

Soil vapour and ground gas risk assessment: Topping Mill, Topping Street, Bury

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Soil vapour and ground gas risk assessment:

Topping Mill, Topping Street, Bury

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Glossary and Abbreviations

This glossary includes definition of key technical terms and abbreviations that may be used within the report text.

AOD	Above Ordnance Datum
bgl	Below ground level
BTEX	Benzene, toluene, ethylbenzene, xylene
DRO	Diesel range organics
GRO	Gasoline range organics
LOD	Limit of detection
PAH	Polycyclic Aromatic Hydrocarbons
PID	Photo-ionisation detector
SVOC	Semi-volatile organic compound
TPH	Total Petroleum Hydrocarbons
VOC	Volatile Organic Compound

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1 INTRODUCTION

1.1 Background

Planning approval was granted by Bury Council in August 2021 (planning application ref: 65525) for the 'Change of use of former industrial premises (Class B2) into 15 no. residential apartments (Class C3)' at the site of Topping Mill, Topping Street, Bury, BL9 6DR (herein known as 'the Site'). The Site occupies an area of c. 0.06 ha (see Figure 1.1).

The Site is currently occupied entirely by a derelict two-storey building (there are no external areas of hard or soft landscaping associated with the application Site). The building has been cleared of all internal fittings and is currently in a poor state of repair. The ground floor level comprises of two open spaces, a modest toilet block, an entrance lobby and a stairwell (see Figure 1.2). A modest 'cellar' area (a former boiler room) is located beneath the southern part of the ground floor level.

The approved development plans allow for the creation of seven flats, plus an entrance hall and bin / cycle store, across the ground floor level (see Figure 1.3); a further eight flats are proposed on the first floor level.

In support of the planning process, GeoSmart Information Ltd. produced a Phase 1 contaminated land risk assessment report for the study Site in June 2020 (report ref: 73309R1).

The Phase 1 report concluded that the prevailing ground conditions at the Site may pose a Moderate to Low risk to relevant environmental receptors. The following recommendation was made: *'Given the nature of the historical on-Site and off-Site land use and therefore the potential for contamination to be present at the Site, it is recommended that a proportionate programme of site investigation and monitoring works be undertaken in order to establish the presence or absence of contamination and to enable a quantitative assessment of the associated environmental risks'*.

A planning consultation response provided by the Council's environmental protection officer (Judith Scott) on 7th July 2020 concluded that, *'The desk study information provided appears to be sufficient to assess the potential risks at the site'*.

The planning approval includes two conditions relating to the assessment of contaminated land risks posed by the prevailing ground conditions at the study site:

3. No development shall commence unless and until:-

- A contaminated land Preliminary Risk Assessment report to assess the actual/potential contamination and/or ground gas/landfill gas risks at the site shall be submitted to, and approved in writing by, the Local Planning Authority;
- Where actual/potential contamination and/or ground gas/landfill gas risks have been identified, detailed site investigation and suitable risk assessment shall be submitted to, and approved in writing by the Local Planning Authority;
- Where remediation/protection measures is/are required, a detailed Remediation Strategy shall be submitted to, and approved in writing by, the Local Planning Authority.

4. Following the provisions of Condition 3 of this planning permission, where remediation is required, the approved Remediation Strategy must be carried out to the satisfaction of the Local Planning Authority within agreed timescales; and A Site Verification Report detailing the actions taken and conclusions at each stage of the remediation works, including substantiating evidence, shall be submitted to and approved in writing by the Local Planning Authority prior to the development being brought into use.

1.2 Instruction

Ground First was instructed by St David Group (the Client) on 27th November 2023 to undertake a further assessment of contaminated land risks at the development Site, as outlined in proposal reference 4332P1, dated 31st August 2023.

Note: following Council consultation, the agreed scope of works was modified in December 2023 to include sub slab monitoring activities.

1.3 Objective

The objective of the proposed work was to undertake a proportionate programme of site investigation in line with the Phase 1 report recommendations and consistent with the requirements of planning condition 3.

1.4 Scope of works

In order to achieve the stated objectives, the scope of work carried out for this report included the following tasks:

- Review of the existing Phase 1 report and associated information.
- Undertake a site walkover including inspection of the current building condition and surrounding land area.
- Undertake indoor air monitoring within the on-Site structure.
- Undertake sub-slab soil gas monitoring and soil gas sampling within the on-Site structure.
- Update the existing conceptual site model using observations and laboratory test results from the site investigation works.
- Clarify the relevant contaminant linkages and undertake appropriate human health risk assessment.

1.5 Exclusions

It is noted that the findings presented in this report are in part based on information supplied by third parties. Whilst we assume that all information is representative of past and present conditions we can offer no guarantee as to its validity. This report excludes consideration of potential hazards arising from any activities at the Site other than normal use of the proposed residential development. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

Figure 1.1 Site location



Figure 1.2 Existing Site layout

Figure 1.3 Site development plans

Development plans

January 2024

Drawn: AJS

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2 SITE HISTORY AND ENVIRONMENTAL SETTING

The following section provides a summary of the Site's land use history and environmental setting.

2.1 Site history

The Site's land use history is summarised within the existing Phase 1 report (GeoSmart, 2020). Salient aspects of the Site's history are as follows:

- The eastern part of the Site was developed prior to 1849. The Site was subsequently redeveloped during the late 1800s and also during the early 1900s (the existing structure appears to have been erected by 1930).
- A possible well feature may have been present on-Site in 1891 (this feature was no longer shown on land use mapping dating from 1893 onwards). It is noted that a spring was marked on the 1949 land use map, directly to the north of the Site.
- The Site was labelled as a works from the 1950s until at least the 1990s. The current structure is described within the Phase 1 report as a 'vacant light industrial / warehouse building'. There are no reports of any former buried storage tanks or bulk fuel or chemical storage on-Site.
- Surrounding land uses have included assorted residential, commercial and industrial activity (including a foundry, timber yard, garage and various works buildings within a 100 m radius of the Site).

A consultation response from Bury Metropolitan Borough Council, described in the Phase 1 report, stated that the Site was historically used as an unspecified works and that the Council does not hold any site investigation data for the Site.

2.2 Building construction

The building is of a traditional brick construction with a slate roof. The first floor level is supported by a series of internal metal columns. The building flooring is formed entirely from a concrete slab.

An asbestos survey (in line with the HSG264 asbestos survey guidelines) was performed at the study Site during November 2018 by DJ Surveying. The survey report (see Appendix A) documents the following asbestos containing materials within the on-Site building:

- Pipe insulation (basement boiler room).
- Boiler components (basement boiler room).
- Cement flue (basement boiler room).
- Ironing board (ground floor storage area).
- Floor tiles (ground floor storage area and stairway).
- Flash pad (first floor workshop).
- Electrical components (ground floor workshop).
- Toilet cistern (ground floor toilet).
- Sink pad (kitchen).

Asbestos removal works were performed by RS Asbestos Ltd in June and July 2019 (see Appendix A). These works included the controlled removal of the following materials:

- Pipe lagging / insulation materials.
- Rope gaskets associated with the former boiler unit.

- Cement flue pipe.

The asbestos removal works were verified by REC on 1st July 2019. The verification works included visual inspections and indoor air sampling (see Appendix A).

It is noted that during the site inspection performed by Ground First in January 2024, all other ACMs identified in 2018 by DJ Surveying appeared to have been removed from Site (including all toilet and kitchen fittings, floor tiles and electrical components).

2.3 Environmental setting

The Site's environmental setting is summarised in the existing Phase 1 report (GeoSmart, 2020). Salient aspects of the local environmental setting are as follows:

- British Geological Survey (BGS) mapping indicates that the underlying superficial geology consists of Till, which comprises of diamicton and is classified as a Secondary (undifferentiated) Aquifer.
- The bedrock geology consists of the Pennine Lower Coal Measures Formation, which comprises of mudstone, siltstone and sandstone and is classified as a Secondary A Aquifer.
- There are four BGS borehole / trial pit records within a c. 100 m radius of the Site (all located c. 100 m to the east of the Site):
 - BGS borehole ref: SD81SW497 (Bridge Street Depot) was drilled c. 90 m to the east of the Site (NGR: 381100, 411355) in 1994. The associated borehole log recorded 0.8 m of Made Ground / fill, overlying 6.2 m+ of sandy clay, sandy gravelly clay and slightly sandy silty clay.
 - BGS trial pit ref: SD81SW508 (Jewsons) was excavated c. 85 m to the east of the Site (NGR: 381095, 411353) in 1998. The associated soil log recorded 0.7 m of Made Ground / fill, overlying 0.3 m+ of sandy silty clay.
 - BGS trial pit ref: SD81SW509 (Jewsons) was excavated c. 100 m to the east of the Site (NGR: 381110, 411322) in 1998. The associated soil log recorded 0.9 m of Made Ground / fill, overlying 0.2 m+ of silty clay.
 - BGS borehole ref: SD81SW498 (Bridge Street Depot) was drilled c. 105 m to the east of the Site (NGR: 381115, 411320) in 1994. The associated borehole log recorded 2.2 m of Made Ground / fill, overlying 3.8 m+ of sandy gravelly clay. Standing water was recorded at a depth of c. 3 m bgl.
- The Site is located within a Coal Authority coal mining report area (i.e., an area potentially affected by past coal mining). There are however no recorded Development High Risk Areas within 200 m of the Site.
- The Site does not lie within a groundwater Source Protection Zone (SPZ).
- The nearest licensed groundwater abstraction (for manufacturing use) is located c. 325 m to the north east of the Site.
- The nearest water feature is located c. 150 m east of the Site boundary.
- There are no environmentally sensitive land uses within 500 m of the Site.
- There are no recorded landfill sites within 250 m of the Site.
- No Environment Agency pollution incidents have been recorded within 250 m of the Site.
- the Site lies in an area where <1% of homes are at or above the UK radon action level.

2.4 Site development activities

The approved development plan is shown on Figure 1.3; this allows for internal alterations to the existing building (including the creation of various partition walls) in order to create a series of ground floor and first floor level flats.

The existing concrete flooring will be retained across the ground floor level; this will be covered by a concrete screed layer (in order to create a singular level) and a continuous damp proof membrane, solid insulation and timber flooring.

2.5 Previous site investigations

Following a search of the Council's on-line planning register, there are no planning applications recorded within the BL9 6DR post code area which include any ground investigation information.

3 SITE INVESTIGATION WORKS

3.1 Site investigations

Ground First's monitoring proposals were shared with Bury Metropolitan Borough Council in advance. The Council's environmental protection officer (Rebecca Jones) confirmed via email exchange (emails sent between 5th and 11th December 2023) that the proposed site investigations were deemed appropriate.

Environmental monitoring works were performed by Ground First on 10th January 2024. A summary of the site investigation activities undertaken is presented the table below. The site investigation locations are shown on Figure 3.1. A photographic record of the Site works is provided in Appendix B.

Table 3.1 Site investigations performed

Element of investigation	Details	Rationale
Site inspection	The ground floor and cellar areas of the on-Site structure were closely inspected in order to clarify the building construction and thus inform the prevailing conceptual site model. Particular attention was paid to the flooring construction and the presence of any obvious vapour / ground gas pathways into the indoor building space.	To improve the understanding of potential source-pathway-receptor linkages.
Environmental monitoring performed across the ground floor and cellar areas	A PID meter was used to survey the ground floor and cellar areas of the property; this involved regular measurements taken along the floor and wall joints plus any service entry points (see Figure 3.1). Three 16 mm diameter holes were drilled through the concrete floor slab and c. 0.1 m into the underlying ground (see Figure 3.1): - Location 'DRILL1' was created in order to verify the slab thickness and allow for a spot PID reading (i.e., to provide an indication of sub-slab soil vapour conditions). - Locations 'VP1' and 'VP2' were fitted with Vapor Pins; see Photographs 24 and 25 in Appendix B. The pins were capped and left for 2 hours (in line with the manufacturer's recommendations) prior to PID monitoring. One sub-slab soil gas sample was taken using a laboratory supplied gas sampling canister (1400 ml Silonate Canister). The sample was collected from Vapor Pin VP1; see Photograph 28 in Appendix B. The canister was initially checked to ensure the correct pressure before the sampling train was opened. The container was left in situ until the recorded pressure was less than 5" Hg (as per the manufacturer's instructions).	To provide a measure of vapour concentrations both within the building and also directly beneath the foundation slab.
Laboratory analyses	The indoor air sample was dispatched to UKAS accredited ALS Ltd. for analysis. The analysis included a suite of volatile organic compounds (VOCs) plus bulk gases (including methane and carbon dioxide).	To inform the assessment of soil vapour and ground gas risks to future Site occupants.

