
6 rounds of ground gas monitoring have been undertaken in line with CIRIA 665.

A summary of the soil gas monitoring results is presented below.

Date	BH	CH4%	CO2%	O2%	Press	Flow l/h	Weather/Temp
26/09/2023	1	0.4	4.6	17.2	1010	0.4	12°C Clear
12/10/2023	1	0.3	1.9	18.5	1009	0.6	12°C Sunny/Clear
25/10/2023	1	0.2	1.3	18.9	994	0.7	8°C Foggy
07/11/2023	1	0.2	1.9	18.8	1008	0.7	10°C Overcast/Raining
23/11/2023	1	0.2	2.0	18.7	1018	0.8	12°C Overcast/Windy
06/12/2023	1	0.1	1.7	19.4	1014	0.7	0°C Clear / Frosty

Date	BH	CH4%	CO2%	O2%	Press	Flow l/h	Weather/Temp
26/09/2023	3	0.3	10.1	16.5	1010	0.4	12°C Clear
12/10/2023	3	0.2	7.2	17.7	1010	0.6	12°C Sunny/Clear
25/10/2023	3	0.0	5.4	17.9	995	0.7	8°C Foggy
07/11/2023	3	0.0	6.8	17.8	1008	0.6	10°C Overcast/Raining
23/11/2023	3	0.2	5.5	18.0	1018	0.6	12°C Overcast/Windy
06/12/2023	3	0.0	6.9	18.4	1015	0.7	0°C Clear / Frosty

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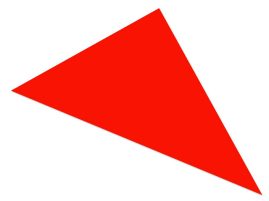
Gas screening values should be calculated on a borehole basis in the first instance. Consideration of worst case i.e. highest flow and highest concentrations should only be considered if the CSM warrants it. In line with CIRIA 665 Guidance on Methane and Carbon Dioxide, the site is to be developed for residential end use and the ground gas investigation has identified a maximum carbon dioxide concentration of 10.1% with flows up to 0.80l/hr recorded to date. The maximum recorded concentration for methane was 0.40%. In addition, hydrogen sulphide concentrations of 0.0 ppm were recorded.

Given the above gas protection measures are recommended for all buildings on site, however the scope of protection measures for each section will be assessed based on the building type and Characteristic Situation. This has been assessed using the matrix presented in BS8485:2015 and is presented in the table below.

Gas protection measures should be installed in accordance with BS8485: 2015. Based on a Type A development and CS2 classification a gas protection score of 3.5 to will need to be achieved.

Building Type	Floor Slab Type	Ventilation	Membrane	Required Points Score	Points Achieved
Conventional residential house (Building Type A)	Block and beam suspended floor (0 Points)	Suspended beam and block flooring with suspended ventilated void (2.5 points)	Full gas membrane installed to S8485:2015 and validated to CIRIA 735 (2 points)	3.5	4.5 points

On the basis of these results, certification of ground gas measures are classified as Situation 2 (Amber 1) conditions and ground gas protection measures should be adopted, utilising Low Permeability membrane and ventilated sub-floor void that creates a permeability contrast to limit the ingress of gas into buildings. Service entries should be sealed with appropriate Visqueen or similar specialist proprietary equipment.



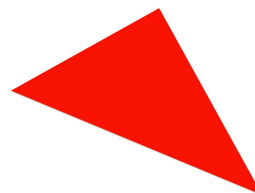
Gas protection measures should be installed as prescribed in BRE 414 with the ventilation of the sub-floor void designed to provide a minimum of one complete volume change per 24 hours.

7.0 VALIDATION

Validation will be required on completion. To ensure that all elements of this Remediation Statement are properly implemented, a final Validation Report will be prepared by an appropriately qualified consultant, confirming that the remedial works have been completed.

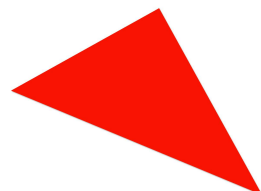
The validation report will confirm the following:

- Confirmation that the proposed clean cover materials are suitable for the proposed end use. This will be undertaken by recovery of representative soil samples after importation for testing.
- A testing regime on imported (in situ) material will be carried out, including testing one sample per 50m³ of imposed material (from a brownfield source) and one sample per 200m³ of imported material (from a greenfield source). A minimum of 3 such samples will be carried out for materials from differing types and from different sources.
- Depths of imported material will be verified by photographs on a plot-by-plot basis.
- Any material removed from site must have appropriate waste transfer documentation to confirm appropriate removal and disposal.
- Validation of installation of the gas membrane to mitigate against carbon dioxide to CS2/Amber 1 in line with the appended verification plan. This is to be carried out by an approved specialist in design and installation of this system.



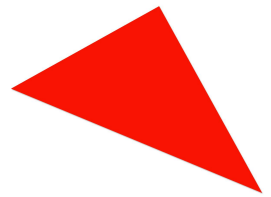
A summary of actions is listed in the table below:-

Summary of Action	
Action	Person Responsible
Site Management procedures to protect site neighbours, environment and amenity during works, including a) Health & Safety plans and procedures b) Dust, noise & odour suppression/controls, including monitoring protocols c) Control of surface water runoff d) Site Waste Management Plan (SWMP)	Main Contractor
Assessment of ground conditions if unanticipated or obviously very high levels of contamination are uncovered, plus appropriate additional testing of such material.	Main Contractor Engineering Consultant NHBC Building Control
Method Statement indicating the procedure for removal of potentially contaminated material, and placement of clean cover throughout all areas of soft landscaping within the development	Main Contractor
Provide suitable protection to site utilities in accordance with the requirements of the service provider	Main Contractor
Witness/verify the placement of correct thickness of clean cover materials in accordance with the Sub Soil Surveys Ltd methodology	Engineering Consultant
Laboratory testing to confirm the suitability of the clean cover materials post placement	Engineering Consultant
Installation of Gas Membrane	Specialist Sub Contractor
Checking and validation of gas membrane	Specialist Consultant
Completion of post-site works Final Validation Report	Engineering Consultant



APPENDIX 1

SITE LAYOUT



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