Figure 3.1 Site investigation monitoring locations



4 SITE INVESTIGATION RESULTS

4.1 Encountered foundation conditions

Three 16 mm holes were drilled through the ground floor foundation slab (see Figure 3.1 and also Photograph 23 in Appendix B).

The following observations were recorded during the drilling activity:

- Drill location DRILL1 encountered a c. 325 mm thickness of concrete, overlying soft ground.
- Drill location VP1 encountered a c. 250 mm thickness of concrete and c. 100 mm of brick over soft ground.
- Drill location VP2 encountered a c. 150 mm thickness of concrete, over soft ground.

4.2 Soil gas analyses

The laboratory certificate relating to the soil gas sample taken at VP1 is presented in Appendix C. A summary of the test results is presented in **Error! Reference source not found..** Note: only those VOCs measured above the laboratory limit of detection are presented.

Table 4.1 Summary of soil gas detections

Analyte	Unit	VP1
Bulk gases		
Hydrogen	% v/v	<0.5
Oxygen	% v/v	18.0
Nitrogen	% v/v	82.0
Methane	% v/v	<0.05
Carbon dioxide	% v/v	<0.05
Carbon monoxide	% v/v	<0.05
Hydrogen sulphide	ppm	<1
VOCs		
1-Propanol	µg/m ³	7.1
1,1-Dichloroethane	µg/m ³	9.29
1,1-Dichloroethene	µg/m ³	12.7
1,1,1-Trichloroethane	µg/m ³	13.0
1,2-Dichloroethane (DCE)	µg/m ³	6.16
1,2-Dichlorotetrafluoroethane	µg/m ³	29.1
1,2,4-Trimethylbenzene	µg/m ³	8.79
Acetone and Propanal	µg/m ³	134
Acetonitrile	µg/m ³	64.8
Benzene	µg/m ³	12.1
Carbon disulphide	µg/m ³	13.9
Carbon Tetrachloride (Tetrachloromethane)	µg/m ³	14.7
Chloroethane	µg/m ³	9.64
Chloroform (Trichloromethane)	µg/m ³	11.0
cis-1,2-Dichloroethene	µg/m ³	7.09
Cyclohexane	µg/m ³	12.5

Analyte	Unit	VP1
Dichlorodifluoromethane	µg/m ³	23.1
Difluorochloromethane	µg/m ³	14.3
Ethylbenzene	µg/m ³	9.75
Hexanal	µg/m ³	11.9
Hexane	µg/m ³	45.7
Isobutene	µg/m ³	8.98
Isoprene	µg/m ³	9.12
m/p-Xylene	µg/m ³	50.6
Methylacrolein	µg/m ³	5.85
Methylene chloride	µg/m ³	134
Methyl tertiary butyl ether (MTBE)	µg/m ³	12.3
Naphthalene	µg/m ³	52.1
o-Xylene	µg/m ³	18.9
Pentane	µg/m ³	21.9
Tetrachloroethene (PCE)	µg/m ³	28.7
Toluene	µg/m ³	29.4
trans-1,2-Dichloroethene	µg/m ³	8.58
Trichloroethene (TCE)	µg/m ³	33.7
Trichlorofluoromethane	µg/m ³	22.6
Trichlorotrifluoroethane	µg/m ³	27.6
Vinyl Chloride (Chloroethene)	µg/m ³	8.62

Salient observations taken from the soil gas data set include the following:

- All methane, carbon dioxide, carbon monoxide and hydrogen sulphide concentrations were below the limits of laboratory detection.
- A variety of VOCs were identified within the soil gas sample. It is noted that the majority of VOCs were measured at concentrations only moderately in excess of the limits of laboratory detection.

4.3 Field measurements

Total VOC concentrations within the building air space were measured at multiple locations across the ground floor and also within the cellar area of the property on 10th January 2024, using a hand-held PID meter (see Photographs 21 and 22 in Appendix B). All in-situ total VOC measurements were below the instrument limit of detection (< 0.01 ppm).

A PID reading of <0.01 ppm was taken from within the open 16 mm hole (DRILL1) drilled within the floor slab present in the south-eastern part of the property.

Further PID readings were taken from the two Vapor Pins (VP1 and VP2) installed within the foundation slab both directly after installation and also 2 hours following installation (see Photographs 26 and 27 in Appendix B). All PID readings were <0.01 ppm.

4.4 Other site observations

Other salient observations made during the site investigation works included:

- The application Site was entirely covered by the building footprint (see Photographs 1 to 4 in Appendix B).

- An adjoining car park (surfaced with tarmac) was present directly to the east of the Site (see Photograph 7 in Appendix B).
- The on-Site building was in a poor state of repair. Glass was absent from the majority of the window openings (see Photographs 2 and 5 in Appendix B) and sections of the roof were missing.
- The majority of the window openings on the western elevation were infilled / bricked-up (see Photograph 3 in Appendix B).
- The property was vacant and had previously been cleared of all fixtures and fittings. Internal scaffolding was present across the building footprint.
- No obvious adhesives, solvents or other chemicals were observed within the building (which could influence the vapour monitoring and sampling activities).
- No fuel or chemical storage was observed on-Site.
- No notable odours were recorded within the on-Site building.
- The ground floor layout included two open spaces either side of an entrance lobby and stairwell. A toilet block was observed at the southern edge of the building; all fittings had been removed and the waste pipes were directed through the external building wall (see Photograph 11 in Appendix B).
- Concrete flooring was present across the ground floor level (see Photographs 8, 9, 12 and 14 in Appendix B). Some residual tile adhesive was present across the majority of the floor area (see Photograph 10 in Appendix B). The exposed concrete appeared to be in a reasonable state of repair.
- The internal concrete floor level was c. 0.2 m higher than the external pavement / ground level to the north of the building. The flooring along the southern edge of the building was c. 0.75 m higher than the neighbouring external pavement / ground level. As such, the 'cellar' feature situated on the southern edge of the Site was situated only partially below ground level.
- The 'cellar' was constructed from brick walls with solid concrete flooring (see Photograph 16 in Appendix B). Several window openings were present along the southern edge of the 'cellar' (see Photograph 20 in Appendix B). A former boiler plinth and flue opening were evident within the 'cellar' (see Photographs 18 and 19 in Appendix B).
- No manhole covers, service entry points or suchlike were evident across the ground floor level. A circular drainage cover was however observed within the floor of the 'cellar' room (see Photograph 17 in Appendix B); this feature was positioned directly adjacent to the former boiler.

Note: the first floor level was not inspected due to health and safety considerations (including possible weak flooring and also sections of missing flooring).

5 SOIL VAPOUR AND GROUND GAS ASSESSMENT

The following section identifies any potential contaminants of concern (COC) identified during the recent monitoring and testing activities. The outputs of this process will be used to refine the conceptual site model which will in turn provide the technical basis for an updated assessment of contamination risks in Section 6.

5.1 Introduction

The approach to contaminated land risk assessment within the UK is based around the evaluation of contaminant source – pathway – receptor linkages. In the context of the prevailing conceptual site model, the focus of the current risk assessment is on the presence of a vapour or gas source either beneath the existing floor slab or within the building air space which could pose a potential risk to future residents from the inhalation exposure pathway.

5.2 Vapour sources

The PID monitoring results recorded across the ground floor and cellar areas have indicated the absence of any appreciable VOCs within the internal air space. It is noted that there was the potential for significant ventilation of the building prior to and throughout the recent monitoring activities (due to missing window panes and some roofing sections); as such, the field measurements may not be representative of conditions within the structure, post-development.

The PID monitoring results associated with the two Vapor Pin positions (plus readings taken from the open drill hole (DRILL1)) were also below the limit of instrument detection.

The sub-slab soil gas sampling and laboratory testing identified the presence of various volatile compounds beneath the building foundation (note: the limits of detection associated with the laboratory analyses were considerably lower than that associated with the PID meter).

In order to assess the significance of risks to human health from observed soil vapour concentrations the soil gas results were initially screened against USEPA Resident Air Screening Levels (USEPA, 2024). All substances recorded in excess of the adopted screening levels are shown in Table 5.1

Table 5.1 Initial soil vapour risk screen

Contaminant	Air quality ($\mu\text{g}/\text{m}^3$)	
	Screening value ¹	VP1 concentration
1,1-Dichloroethane	1.8	9.29
1,2-Dichloroethane (DCE)	0.11	6.16
Acetonitrile	63	64.8
Benzene	0.36	12.1
Carbon Tetrachloride (Tetrachloromethane)	0.47	14.7
Chloroform (Trichloromethane)	0.12	11
Ethylbenzene	1.1	9.75
Methylene chloride	100	134
MTBE (Methyl tertiary butyl ether)	11	12.3
Naphthalene	0.083	52.1
Tetrachloroethene (PCE)	11	28.7
Trichloroethene (TCE)	0.48	33.7
Vinyl Chloride (Chloroethene)	0.17	8.62

¹ Screening values based on USEPA Resident Air Screening Levels, Nov 2023 (USEPA, 2024)

Table 5.1 indicates that various substances are present within the sub surface at concentrations modestly in excess of indoor air screening values. In order to further assess the significance of these substances, the potential indoor air inhalation exposures (resulting from the measured sub-slab VOC concentrations) have been calculated using the Environment Agency's CLEA model (version 1.071).

The CLEA model use generic assumptions regarding the fate and transport of chemicals in the environment, alongside generic conceptual models, to estimate human exposures to soil contaminants for those living, working or playing on contaminated sites over long periods of time. The CLEA software includes the ability to simulate human exposure to contaminants via a number of key pathways, including an indoor air model to assess inhalation exposures within buildings from any contaminants present beneath the building footprint. More specifically, the CLEA approach adopts the Johnson and Ettinger (J&E) model to calculate levels of vapour intrusion into buildings based on a limited number of key parameters (including the physico-chemical properties of each contaminant, key soil properties, the building dimensions, the floor slab thickness and the frequency of defects within the floor slab). The levels of vapour intrusion and resulting receptor exposures are expressed as the Average Daily Exposure (ADE). The CLEA model also contains information relating to the toxicology of modelled contaminants, including concentrations below which exposures are deemed to be acceptable (expressed as Health Criteria Values (HCVs)).

It is recognised that vapour transport modelling is inherently complex and subject to many site-specific factors which are difficult to accommodate within simple deterministic models. Inevitably, vapour transport models include a range of simplifications and assumptions to allow their ease of application. The CLEA indoor air model includes the following key assumptions:

- The source term is homogeneously distributed beneath the building (at a depth of 0.5 m from the base of the foundation).
- No contaminant degradation is assumed to occur within the sub surface.
- Steady state conditions exist (including flow into the building and building ventilation rates).
- The model assumes a solid slab foundation.
- Vapour migration is through cracks and openings in the walls and foundations.
- No significant preferential pathways exist (between the sub surface and the internal building space).
- Air mixing within the building is assumed to be instantaneous and consistent across the structure.

The prevailing conceptual site model relating to the Topping Mill property is considered to be broadly consistent with the modelling assumptions adopted within CLEA.

The CLEA model can be operated in two modes; firstly, to estimate soil concentrations which are protective of human health for a given conceptual scenario (i.e., for a particular set of land use and exposure assumptions), and secondly, in the 'ratio' mode, which estimates the ADE : HCV ratio for a given conceptual scenario. Critically, measured (i.e., actual) soil vapour concentrations can be used in the ratio mode in order to calculate the ADE value associated with the vapour inhalation pathway.

The CLEA software has been used in the ratio mode to calculate ADE : HCV ratios (for the vapour transport pathway) for those contaminants of concern identified in Table 5.1. In effect, an ADE : HCV ratio of less than 1 indicates the absence of any significant health risks.

The model inputs and outputs for each of the contaminants of concern are presented in Appendix E. The model inputs are based on the parameterisation adopted by SoBRA for the development of Generic Assessment Criteria for assessing vapour risks from volatile contaminants in groundwater (SoBRA, 2017). Note: given the absence of any outdoor space

at the Site, the CLEA model runs performed for the current assessment include only the indoor vapour exposure pathway.

The calculated ADE : HCV ratios shown in Appendix E are all less than 0.05 (i.e., the modelled vapour exposures within the building indoor air space are all considerably less than acceptable indoor air concentrations). Note: model parameterisation is not readily available for either acetonitrile or methylene chloride, however, given that both substances were observed only marginally above the adopted USEPA Resident Air Screening Levels (which relate to indoor air concentrations and not sub-slab soil gas concentrations), the measured soil gas levels are not considered to pose a significant health risk.

It is notable that the CLEA approach advocates the use of other lines of evidence (in addition to model results) when assessing the potential significance of soil vapour exposures. As such, the significance of the site investigation findings are considered within the context of the prevailing conceptual site model in Section 6.

5.3 Permanent ground gas sources

In general, ground gases may pose a variety of risks to human health and property through potential acute effects including asphyxiation and explosion, as well as on-going physiological effects (CIRIA, 2007).

The bulk gas analyses performed on the soil gas sample recently collected from Vapor Pin VP1 indicate an absence of any measurable methane, carbon dioxide, carbon monoxide and hydrogen sulphide concentrations (i.e., all results were below the limits of laboratory detection).

The significance of the observed ground gas concentrations is considered further within the context of the prevailing conceptual site model in Section 6.

6 RISK ASSESSMENT

A summary of the updated soil vapour and ground gas risk assessment is presented in Table 6.1.

The soil vapour and ground gas risks have been assessed using the risk assessment methodology described in CIRIA C552 (2001). As such, risk is considered to be a function of both the probability (likelihood) of contamination occurring at the Site and also the potential severity (consequence) of the environmental impacts associated with any such contamination. The classification system used to define contaminant probability, consequence and risk is described in Appendix D.

Table 6.1 Risk assessment

Sources	Pathways	Receptors	Consequence	Probability	Risk	Comment / Risk Management
Potential soil vapours present with the sub surface (i.e., any residual organic contamination relating to in-situ Made Ground)	Potential for migration of any soil vapours through any gaps or defects within the ground level flooring; potential accumulation within the ground floor space and subsequent inhalation by Site occupants	Future Site occupants	Medium	Unlikely	Low Risk	PID measurements have indicated the absence of any appreciable VOC concentrations across the ground floor of the building, within the on-Site cellar, and also beneath the in-situ floor slab (at three discrete drill locations). Soil vapour sampling and testing has identified modest concentrations of various VOCs beneath the existing floor slab. However, vapour transport modelling has indicated that the observed sub-slab VOC concentrations do not pose a significant health risk to future residential occupants. The modelling results are consistent with the presence of a concrete slab across the on-Site structure (observed to be between 150 mm and 325 mm thick), which appears to be in reasonable condition, with minimal service entry points. This foundation will offer a reasonable degree of protection from any sub surface soil vapours (i.e., a structural barrier). Furthermore, the planned refurbishment works (including the placement of a concrete screed layer and a Visqueen membrane across the existing slab) will further reduce the possibility of vapour ingress across the ground floor area. Available BGS borehole records indicate the presence of over 6 m of sandy silty clay, sandy clay and sandy gravelly clay beneath the local area. This is consistent with the mapped presence of glacial Till deposits. The clayey nature of the sub surface soils may reduce the potential for vapour (and gas migration) within the sub surface (including possible migration onto the Site from any neighbouring soil vapour or ground gas sources). A spring was marked on the 1949 land use map directly to the north of the Site; this may indicate the presence of shallow groundwater beneath the Site. Any such groundwater may also act to constrain local soil vapour (and ground gas) movements. The prevailing conceptual site model indicates that the risks posed by the potential migration and accumulation of significant concentrations of hazardous soil vapours within the on-Site building are likely to be low.

Sources	Pathways	Receptors	Consequence	Probability	Risk	Comment / Risk Management
Potential ground gases (including methane and carbon dioxide) present within the sub surface (potentially including gases associated with historical Made Ground as well as the underlying coal measures formation / historical mining activity)	Potential for migration of any ground gases through any localised gaps / defects within the ground level flooring; potential accumulation within the ground floor space and subsequent explosive, asphyxiation and toxic impacts	Future Site occupants	Medium	Unlikely	Low Risk	Recent sub-slab soil gas sampling and testing has shown the likely absence of any appreciable bulk gases below the building foundation. The soil gas results are consistent with the prevailing conceptual site model which suggests the absence of any appreciable volumes of Made Ground beneath the Site and also the aged nature of any underlying materials (both of which will constrain the generation of bulk gases). It is noted that the current Site structure appears to have been present from before 1930. Whilst the Site is situated within a Coal Authority coal mining report area (i.e., an area potentially affected by past coal mining activity), there are no recorded Development High Risk Areas within 200 m of the Site. The presence of a concrete slab (observed to be between 150 mm and 325 mm thick), which appears to be in reasonable condition, with minimal service entry points, will offer a reasonable degree of protection from any sub surface gases (i.e., the slab will offer a structural barrier to gas ingress). Furthermore, the planned refurbishment works (including the placement of concrete screed layer and a Visqueen membrane across the existing slab) will further reduce the possibility of gas ingress across the ground floor area. The prevailing conceptual site model indicates that the risks posed by the potential migration and accumulation of significant concentrations of hazardous ground gases within the on-Site building are likely to be low.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 Conceptual understanding

Salient aspects of the prevailing conceptual site model are described below:

- The eastern part of the Site was developed prior to 1849. The Site was subsequently redeveloped during the late 1800s and also during the early 1900s (the existing structure appears to have been erected by 1930).
- The Site was labelled as a works from the 1950s until at least the 1990s. The current structure is described within the Phase 1 report as a 'vacant light industrial / warehouse building'.
- There are no reports of any former buried storage tanks or bulk fuel or chemical storage on-Site.
- The building flooring is formed entirely from a concrete slab. Minimal service entry points have been observed within the flooring, which appears to be in a reasonable condition. The slab thickness was observed to be between 150 mm and 325 mm during the recent investigation works.
- Geological mapping indicates that the underlying superficial geology consists of Till, which comprises of diamicton. The bedrock geology consists of the Pennine Lower Coal Measures Formation, which comprises of mudstone, siltstone and sandstone.
- Local BGS boreholes logs indicate that the near surface deposits are dominated by cohesive soil types including sandy silty clay, sandy clay and sandy gravelly clay.
- The Site is located within a Coal Authority coal mining report area (i.e., an area potentially affected by past coal mining). There are however no recorded Development High Risk Areas within 200 m of the Site.
- A spring was marked on the 1949 OS land use map, directly to the north of the Site. Standing water was also recorded at a depth of c. 3 m bgl on a nearby borehole log. As such, shallow groundwater may be present within the Site locality.
- PID monitoring recently performed across the ground floor level and also within the modest cellar area has indicated the absence of any discernible VOC concentrations (all vapour readings were below the instrument limit of detection).
- Further PID readings were taken from two Vapor Pins installed within the foundation slab; all sub-slab PID readings were also below the instrument limit of detection.
- Air quality testing was performed on a soil gas sample collected from one of the Vapor Pins. A variety of VOCs were identified within the soil gas sample, albeit the majority of VOCs were measured at concentrations only moderately in excess of the limits of laboratory detection.

7.2 Land quality risks posed to future Site occupants

The following conclusions are drawn from the site investigation works and subsequent risk assessments described in this report:

Vapour risks:

based on the available monitoring data, vapour transport modelling results and prevailing conceptual site understanding, the risks posed to future Site users from sub surface soil vapours are considered to be low.

Ground gas risks: based on the available test results (including the absence of any measurable methane, carbon dioxide, carbon monoxide or hydrogen sulphide concentrations beneath the floor slab) and prevailing conceptual site understanding,

the risks posed to future Site users from sub surface ground gases are considered to be low.

7.3 Recommendations

Based on observed Site conditions and the prevailing environmental risk assessments described in this report no further Site assessment activities are considered necessary.

As a precautionary measure, it is recommended that (where feasible) some passive ventilation is maintained within the cellar room (which includes windows positioned above the external ground level) in order to avoid the potential accumulation of any localised soil vapours or ground gases.

It is recommended that the drainage cover present within the cellar room is appropriately sealed, in order to avoid the potential ingress of any localised soil vapours or ground gases.

In addition, the three 16 mm diameter holes recently drilled within the building floor slab (at locations VP1, VP2 and DRILL1) should also be appropriately sealed prior to any further development works.

8 REFERENCES

CIRIA, 2001. Contaminated land risk assessment. A guide to good practice. C552. CIRIA London. ISBN 0-86017-552 9.

CIRIA, 2007. Assessing risks posed by hazardous ground gases to buildings. C665. CIRIA London. ISBN: 978-0-86017-665-7.

GeoSmart, 2020. Phase 1 contaminated land report. Topping Mill, Topping Street, Bury, BL9 6DR. Report ref: 73309R1.

SoBRA, 2017. Generic Assessment Criteria for assessing vapour risks to human health from volatile contaminants in groundwater.

USEPA, 2024. Published Resident Air Screening Levels: <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables>.

APPENDICES

APPENDIX A

Asbestos survey and clearance reporting

Report No. DJ181109B
Asbestos Refurb/Demo Survey



Textile Mill, Topping Street, Bury BL8 6DR



Date of survey: 09/11/18

Survey undertaken by:
DJ Surveying
16 Brynteg Crescent,
Brynteg,
Wrexham
LL11 6NA

Signed 
Dale Jones – DJ Surveying

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Executive Summary of Sampled Materials

Sample No:	Location	Item	Asbestos Material?	Also to other rooms	Total Quantity	Licensed Contractor required?
01	1/02: first floor workshop	Grey vinyl floor tiles	No	-	-	-
02	1/02: first floor workshop	Blue vinyl floor tiles	No	-	-	-
03	1/02: first floor workshop	White vinyl floor tiles	No	-	-	-
04	1/02: first floor workshop	White floor lining	No	-	-	-
05	0/02: entrance hall	Red vinyl sheet flooring	No	-	-	-
06	0/09: GF storage area	Blue vinyl floor tiles	Yes	0/16	70sq.m	No
07	0/09: GF storage area	Yellow vinyl floor tiles	Yes	no	50sq.m	No
08	0/09: GF storage area	Floor tile adhesive	Yes	0/16	120sq.m	No
09	0/10: stairway	White stair nosings	No	-	-	-
10	0/17: GF workshop	Dark grey vinyl floor tiles	No	-	-	-
11	0/17: GF workshop	Light grey vinyl floor tiles	No	-	-	-
12	-1/02: basement boiler room	Pipe insulation	Yes	-1/01	13m	Yes
13	0/16: GF stock room	White vinyl sheet flooring	No	-	-	-
14	1/01: stairway	Red vinyl floor tiles	Yes	0/10	8sq.m	No
15	1/02: FF workshop	Flash pad	Yes	Yes	3 No. min.	No
16	0/09: GF storage area	Panel to ironing board	Yes	no	1No.	No
17	-1/02: basement boiler room	Cement flue	Yes	presumed	1m minimum	No
18	0/07: GF office	Redundant cistern	No	-	-	-
19	0/12: GF male WC	Blue vinyl sheet flooring	No	-	-	-
20	0/13: GF female WC	Toilet cistern	Yes	no	1No.	No
21	0/10: GF toilet lobby	Panels below stairs	No	-	-	-
22	0/09: kitchen area	Sink pad	Yes	no	1No.	No
A	0/17: GF workshop	Electrical components	Presumed	Yes	multiple fuse boxes	No
B	-1/02: basement boiler room	Boiler components	Presumed	no	1No. boiler	Yes

* Areas/volumes given are approximate and should not be relied upon for tendering purposes

Scope of Works

This Asbestos Refurbishment/Demolition Survey of the textile mill at Topping Street, Bury was commissioned on 9th November 2018. The purpose of the survey undertaken was to provide the client with sufficient information regarding the presence (or otherwise) of asbestos-containing materials to enable the client to satisfy their responsibilities under the Construction, Design and Management Regulations 2015.

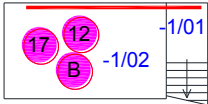
Scope of works:

- i) Take suitable and sufficient steps to determine all (so far as is reasonably practicable) materials likely to contain asbestos in the areas specified by the client.
- ii) Identify the product type, asbestos type, location and extent/amount of all sampled and presumed asbestos containing materials to be recorded.
- iii) As the survey is designed for use as the basis for tendering the removal of asbestos containing materials from the building prior to demolition or major refurbishment, the survey does not assess the condition of the asbestos. The only exception to this is to note areas of damage or where additional asbestos debris may be expected to be present.

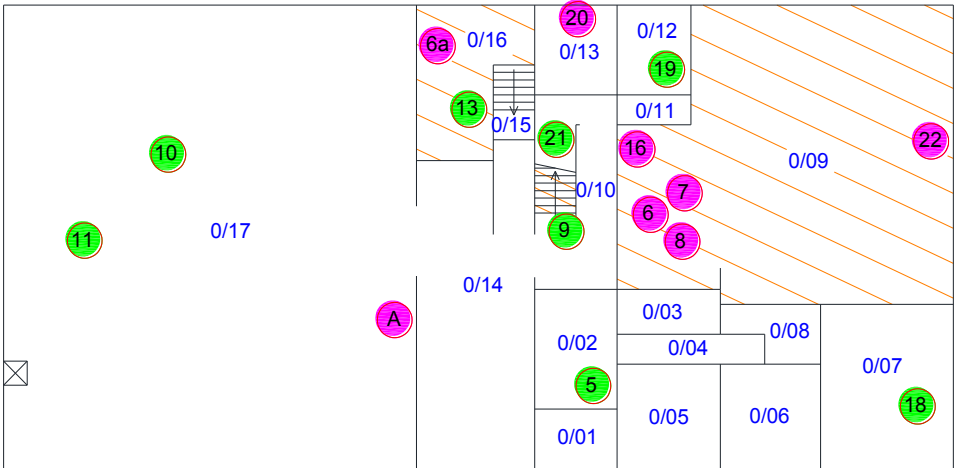
An asbestos demolition/refurbishment survey (Full access sampling and identification survey) was undertaken at the site in line with HSG264. The inspection has been undertaken to client specified areas only. Where necessary, samples have been collected and analysed to confirm whether or not they contain asbestos.

Caveats

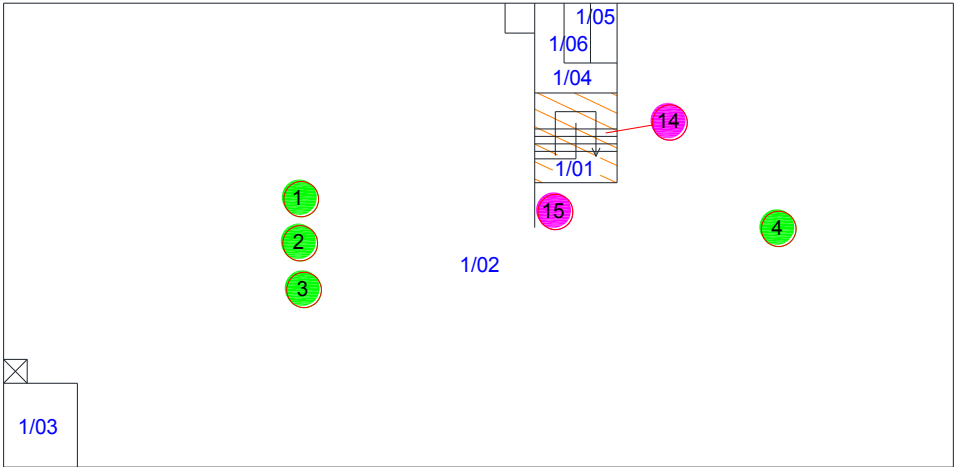
1. This report is for the sole use of the client as per the Scope of Works. DJ Surveying are not responsible to any person other than the client in respect of the contents of this report.
2. Only the areas defined are covered in this report. Any areas not identified should be considered as not accessed for the purposes of this survey.
3. All areas specified by the client have been inspected where practicable. Please see Specific Exclusions for areas/items not sampled/inspected.
4. The survey undertaken has been conducted in compliance with the Control of Asbestos Regulations 2012 (Reg. 10), i.e. dust release during sampling was reduced to as low as is reasonably practicable. Following sampling, all areas damaged as a result of the sampling methods used were sealed in an appropriate manner in order to prevent future fibre release from these areas only.
5. We accept no responsibility for damage to asbestos-containing materials incurred as a result of the actions (deliberate or otherwise) of other persons or parties before or after the sampling was undertaken.
6. For contractual or engineering purposes, this report must be read in its entirety, including any appendices. The author accepts no responsibility for sub-division of this report.
7. This report includes coloured lines within the footer. Copies of this report that do not carry those coloured lines may not be a true copy of the report as it left this office.
8. Should you not be satisfied with the level of service you have received, please request a copy of our complaints handling procedure, copies of which are available from:
DJ Surveying, 16 Brynteg Crescent, Brynteg, Wrexham LL11 6NA



Basement



Ground Floor



First Floor

- 0/01 Room Number
- 1 Sample Number
- Non-asbestos
- Asbestos material

- Asbestos pipe insulation
- Asbestos flooring material

Client:		
Textile Mill, Topping Street, Bury BL9 6DR		
Survey Ref: DJ181109B	Drawn by: D.J.	Scale: NOT TO SCALE
Survey Type: Refurbishment	Date: 09-11-18	Dwg No.: 1 of 1

Non-Accessible Areas (may contain asbestos)

Item/Areas	Floor	Likelihood of asbestos	Reason for no access
-	-	-	-

Property Summary

An asbestos refurb/demolition survey has been undertaken at this commercial property. All areas of the property were inspected during the survey, including the exterior. The property was unoccupied at the time of surveying.

Of 22 materials sampled for the possible presence of asbestos, ten returned as positive, along with two presumptions.

Asbestos **pipe insulation** is present to the basement stairway and boiler room. Asbestos insulation is a high risk material that may only be removed by a HSE-licensed contractor. At the time of inspection the pipe insulation was in poor condition with debris and visible fibres (as dust) to the floor and other surfaces. Removal is advised followed by a full environmental clean of the boiler room and stairway. Access to the basement must be highly restricted until this work is completed.

The **vinyl floor tiles** to the ground floor storage area & stairway and the **adhesive** that they are laid on contain asbestos fibres. Asbestos vinyl floor tiles and asbestos adhesive are non-licensed materials that may be removed by a suitably trained general contractor wearing appropriate RPE/PPE and following HSE guidance work methods. If removed, these materials must be disposed as hazardous waste. Alternatively, the floor tiles may be overlaid and managed in-situ.

The **flash pads** within multiple fuse boxes throughout the building are an asbestos rope material. Asbestos rope seals and arc shields may also be present. The **electrics** were not fully inspected due to the absence of an isolation certificate. We advise that all fuse boxes be removed as whole units and disposed as hazardous waste. This is non-licensed work.

An **ironing board** with an asbestos insulation board panel is present to the ground floor storage area. We advise that the ironing board is disposed as hazardous waste. This is non-licensed work providing the ironing board is disposed as a whole unit.

The **boiler flue** within the basement boiler room is asbestos cement. Asbestos cement is a non-licensed material that may be removed by a suitably trained general contractor wearing appropriate RPE/PPE and following HSE guidance work methods. If removed, the flue must be disposed as hazardous waste. The full extent of the flue could not be determined as it is partially concealed within a chimney.

The **toilet cistern** to the female WC contains asbestos fibres. Asbestos cisterns are a low risk non-licensed material that may be removed by a suitably trained general contractor wearing appropriate RPE/PPE and following HSE guidance work methods.

The **bitumen pad** to the underside of the sink unit within the ground floor kitchen area of the store room contains asbestos fibres. If removed, we suggest disposing of the sink as a whole unit as hazardous waste.

The **boiler** within the basement was not fully inspected due to heavy contamination from the nearby pipe insulation. The boiler is presumed to contain asbestos components such as rope seals and gaskets due to its age. As the boiler is redundant, we advise removal and disposal by a HSE-licensed contractor under controlled conditions as the boiler may require dismantling to facilitate removal. The boiler must be disposed as hazardous waste.

All other materials inspected during the survey were either sampled or visually identified as non-asbestos products.

All reasonable effort has been made to identify all potential asbestos materials in the surveyed areas. However, should suspect materials be uncovered during forthcoming works, please contact this office to arrange further inspection of such materials.

Advice on working with asbestos materials is available at:
<http://www.hse.gov.uk/asbestos/essentials/index.htm>

Alternatively, contact this office for further information or if you are unsure as to any aspects of this report.

Further guidance on individual materials is given in the following pages.

Register of Materials

Survey ref: DJ181109B

Survey Date:	09-11-2018
Survey Type:	Refurb/Demo
Lead Surveyor:	Dale Jones

Sample no: 01
Room no: 1/02
Location: first floor workshop
Item: grey vinyl floor tiles
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A



Comments: Non-asbestos material.

Sample no: 02
Room no: 1/02
Location: first floor workshop
Item: blue vinyl floor tiles
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A



Comments: Non-asbestos material.

Additional Notes:

Survey ref: DJ181109B

Survey Date: 09-11-2018
Survey Type: Refurb/Demo
Lead Surveyor: Dale Jones

Sample no: 03
Room no: 1/02
Location: first floor workshop
Item: white vinyl floor tiles
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A



Comments: Non-asbestos material.

Sample no: 04
Room no: 1/02
Location: first floor workshop
Item: white floor lining
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A



Comments: Non-asbestos material.

Additional Notes:

Survey ref: DJ181109B

Sample no: 05
Room no: 0/02
Location: entrance hall
Item: red vinyl sheet flooring
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A

Survey Date: 09-11-2018
Survey Type: Refurb/Demo
Lead Surveyor: Dale Jones



Comments: Non-asbestos material.

Sample no: 06
Room no: 0/09 & 0/16
Location: GF storage area
Item: blue vinyl floor tiles
Accessibility: easy
Sample Taken: Yes
Lab Result: chrysotile asbestos
Quantity: 70sq.m
Surface Treatment: composite
Areas of Damage: minor



Comments: Asbestos material. The vinyl floor tiles to the ground floor storage area contain asbestos fibres. Asbestos vinyl floor tiles are a non-licensed material that may be removed by a suitably trained general contractor wearing appropriate RPE/PPE and following HSE guidance work methods. If removed, the floor tiles must be disposed as hazardous waste. Alternatively, the floor tiles may be overlaid and managed in-situ.

Additional Notes:

Survey ref: DJ181109B

Survey Date:	09-11-2018
Survey Type:	Refurb/Demo
Lead Surveyor:	Dale Jones

Sample no: 07
Room no: 0/09
Location: GF storage area
Item: yellow vinyl floor tiles
Accessibility: easy
Sample Taken: Yes
Lab Result: chrysotile asbestos
Quantity: 50sq.m
Surface Treatment: composite
Areas of Damage: minor



Comments: Asbestos material. The vinyl floor tiles to the ground floor storage area contain asbestos fibres. Asbestos vinyl floor tiles are a non-licensed material that may be removed by a suitably trained general contractor wearing appropriate RPE/PPE and following HSE guidance work methods. If removed, the floor tiles must be disposed as hazardous waste. Alternatively, the floor tiles may be overlaid and managed in-situ.

Sample no: 08
Room no: 0/09 & 0/16
Location: GF storage area
Item: floor tile adhesive
Accessibility: moderate
Sample Taken: Yes
Lab Result: chrysotile asbestos
Quantity: 120sq.m
Surface Treatment: overlaid
Areas of Damage: none



Comments: Asbestos material. The bitumen adhesive that the vinyl floor tiles to the storage area are laid on contains asbestos fibres. Asbestos bitumen adhesive is a non-licensed material that may be removed by a suitably trained general contractor wearing appropriate RPE/PPE and following HSE guidance work methods. If removed, this material must be disposed as hazardous waste. Alternatively, the bitumen adhesive may be overlaid and managed in-situ.

Additional Notes:

Survey ref: DJ181109B

Survey Date:	09-11-2018
Survey Type:	Refurb/Demo
Lead Surveyor:	Dale Jones

Sample no: 09
Room no: 0/10
Location: stairway
Item: white stair nosings
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A



Comments: Non-asbestos material.

Sample no: 10
Room no: 0/17
Location: GF workshop
Item: dark grey vinyl floor tiles
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A



Comments: Non-asbestos material.

Additional Notes:
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Survey ref: DJ181109B

Survey Date: 09-11-2018
Survey Type: Refurb/Demo
Lead Surveyor: Dale Jones

Sample no: 11
Room no: 0/17
Location: GF workshop
Item: light grey vinyl floor tiles
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A



Comments: Non-asbestos material.

Sample no: 12
Room no: -1/02
Location: basement boiler room
Item: pipe insulation
Accessibility: easy
Sample Taken: Yes
Lab Result: chrysotile & crocidolite
Quantity: 13m
Surface Treatment: unsealed in parts
Areas of Damage: high



Comments: Asbestos material. Asbestos pipe insulation is present to the basement stairway and boiler room. Asbestos insulation is a high risk material that may only be removed by a HSE-licensed contractor. At the time of inspection the pipe insulation was in poor condition with debris and visible fibres (as dust) to the floor and other surfaces. Removal is advised followed by a full environmental clean of the boiler room and stairway. Access to the basement must be highly restricted until this work is completed.

Additional Notes:

Survey ref: DJ181109B

Survey Date:	09-11-2018
Survey Type:	Refurb/Demo
Lead Surveyor:	Dale Jones

Sample no: 13
Room no: 0/13
Location: GF stock room
Item: white vinyl sheet flooring
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A



Comments: Non-asbestos material.

Sample no: 14
Room no: 1/01
Location: stairway
Item: red vinyl floor tiles
Accessibility: easy
Sample Taken: Yes
Lab Result: chrysotile asbestos
Quantity: 8sq.m
Surface Treatment: vinyl
Areas of Damage: none



Comments: Asbestos material. The vinyl floor tiles to the stairway contain asbestos fibres. Asbestos vinyl floor tiles are a non-licensed material that may be removed by a suitably trained general contractor wearing appropriate RPE/PPE and following HSE guidance work methods. If removed, the floor tiles must be disposed as hazardous waste. Alternatively, the floor tiles may be managed in-situ.

Additional Notes:

Survey ref: DJ181109B

Survey Date: 09-11-2018
Survey Type: Refurb/Demo
Lead Surveyor: Dale Jones

Sample no: 15
Room no: 1/02
Location: FF workshop
Item: flash pad
Accessibility: easy
Sample Taken: Yes
Lab Result: chrysotile asbestos
Quantity: 3No. minimum
Surface Treatment: enclosed
Areas of Damage: none



Comments: Asbestos material. The flash pads are an asbestos rope material. We advise that the fuse box be removed as a whole unit and disposed as hazardous waste. This is non-licensed work.

Sample no: 16
Room no: 0/09
Location: GF storage area
Item: panel to ironing board
Accessibility: easy
Sample Taken: Yes
Lab Result: chrysotile asbestos
Quantity: 1 No.
Surface Treatment: none
Areas of Damage: none



Comments: Asbestos material. The ironing board panel is asbestos insulation board (AIB). We advise that the ironing board is disposed as hazardous waste. This is non-licensed work providing the ironing board is disposed as a whole unit.

Additional Notes:

Survey ref: DJ181109B

Survey Date:	09-11-2018
Survey Type:	Refurb/Demo
Lead Surveyor:	Dale Jones

Sample no: 17
Room no: -1/02
Location: basement boiler room
Item: cement flue
Accessibility: partially behind brickwork
Sample Taken: Yes
Lab Result: chrysotile asbestos
Quantity: 1m minimum
Surface Treatment: cement
Areas of Damage: none



Comments: Asbestos material. The boiler flue is asbestos cement. Asbestos cement is a non-licensed material that may be removed by a suitably trained general contractor wearing appropriate RPE/PPE and following HSE guidance work methods. If removed, the flue must be disposed as hazardous waste. The full extent of the flue could not be determined as it is partially concealed within a chimney.

Sample no: 18
Room no: 0/07
Location: GF office
Item: redundant cistern
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A



Comments: Non-asbestos material.

Additional Notes:

Survey ref: DJ181109B

Survey Date:	09-11-2018
Survey Type:	Refurb/Demo
Lead Surveyor:	Dale Jones

Sample no: 19
Room no: 0/12
Location: GF male WC
Item: blue vinyl sheet flooring
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A



Comments: Non-asbestos material.

Sample no: 20
Room no: 0/13
Location: GF female WC
Item: toilet cistern
Accessibility: easy
Sample Taken: Yes
Lab Result: crocidolite asbestos
Quantity: 1 No.
Surface Treatment: composite
Areas of Damage: none



Comments: Asbestos material. The toilet cistern to the female WC contains asbestos fibres. Asbestos cisterns are a low risk non-licensed material that may be removed by a suitably trained general contractor wearing appropriate RPE/PPE and following HSE guidance work methods. If removed, the cistern must be disposed as hazardous waste.

Additional Notes:
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Survey ref: DJ181109B

Survey Date: 09-11-2018
Survey Type: Refurb/Demo
Lead Surveyor: Dale Jones

Sample no: 21
Room no: 0/10
Location: GF toilet lobby
Item: panels below stairs
Accessibility: easy
Sample Taken: Yes
Lab Result: non-asbestos
Quantity: N/A
Surface Treatment: N/A
Areas of Damage: N/A



Comments: Non-asbestos material.

Sample no: 22
Room no: 0/09
Location: kitchen area
Item: sink pad
Accessibility: easy
Sample Taken: Yes
Lab Result: chrysotile asbestos
Quantity: 1 No.
Surface Treatment: composite
Areas of Damage: minor



Comments: Asbestos material. The bitumen pad to the underside of the sink unit within the ground floor kitchen area of the store room contains asbestos fibres. Asbestos sink pads are a non-licensed material that may be removed by a suitably trained general contractor wearing appropriate RPE/PPE and following HSE guidance work methods. If removed, we suggest disposing of the sink as a whole unit as hazardous waste.

Additional Notes:

Survey ref: DJ181109B

Survey Date: 09-11-2018
Survey Type: Refurb/Demo
Lead Surveyor: Dale Jones

Presumption: A
Room no: 0/17 (& others)
Location: GF workshop
Item: electrical components
Accessibility: easy
Sample Taken: No
Presumption: asbestos materials
Quantity: multiple fuse boxes
Surface Treatment: enclosed
Areas of Damage: unknown



Comments: Presumed asbestos materials. The electrics were not fully inspected due to the absence of an isolation certificate but are presumed to contain asbestos components such as rope seals and flash pads due to their age (as per sample 15). If the electrics are to be replaced, we advise disposing of all fuse boxes within the property as whole units as hazardous waste.

Presumption: B
Room no: -1/02
Location: basement boiler room
Item: boiler components
Accessibility: difficult
Sample Taken: No
Presumption: asbestos materials
Quantity: 1 No. boiler
Surface Treatment: enclosed
Areas of Damage: unknown



Comments: Presumed asbestos material. The boiler was not fully inspected due to heavy contamination from the nearby pipe insulation. The boiler is also presumed to contain asbestos components such as rope seals and gaskets due to its age. As the boiler is redundant, we advise removal and disposal by a HSE-licensed contractor under controlled conditions as the boiler may require dismantling to facilitate removal. The boiler must be disposed as hazardous waste.

Additional Notes:



DJ Surveying
16 Brynteg Crescent
Brynteg
Wrexham
LL11 6NA

CERTIFICATE OF ASBESTOS ANALYSIS

NS Ref. : 1811138
Date Received : 12.11.18
Samples Analysed By : Paul Lee
Date Analysis Completed : 13.11.18
Date Reported : 13.11.18
Samples Taken By : Client
Client Ref (if required) : Not required

Site Ref	Client Ref	Location	Description	Lab Ref	Asbestos Identification
Textile Mill, Topping Street	1	First Floor Workshop	Grey VFTs	1811138-1	No Asbestos Detected
Textile Mill, Topping Street	2	First Floor Workshop	Blue VFTs	1811138-2	No Asbestos Detected
Textile Mill, Topping Street	3	First Floor Workshop	White VFTs	1811138-3	No Asbestos Detected
Textile Mill, Topping Street	4	First Floor Workshop	White Floor Lining	1811138-4	No Asbestos Detected
Textile Mill, Topping Street	5	Entrance Hall	Red Vinyl Sheet Flooring	1811138-5	No Asbestos Detected
Textile Mill, Topping Street	6	Ground Floor Storage Area	Blue VFTs	1811138-6	Chrysotile
Textile Mill, Topping Street	7	Ground Floor Storage Area	Yellow VFTs	1811138-7	Chrysotile
Textile Mill, Topping Street	8	Ground Floor Storage Area	Adhesive	1811138-8	Chrysotile
Textile Mill, Topping Street	9	Stairway	White Stair Nosings	1811138-9	No Asbestos Detected
Textile Mill, Topping Street	10	Ground Floor Workshop	Dark Grey VFTs	1811138-10	No Asbestos Detected
Textile Mill, Topping Street	11	Ground Floor Workshop	Light Grey VFTs	1811138-11	No Asbestos Detected

The laboratory cannot be responsible for inaccurate or unrepresentative sampling. All sample descriptions and locations are provided by the client, the laboratory cannot be held responsible for inaccurate information

Analysis for asbestos in bulk materials using dispersion staining was carried out in accordance with our documented in-house method NSTM4 which is based on the methodology set out in HSG 248

For and on behalf of
North Star Environmental Ltd

P. Lee
Laboratory Manager

K. Burns
Technical Manager

This certificate shall not be reproduced, except in full, without prior written approval by North Star Environmental Ltd. It should be noted that opinions and interpretations detailed herein are outside the scope of UKAS accreditation held. North Star Environmental Ltd, Suite A1, 1st Floor, Beech House, Oaklands Office Park, Hooton Road, Hooton, CH66 7NZ
Tel No: 0151 538 3141, Fax: 0151 331 3541, Email: info@northstarencironmental.co.uk

Company No. 7948744

Page 1 of 2



DJ Surveying
16 Brynteg Crescent
Brynteg
Wrexham
LL11 6NA

CERTIFICATE OF ASBESTOS ANALYSIS

NS Ref. : 1811138
Date Received : 12.11.18
Samples Analysed By : Paul Lee
Date Analysis Completed : 13.11.18
Date Reported : 13.11.18
Samples Taken By : Client
Client Ref (if required) : Not required

Site Ref	Client Ref	Location	Description	Lab Ref	Asbestos Identification
Textile Mill, Topping Street	12	Boiler Room	Pipe Insulation	1811138-12	Chrysotile, Crocidolite
Textile Mill, Topping Street	13	Ground Floor Stock Room	White Vinyl Sheet Flooring	1811138-13	No Asbestos Detected
Textile Mill, Topping Street	14	Stairway	Red VFTs	1811138-14	Chrysotile
Textile Mill, Topping Street	15	First Floor Workshop	Flash Pad	1811138-15	Chrysotile
Textile Mill, Topping Street	16	Ground Floor Storage Area	Panel To Ironing Board	1811138-16	Chrysotile
Textile Mill, Topping Street	17	Basement	Cement Flue	1811138-17	Chrysotile
Textile Mill, Topping Street	18	Ground Floor Office	Redundant Cistern	1811138-18	No Asbestos Detected
Textile Mill, Topping Street	19	Ground Floor Male WC	Blue VSF	1811138-19	No Asbestos Detected
Textile Mill, Topping Street	20	Ground Floor Female WC	Toilet Cistern	1811138-20	Crocidolite
Textile Mill, Topping Street	21	Ground Floor Toilet Lobby	Panels Below Stairs	1811138-21	No Asbestos Detected
Textile Mill, Topping Street	22	Kitchen	Sink Pad	1811138-22	Chrysotile

The laboratory cannot be responsible for inaccurate or unrepresentative sampling. All sample descriptions and locations are provided by the client, the laboratory cannot be held responsible for inaccurate information

Analysis for asbestos in bulk materials using dispersion staining was carried out in accordance with our documented in-house method NSTM4 which is based on the methodology set out in HSG 248

For and on behalf of
North Star Environmental Ltd

P. Lee
Laboratory Manager

K. Burns
Technical Manager

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North Star Environmental Ltd, Suite A1, 1st Floor, Beech House, Oaklands Office Park, Hooton Road, Hooton, CH66 7NZ
Tel No: 0151 538 3141, Fax: 0151 331 3541, Email: info@northstarenvironmental.co.uk

Company No. 7948744

Page 2 of 2

Asbestos Survey Strategy

A strategy has been established to keep to a minimum the number of bulk samples taken for analysis. The strategy employed is a combination of a visual inspection and sampling of bulk materials.

During the survey, where a material is suspected to contain asbestos, a bulk sample is taken for analysis. In areas where there are substantial quantities of visually uniform materials, a small number of samples are taken as being representative of the whole area, or rooms of the same construction and time period.

In general, for homogenous manufactured products containing asbestos, it can be assumed that the asbestos is uniformly distributed throughout the material and one or two samples will suffice, e.g. boards, sheets, cement pipes, textiles, ropes, friction products, plastics and vinyls, mastics, sealant, bitumen roofing felt and gaskets. Insulation and spray materials are generally less homogenous as they were applied 'on-site' and the composition depended on the availability of materials. Subsequent repairs and patching may add to this variability and increase the number of samples required. In addition, substantial over-spray contamination and debris may have been produced. Often a single sample may be all that is required to confirm the suspicion that a homogenous material is asbestos and to make a presumption that this applies to other materials of the same type. However, for non-homogenous materials and for some presumed non-asbestos materials, additional sampling may often be needed in order to reduce the possibility of false negatives, which may lead to uncontrolled exposures.

Where 'NO ACCESS' is used, it indicates that the area specified was not accessible at the time of the survey. The client is to be aware of the possibility of there being asbestos materials in the area. This may therefore require further investigation. Only the areas defined are covered in this report. Any areas not identified should be considered as not accessed for the purposes of this survey.

Sampling Strategy for Asbestos Material (Health & Safety Policy)

The purpose of undertaking sampling was to identify the nature and extent of all asbestos material, using intrusive techniques where permitted by the client.

All samples were collected in self-seal bags, where appropriate. Care was taken to prevent cross-contamination of samples.

All sampling was undertaken with the intention of causing the minimum possible nuisance and risk to the health of occupants and visitors to the property.

Under the Control of Asbestos Regulations 2012, dust release during sampling must be reduced to as low as is reasonably practicable. In order to achieve this, various control measures were employed, as specified within HSG264. Dependant upon the type of material being sampled, this may have included either shadow-vacuuming of the sampled area or the use of a wetting agent as a dust suppressant.

After sampling, any areas damaged as a result of the sampling methods used were sealed in an appropriate manner in order to prevent future fibre release.

All samples were double-sealed in polythene bags at the point of sampling.

Samples may have been taken in locations that may impair the integrity (except structurally) of the product, where permitted by the client.

Where possible, all sampling points were previously agreed with the client prior to actual sampling.

All samples have been taken in accordance with standard terms of engagement and the survey plan.

Specific Exclusions

The survey was limited to those areas accessed at the time of the survey.

Flues, ducts, voids or any similarly enclosed areas, the access to which would have necessitated the use of specialist equipment or tools, may require re-inspection upon access being facilitated by the client. Where this is the case, reference will have been made within the report. Samples may not have been taken where to do so would have impaired the structure. A 'presumption' or 'strong presumption' may have been given as an alternative. Therefore we are not responsible for inaccurate asbestos diagnosis within these areas, i.e. materials may have been presumed to contain asbestos where this is not the case.

We do not accept liability for damage to decoration, fittings or fixtures caused during the undertaking of the survey where this has facilitated the inspection of otherwise inaccessible areas/surfaces/items.

We have not inspected lift shafts, plant rooms or similar which require the attendance of a specialist engineer without such an engineer in attendance. It is the responsibility of the client to arrange such services unless otherwise agreed prior to the survey being undertaken.

The removal or relocation of carpets, furniture, blinds, curtains, fixtures or fittings is the responsibility of the client. Whilst every care and effort is taken to minimise the possibility, we do not accept responsibility for damage to such items howsoever caused during the undertaking of the survey. Please remove such items from areas likely to require inspection prior to the survey being undertaken where possible.

We have not inspected any areas requiring specialist access equipment other than extendable ladders. Any areas requiring specialist access equipment have been specifically excluded unless otherwise stated. Please provide access equipment for the duration of the survey should you be aware that it may be required.

We have not reported on concealed spaces that may exist within the fabric of the building where the extent and presence of these is not evident due to inaccessibility or insufficient knowledge of the structure at the time of the survey.

Samples have not been taken where the act of sampling would endanger the surveyor or affect the functional integrity of the item concerned unless prior permission has been granted by the client or client's representative. This includes, for example, fuses within electrical boxes, gaskets, fire doors, ropes associated with heating, glazing or power plant, etc. A presumption may have been given as an alternative.

Samples have not been taken where prohibited or prevented by the client, tenant or their representative.

Bulk samples have been taken from all materials that upon visual inspection appeared likely to contain asbestos, where practicable.

The presence of debris to pipework, which is not readily visible or would require the removal of overlying non-asbestos insulation, may have been excluded from this survey only if so requested by the client.

Materials have been referred to as Asbestos Insulating Board or Asbestos Cement based upon their asbestos content and visual appearance alone. Density checks have not been carried out on any material unless otherwise stated.

Statement of Completion

Date: 25th – 28th June 2019 1st July 2019.
Client: Colbre Projects Ltd
Site Address: Former Textile Mill. Topping Street, Bury, BL9 6DR
Job No: M18-3383

Brief Description of Works Carried Out:

- For the removal and disposal of 13 Lnr Mtrs of Pipe Lagging using the Wrap & Cut Method
- For the splitting down of the Boiler for the removal of presumed Rope Gaskets internally
- For the removal and disposal of Asbestos Cement Flue Pipe
- To carry out a full environmental clean to Basement Boiler Room and stairwell which includes the removal of flaking paint to walls and disposal of contaminated non-fixed items

Contractor Name: RS Asbestos Ltd
Ground Floor, Canal Wharf,
Bacup Road,
Todmorden, OL14 7PN

Tel: 01706 839082

I have checked the area(s) in question where works have taken place and they have been carried out satisfactorily, professionally and left clean and tidy:

Client (Signature)



Print

C. PAYNE

Date

1/ JULY 2019

Comments

CERTIFICATE OF REOCCUPATION

Manchester
Hadfield House
9 Hadfield Street
Manchester
M16 9FE



Certificate no.:	RC-20190701091507	Project no.:	M-53443
UKAS accredited method statement and disclaimers:	As per all current legislation, regulations, ACOP's and Guidance		
Client name and address:	RS Asbestos Ltd, Ground Floor, Canal Wharf, Bacup Road, Todmorden, OL14 7PN	Asbestos removal contractor name and address:	RD Asbestos Solutions, Ground Floor, Canal Wharf, Bacup road, Todmorden, OL14 7PN
Site address for clearance:	Former Textile Mill Topping Street, Bury, BL9 6DR	Asbestos removal contractor's site supervisor:	John Molloy
Location of enclosure/work area:	Former Textile Mill, Topping street, Bury, BL9 6DR	Representative confirming start and acknowledging outcome:	Les Batty
Description of work:	Wrap and cut of Thermal insulation to pipework, Environmental clean of entire enclosure, (as far as resonbably practicable)		
Estimated time (minutes) for Stage 2:	60	Actual time (minutes) for Stage 2:	70
Time difference between estimate and actual Comment if > 20%:			
Start date:	01/07/2019	Start time:	09:23

CERTIFICATE OF REOCCUPATION

Manchester
Hadfield House
9 Hadfield Street
Manchester
M16 9FE



Stage 1 of 4: Preliminary check of site condition and job completeness			
Stage 1 start:		01/07/2019 08:50	
Plan of work checked to confirm areas to be assessed?		YES	
Details of any problems, differences or fixed installations:		No changes reported. ASB 5 notification, was re-submitted due to, time of the works running over, New ASB 5 has now been issued.	
Description and location of any ACMs being retained:		No ACMs are being retained	
Are the following intact and operational:			
Work areas		YES	
Enclosures/air extraction		YES	
Hygiene facilities		YES	
Viewing panel fitted?		YES	
Are the following areas and their immediate surroundings free of obvious asbestos debris and asbestos waste sacks			
Skip area/waste route		YES	
Transit route		YES	
Hygiene facilities		YES	
Enclosure/ work area		YES	
Stage 1 of 4: Pass/Fail			
Pass/fail:		PASS	
Comments:		All satisfactory, viewing panels in correct locations, DCU operating well, enclosure constructed correctly. All transit/Waste routes clear. Waste held in sealed compartment of RS Asbestos vehicle.	
Analyst name:	Les Batty	Analyst Signature:	
Contractor's representative name:	John Molloy	Contractor's representative Signature:	
Stage 1 finish:		01/07/2019 09:15	

Stage 2 of 4: Thorough visual inspection			
Stage 2 start:		01/07/2019 09:35	
Airlock/baglock/enclosure are free of waste bags, materials and unnecessary equipment		YES	
All ACMs have been completely removed from the underlying surfaces		YES	
Interior surfaces inside the enclosure are free from debris and fine settled dust		YES	
Stage 2 of 4: Pass/Fail			
Pass/fail:	PASS		
Comments:	All surfaces have been cleaned (as far as reasonably practicable) these include all the brick walls, ceilings (Concrete), floors (Concrete) Thermal insulation to pipework has been removed using the "Wrap and cut" method. various areas were sealed up with Fabric tape these included, opening of vent to wall, possibly an old chimney, gaps around steel beams and ends of pipes removed during the Visual inspection. redundant boiler section left in situ, due to weight of the metal components, again cleaned down (as far as reasonably practicable)		
Analyst name:	Les Batty	Analyst signature:	
Stage 2 finish:	01/07/2019 10:43		

CERTIFICATE OF REOCCUPATION

Manchester
Hadfield House
9 Hadfield Street
Manchester
M16 9FE



Stage 3 of 4: Clearance air monitoring inside the enclosure

Stage 3 start:			01/07/2019 10:44
Enclosure/work areas are dry?			YES
Air movers switched off and sealed?			YES
Evidence of lock down sprays used?			YES
Original floor surface uncovered?			YES
Disturbance method used:			Brush
Total time of disturbance (minutes):			3
Area (m ²) / Volume (m ³) of enclosure:			32m2/70m3
Number of air samples:			2
Result of Clearance Air Monitoring (Stage 3):			
Pass/fail:			PASS - The area is cleared for the enclosure to be removed.
Comments:			All clearance air monitoring was satisfactory, <0.01 f/ml
Analyst name:	Les Batty	Analyst signature:	
Stage 3 finish:	01/07/2019 11:56		

Stage 4 of 4: Assessment of site for reoccupation

Stage 4 start:	01/07/2019 13:15
Former enclosure/work area and the immediate surrounding area are free from any visible debris, asbestos sacks and waste?	YES
Transit route and waste routes are free from any asbestos debris, asbestos sacks and waste?	YES
All ACMs in the scope of work have been removed and any known ACMs remaining are intact?	YES
Stage 4 Pass/Fail	
Pass/fail:	PASS - The area can be reoccupied.
Comments:	All enclosure materials removed, small amounts of insulation were found on the timber staircase, this was removed. tape, polythene removed from Timber door frames, metal door frames and metal window frames all equipment removed and the site was left tidy.

Analyst name:	Les Batty	Analyst signature:	
Stage 4 finish:	01/07/2019 13:57		

AIR SAMPLING TEST CERTIFICATE

Manchester

Hadfield House
9 Hadfield Street
Manchester
M16 9FE



2520

Certificate no.:	RC-20190701091507	Project no.:	M-53443
UKAS accredited method statement and disclaimers:	As per all current legislation, regulations, ACOP's and Guidance		
Client name and address:	RS Asbestos Ltd, Ground Floor, Canal Wharf, Bacup Road, Todmorden, OL14 7PN	Site address:	Former Textile Mill Topping Street, Bury, BL9 6DR
Work location:	Former Basement Boiler room	Date:	01/07/2019 11:56:00

Microscope no.:	362	NPL test slide no.:	2641	Graticule Diameter (µm):	100	Graticule ref:	n/a
Exposed filter diameter (mm)	22.25	Timer ref:	1729	Flow meter ref:	1239	Counter ref	1573, 1233
Barometer ref:	2617	Pressure (mb):	1018	Thermometer ref:	2617	Temperature (°C):	14
Stage micrometer	2640	Band 5 visible:					
Test Conditions	Dry, internal						

Sample no.	Pump no.	Cowl no.	Test	Location	Start time	Finish time	Sample time (T)	Initial flow (l/m)	Final flow (l/m)	Average flow (F) (l/m)	Volume (V) (V=T*F)	Fibres	Fields	Limit of quantification	Calculated result (f/ml)	Recorded result (f/ml)
001	47	1205	Clearance	See site plan/diagram	10:51	11:25	34	16.0	16.0	16.0	544	6.5	200	0.009	0.0030	< 0.01
002	4	1206	Clearance	See site plan/diagram	10:52	11:27	35	16.0	16.0	16.0	560	7	200	0.009	0.0031	< 0.01
013							0			0.0	0					

Acknowledgement	
Pass or fail statement:	PASS
Analyst name:	Les Batty
Analyst signature:	
Date and time:	01/07/2019 11:56

CERTIFICATE OF REOCCUPATION

Manchester

Hadfield House
9 Hadfield Street
Manchester
M16 9FE



2520

Acknowledgement:			
Pass or fail statement:	I have been advised by the analyst that the Certificate for Reoccupation can be issued as the area has passed all four stages.		
Contractor's representative name:	John Molloy	Contractor's representative signature:	
Date and time:	01/07/2019 13:42		
Analyst name:		Analyst signature:	
Date and time:	01/07/2019 13:42		

PHOTOGRAPH APPENDIX



Certificate no.:	RC-20190701091507	Project no.:	M-53443
Analyst name:	Les Batty		

	Stage 1 - DCU, barred off
	Stage 1 - Airlock, viewing panel
	Stage 1 - CCTV, operating well
	Stage 1 - Welfare unit

	Stage 2 - Image showing pipework, remaining in concrete ceiling, the remainder has been removed, using 'Wrap and cut' method.
	Stage 2 - stairwell, entering the enclosure
	Stage 2 - Heavy components of Boiler, left in situ due to weight.
	Stage 2 - NPU
	Stage 2 - Floor of enclosure

	Stage 2 - Textured coating to plaster board walls, (NOT IN SCOPE) will be remaining, presence of ACM (Unknown)
	Stage 3 - Sample pump 001
	Stage 3 - Sample pump 002
	Stage 3 - Sealed NPU
	Stage 3 - Brush used for disturbance during clearance air monitoring

	Stage 3 - Slightly damp in place majority of the floor is dry.
	Stage 4 - Textured coating to wall, Not in scope of works left insitu
	Stage 4 - small amounts of insulation was removed during stage 4 of 4, wetter down and REP and PPE were worn at all times!
	Stage 4 - Former enclosure
	Stage 4 - former enclosure



Stage 4 - chimney/ void was sealed, during the works.



Stage 4 - Former air/bag lock locations.

Manchester

Hadfield House
9 Hadfield Street
Manchester
M16 9FE

SITE LAYOUT DIAGRAM



Certificate no.:	RC-20190701091507	Project no.:	M-53443
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DIAGRAMS MUST BE INCLUSIVE OF APPROXIMATE ENCLOSURE DIMENSIONS



Key for diagram	KEY FOR DIAGRAM  Air Locks  Polythene Sheeting  Waste Skip  Viewing Panels  Negative Pressure Unit  Flexible ducting  Asbestos Contractor Vehicle  Asbestos remaining  Transit Route  Decantamination Unit  Sample Locations  SKIP  ARC  X  DCU
We the undersigned agree that the diagram is an accurate indication of the site layout for the project.	

Acknowledgement:			
We the undersigned agree that the diagram is an accurate indication of the site layout for the project.			
Contractor name:	John Molloy	Contractor signature:	
Date:	01/07/2019		
Analyst name:	Les Batty	Analyst signature:	
Date:	01/07/2019 13:42		

APPENDIX B

Site photographs



Photograph 1

Description: Eastern and northern Site elevations

Date: 10/01/2024

Location: View from Topping Street – looking to the south-west



Photograph 2

Description: Site frontage / north-eastern elevation

Date: 10/01/2024

Location: View from Topping Street – looking to the south



Photograph 3

Description: Western Site elevation

Date: 10/01/2024

Location: View from Peter Street – looking to the north-east



Photograph 4

Description: Western and southern Site elevations

Date: 10/01/2024

Location: View from Peter Street – looking to the east



Photograph 5

Description: Typical window opening

Date: 10/01/2024

Location: Site frontage



Photograph 6

Description: Neighbouring land use – residential properties

Date: 10/01/2024

Location: Land directly to the south of the Site



Photograph 7

Description: Neighbouring land use – car park
Date: 10/01/2024
Location: Land directly to the east of the Site



Photograph 8

Description: Ground floor level within on-Site building
Date: 10/01/2024
Location: North-western part of the building



Photograph 9

Description: Ground floor level within on-Site building

Date: 10/01/2024

Location: South-western part of the building



Photograph 10

Description: Typical flooring surface (tile adhesive over concrete slab)

Date: 10/01/2024

Location: Western part of the building



Photograph 11 **Description:** Former toilet block within on-Site building
 Date: 10/01/2024
 Location: Southern edge of the building



Photograph 12 **Description:** Ground floor level within on-Site building
 Date: 10/01/2024
 Location: Eastern part of the building



Photograph 13

Description: Exposed first floor flooring / joists within on-Site building

Date: 10/01/2024

Location: Eastern part of the building



Photograph 14

Description: Typical flooring surface (concrete slab)

Date: 10/01/2024

Location: Eastern part of the building



Photograph 15

Description: Access to 'cellar' area

Date: 10/01/2024

Location: Southern part of the on-Site building



Photograph 16

Description: 'Cellar' area

Date: 10/01/2024

Location: Southern edge of the on-Site building



Photograph 17

Description: Drainage manhole within 'cellar' area

Date: 10/01/2024

Location: Southern edge of the on-Site building



Photograph 18

Description: Former boiler plinth within 'cellar' area

Date: 10/01/2024

Location: Southern edge of the on-Site building



Photograph 19

Description: Former boiler flue within 'cellar' area

Date: 10/01/2024

Location: Southern edge of the on-Site building



Photograph 20

Description: Window present within the 'cellar' area

Date: 10/01/2024

Location: Southern edge of the on-Site building



Photograph 21

Description: Example of internal PID survey

Date: 10/01/2024

Location: Wall-slab joint within on-Site building



Photograph 22

Description: Example of internal PID survey

Date: 10/01/2024

Location: Drainage cover within 'cellar' area



Photograph 23

Description: Exploratory drill location through concrete slab (DRILL1)

Date: 10/01/2024

Location: South-eastern part of the on-Site building



Photograph 24

Description: Vapor Pin installed within the in-situ concrete slab (VP1)

Date: 10/01/2024

Location: North-eastern part of the on-Site building



Photograph 25

Description: Vapor Pin installed within the in-situ concrete slab (VP2)

Date: 10/01/2024

Location: North-western part of the on-Site building



Photograph 26

Description: PID monitoring at Vapor Pin VP1

Date: 10/01/2024

Location: North-eastern part of the on-Site building



Photograph 27

Description: PID monitoring at Vapor Pin VP2

Date: 10/01/2024

Location: North-western part of the on-Site building



Photograph 28

Description: Sub-slab air sampling at Vapor Pin VP1

Date: 10/01/2024

Location: North-eastern part of the on-Site building

APPENDIX C

Laboratory results



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Ground First Limited
26 Victoria Street
Castlefields
Shrewsbury
SY1 2HS

Attention: Andy Singleton

CERTIFICATE OF ANALYSIS

Date of report Generation:	18 January 2024
Customer:	Ground First Limited
Sample Delivery Group (SDG):	240112-131
Your Reference:	4332
Location:	Topping Mill
Report No:	717263
Order Number:	4332

We received 1 sample on Friday January 12, 2024 and 1 of these samples were scheduled for analysis which was completed on Thursday January 18, 2024. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 240112-131

Report Number: 717263

Superseded Report:

Client Ref.: 4332

Location: Topping Mill

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
29201099	VP1			10/01/2024

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 240112-131

Report Number: 717263

Superseded Report:

Client Ref.: 4332

Location: Topping Mill

Results Legend



Test



No Determination
Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water
Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)

29201099

Customer
Sample Reference

VP1

AGS Reference

Depth (m)

Container

Gas Canister

Sample Type

G

Bulk Gas

All

NDPs: 0
Tests: 1

X

VOC's

All

NDPs: 0
Tests: 1

X

SDG: 240112-131

Report Number: 717263

Superseded Report:

Client Ref.: 4332

Location: Topping Mill

Bulk Gas

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 240112-131
Client Ref.: 4332

Report Number: 717263
Location: Topping Mill

Superseded Report:

Sample Number 29201099

Sample ID VP1

Depth

Sampled Date 10/01/2024 00:00:0

- ISO17025 accredited. M - mCERTS accredited. 1-4*§@ - Sample deviation (see appendix)

Method TM330 Determination of VOC's in atmospheric, sub-slab and soil gas samples

Canister No. 8

Sample Volume (ml) 160 Dispatch pressure (psia) 0.04 Initial pressure (psia) 12.96 Final pressure (psia) 19.14 Dilution 1.4768518519

CAS Number	Compound	LOD	Result	Units	LOD	Result	Units
71-55-6	1,1,1-Trichloroethane	<1.38	2.40	# ppbv	<7.51	13.0	# ug/m ³
79-34-5	1,1,2,2-Tetrachloroethane	<1.38	<1.38	# ppbv	<9.48	<9.51	# ug/m ³
79-00-5	1,1,2-Trichloroethane	<1.38	<1.38	# ppbv	<7.51	<7.53	# ug/m ³
75-34-3	1,1-Dichloroethane	<1.38	2.29	# ppbv	<5.59	9.29	# ug/m ³
75-35-4	1,1-Dichloroethene	<1.38	3.20	# ppbv	<5.47	12.7	# ug/m ³
526-73-8	1,2,3-Trimethylbenzene	<1.38	<1.38	# ppbv	<6.77	<6.80	# ug/m ³
120-82-1	1,2,4-Trichlorobenzene	<1.38	<1.38	# ppbv	<10.2	<10.2	# ug/m ³
95-63-6	1,2,4-Trimethylbenzene	<1.38	1.79	# ppbv	<6.77	8.79	# ug/m ³
106-93-4	1,2-Dibromoethane	<1.38	<1.38	# ppbv	<10.6	<10.6	# ug/m ³
95-50-1	1,2-Dichlorobenzene	<1.38	<1.38	# ppbv	<8.30	<8.32	# ug/m ³
107-06-2	1,2-Dichloroethane	<1.38	1.52	# ppbv	<5.59	6.16	# ug/m ³
78-87-5	1,2-Dichloropropane	<1.38	<1.38	# ppbv	<6.38	<6.40	# ug/m ³
76-14-2	1,2-Dichlorotetrafluoroethane	<1.38	4.16	# ppbv	<9.65	29.1	# ug/m ³
108-67-8	1,3,5-Trimethylbenzene	<1.38	<1.38	# ppbv	<6.77	<6.80	# ug/m ³
106-99-0	1,3-Butadiene	<1.38	<1.38	# ppbv	<3.05	<3.06	# ug/m ³
106-46-7	1,4-Dichlorobenzene	<1.38	<1.38	# ppbv	<8.30	<8.32	# ug/m ³
123-91-1	1,4-Dioxane	<1.38	<1.38	3 ppbv	<4.97	<4.98	3 ug/m ³
71-23-8	1-Propanol	<1.38	2.89	ppbv	<3.39	7.10	ug/m ³
78-93-3	2-Butanone (MEK)	<1.38	<1.38	# ppbv	<4.06	<4.08	# ug/m ³
591-78-6	2-Hexanone	<1.38	<1.38	3 # ppbv	<5.64	<5.66	3 # ug/m ³
107-87-9	2-Pentanone	<1.38	<1.38	ppbv	<4.85	<4.87	ug/m ³
589-38-8	3-Hexanone	<1.38	<1.38	ppbv	<5.64	<5.66	ug/m ³
96-22-0	3-Pentanone	<1.38	<1.38	ppbv	<4.85	<4.87	ug/m ³
108-10-1	4-Methyl-2-pentanone	<1.38	<1.38	3 # ppbv	<5.64	<5.66	3 # ug/m ³
67-64-1 & 123-38-6	Acetone + Propanal	<2.77	56.7	# ppbv	<6.57	134	# ug/m ³
75-05-8	Acetonitrile	<1.38	38.6	ppbv	<2.31	64.8	ug/m ³
107-02-8	Acrolein	<1.38	<1.38	# ppbv	<3.16	<3.17	# ug/m ³
71-43-2	Benzene	<1.20	3.81	# ppbv	<3.83	12.1	# ug/m ³
100-44-7	Benzyl Chloride	<1.38	<1.38	# ppbv	<7.17	<7.19	# ug/m ³
75-27-4	Bromodichloromethane	<1.38	<1.38	# ppbv	<9.26	<9.29	# ug/m ³
75-25-2	Bromoform	<1.38	<1.38	# ppbv	<14.3	<14.3	# ug/m ³
74-83-9	Bromomethane	<1.38	<1.38	# ppbv	<5.36	<5.38	# ug/m ³
123-72-8	Butanal	<1.38	<1.38	ppbv	<4.06	<4.08	ug/m ³
75-15-0	Carbon Disulfide	<1.38	4.47	# ppbv	<4.29	13.9	# ug/m ³
56-23-5	Carbon Tetrachloride	<1.38	2.34	# ppbv	<8.69	14.7	# ug/m ³
108-90-7	Chlorobenzene	<1.38	<1.38	# ppbv	<6.38	<6.40	# ug/m ³
75-00-3	Chloroethane	<1.38	3.63	# ppbv	<3.67	9.64	# ug/m ³
67-66-3	Chloroform	<1.38	2.25	# ppbv	<6.72	11.0	# ug/m ³
74-87-3	Chloromethane	<1.38	<1.38	# ppbv	<2.82	<2.83	# ug/m ³
156-59-2	cis-1,2-Dichloroethene	<1.38	1.79	# ppbv	<5.47	7.09	# ug/m ³
10061-01-5	cis-1,3-Dichloropropene	<1.38	<1.38	# ppbv	<6.27	<6.29	# ug/m ³
110-82-7	Cyclohexane	<1.38	3.65	# ppbv	<4.74	12.5	# ug/m ³
75-71-8	Dichlorodifluoromethane	<1.38	4.67	# ppbv	<6.83	23.1	# ug/m ³
75-45-6	Difluorochloromethane	<1.38	4.07	ppbv	<4.85	14.3	ug/m ³
100-41-4	Ethylbenzene	<1.38	2.25	# ppbv	<5.98	9.75	# ug/m ³
87-68-3	Hexachlorobutadiene	<1.38	<1.38	ppbv	<14.7	<14.7	ug/m ³



CERTIFICATE OF ANALYSIS

Validated

SDG: 240112-131
Client Ref.: 4332

Report Number: 717263
Location: Topping Mill

Superseded Report:

Sample Number 29201099

Sample ID VP1

Depth

Sampled Date 10/01/2024 00:00:0

- ISO17025 accredited.

M - mCERTS accredited.

1-4+§@ - Sample deviation (see appendix)

Method TM330

Determination of VOC's in atmospheric, sub-slab and soil gas samples

Canister No. 8

Sample Volume (ml) 160 Dispatch pressure (psia) 0.04 Initial pressure (psia) 12.96 Final pressure (psia) 19.14 Dilution 1.4768518519

CAS Number	Compound	LOD	Result	Units	LOD	Result	Units
66-25-1	Hexanal	<1.38	2.90	# ppbv	<5.64	11.9	# ug/m ³
110-54-3	Hexane	<1.38	13.0	# ppbv	<4.85	45.7	# ug/m ³
74-88-4	Iodomethane	<1.38	<1.38	ppbv	<8.01	<8.04	ug/m ³
115-11-7	Isobutene	<1.38	3.92	ppbv	<3.16	8.98	ug/m ³
78-79-5	Isoprene	<1.38	3.28	ppbv	<3.84	9.12	ug/m ³
108-38-3 & 106-42-3	m/p-Xylene	<2.77	11.7	# ppbv	<12.0	50.6	# ug/m ³
78-85-3	Methylacrolein	<1.38	2.04	ppbv	<3.95	5.85	ug/m ³
75-09-2	Methylene Chloride	<1.38	38.6	# ppbv	<4.80	134	# ug/m ³
1634-04-4	MTBE	<1.38	3.42	# ppbv	<4.97	12.3	# ug/m ³
91-20-3	Naphthalene	<1.38	9.95	ppbv	<7.22	52.1	ug/m ³
95-47-6	o-Xylene	<1.38	4.36	# ppbv	<5.98	18.9	# ug/m ³
110-62-3	Pentanal	<1.38	<1.38	ppbv	<4.85	<4.87	ug/m ³
109-66-0	Pentane	<1.38	7.45	ppbv	<4.06	21.9	ug/m ³
100-42-5	Styrene	<1.38	<1.38	# ppbv	<5.87	<5.89	# ug/m ³
127-18-4	Tetrachloroethene	<1.38	4.23	# ppbv	<9.37	28.7	# ug/m ³
108-88-3	Toluene	<1.38	7.82	# ppbv	<5.19	29.4	# ug/m ³
156-60-5	trans-1,2-Dichloroethene	<1.38	2.16	# ppbv	<5.47	8.58	# ug/m ³
1006-02-6	trans-1,3-Dichloropropene	<1.38	<1.38	# ppbv	<6.27	<6.29	# ug/m ³
79-01-6	Trichloroethene	<1.38	6.28	# ppbv	<7.39	33.7	# ug/m ³
75-69-4	Trichlorofluoromethane	<1.38	4.04	# ppbv	<7.73	22.6	# ug/m ³
26523-64-8	Trichlorotrifluoroethane	<1.38	3.61	# ppbv	<10.6	27.6	# ug/m ³
108-05-4	Vinyl Acetate	<1.38	<1.38	# ppbv	<4.85	<4.87	# ug/m ³
75-01-4	Vinyl Chloride	<1.38	3.40	# ppbv	<3.50	8.62	# ug/m ³



CERTIFICATE OF ANALYSIS

Validated

SDG: 240112-131
Client Ref.: 4332

Report Number: 717263
Location: Topping Mill

Superseded Report:

Table of Results - Appendix

Method No	Description
TM053	Determination of Bulk Gas Composition
TM330	Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 240112-131
Client Ref.: 4332

Report Number: 717263
Location: Topping Mill

Superseded Report:

Test Completion Dates

Lab Sample No(s)	29201099
Customer Sample Ref.	VP1
AGS Ref.	
Depth	
Type	Gas (G)
Bulk Gas	17-Jan-2024
VOC's	18-Jan-2024



CERTIFICATE OF ANALYSIS

SDG: 240112-131
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Report Number: 717263
Location: Topping Mill

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

APPENDIX D

Risk classification methodology

Risk classification methodology

The method of risk evaluation adopted in this document is consistent with CIRIA C552 (2001). Hence, risk is considered to be a function of both the probability (likelihood) of contamination occurring at the study site and also the potential severity (consequence) of the environmental impacts associated with this contamination.

The classification system used to define contaminant probability, consequence and risk is described in the following tables.

Table A: Classification of probability

Classification	Definition
High Likelihood	There is a contaminant linkage and an event that appears either very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	There is a contaminant linkage and all the elements are present and in the right place, which means that it is probably that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term, and likely over the long term.
Low Likelihood	There is a contaminant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term.
Unlikely	There is contaminant linkage but circumstances are such that it is improbable that an event would occur even in the long term.

Table B: Classification of consequence

Classification	Receptor	Definition	Examples
Severe <i>(acute risks)</i>	Humans	Short-term (acute) risk to human health likely to result in "significant harm" as defined in the CTL Statutory Guidance	High concentrations of cyanide on the surface of an informal recreation area
	Controlled waters	Short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource	Major spillage of contaminants from site into controlled water
	Property	Catastrophic damage to buildings/property	Explosion resulting from methane accumulation, causing building collapse (can also equate to an acute human health risk if buildings are occupied)
	Ecology	A short-term risk to a particular ecosystem, or organism forming part of such eco-system	Potentially significant derogation of a designated site or protected species
Medium <i>(long-term)</i>	Humans	Chronic damage to human health ("significant harm" as defined in the Contaminated Land Statutory Guidance)	Concentrations of a contaminant from site exceed the GAC or SSAC
	Controlled waters	Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution)	Leaching of contaminants from a site to a Principal or Secondary Aquifer

Classification	Receptor	Definition	Examples
	Property	Significant damage to sensitive crops, buildings, structures and services	Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability)
	Ecology	A significant change in a particular ecosystem, or organism forming part of such ecosystem	Death of a species within a designated nature reserve
Mild (long-term; less sensitive receptors)	Humans	Contamination present although unlikely to constitute a significant chronic health risk to sensitive receptors	Concentrations of chemical species that exceed the GAC or SSAC for a low sensitive land-use e.g. public open space
	Controlled waters	Pollution of non-sensitive water resources	Pollution of non-classified groundwater
	Property	Damage to sensitive buildings/structures/services	Aggressive ground conditions leading to potential for long term degradation of buried concrete
	Ecology	Damage to the environment	Localised damage to aquatic habitat causing temporary relocation of certain species
Minor (long-term; less significant receptors)	Humans	Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.)	The presence of contaminants at such concentrations that protective equipment is required during site works.
	Controlled waters	Potential minor release of contamination to local water features	Short term or low volume release of potentially polluting material to a secondary surface water course of low existing quality
	Property	Easily reparable effects of damage to buildings, structures and services. Harm which may result in a financial loss, or expenditure to resolve.	The loss of plants in a landscaping scheme. Discolouration of concrete
	Ecology	Short term, localised damage may occur; consequences are spatially and temporally limited	Short term or localised disruption to in situ flora or fauna; no lasting effects

Table C: Risk classification (comparison of consequence and probability)

Probability (likelihood)		Consequence (severity)			
		Severe	Medium	Mild	Minor
	High likelihood	Very high risk	High risk	Moderate risk	Low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

APPENDIX E

CLEA model inputs and outputs

CLEA Software Version 1.071

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Report generated23/01/2024

Report titleTopping Mill

Created byAJS at Ground First



BASIC SETTINGS

Land Use

Residential without produce (C4SL)

Building

Medium/large terraced house

Receptor

Female (res C4SL)

Start age class1

End age class6

Exposure Duration6 years

Soil

Sand

Exposure Pathways

Direct soil and dust ingestion

Consumption of homegrown produce

Soil attached to homegrown produce

Dermal contact with indoor dust

Dermal contact with soil

Inhalation of indoor dust

Inhalation of soil dust

Inhalation of indoor vapour

Inhalation of outdoor vapour



Land Use Residential without produce (C4SL)

Receptor Female (res C4SL)

Age Class	Exposure Frequencies (days yr ⁻¹)						Occupation Periods (hr day ⁻¹)		Soil to skin adherence factors (mg cm ²)		Direct soil ingestion rate (g day ⁻¹)	Body weight (kg)	Body height (m)	Inhalation rate (m ³ day ⁻¹)	Max exposed skin factor		Total skin area (m ²)
	Direct soil ingestion	Consumption of homegrown produce	Dermal contact with indoor dust	Dermal contact with soil	Inhalation of dust and vapour, indoor	Inhalation of dust and vapour, outdoor	Indoors	Outdoors	Indoor	Outdoor							
1	180	0	180	170	365	365	23.0	1.0	0.06	0.10	0.10	5.60	0.7	5.4	0.32	0.26	3.43E-01
2	365	0	365	170	365	365	23.0	1.0	0.06	0.10	0.10	9.80	0.8	8.0	0.33	0.26	4.84E-01
3	365	0	365	170	365	365	23.0	1.0	0.06	0.10	0.10	12.70	0.9	8.9	0.32	0.25	5.82E-01
4	365	0	365	170	365	365	23.0	1.0	0.06	0.10	0.10	15.10	0.9	10.1	0.35	0.28	6.36E-01
5	365	0	365	170	365	365	19.0	1.0	0.06	0.10	0.10	16.90	1.0	10.1	0.35	0.28	7.04E-01
6	365	0	365	170	365	365	19.0	1.0	0.06	0.10	0.10	19.70	1.1	10.1	0.33	0.26	7.94E-01
7	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	22.10	1.2	12.0	0.22	0.15	8.73E-01
8	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	25.30	1.2	12.0	0.22	0.15	9.36E-01
9	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	27.50	1.3	12.0	0.22	0.15	1.01E+00
10	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	31.40	1.3	12.0	0.22	0.15	1.08E+00
11	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	35.70	1.4	12.0	0.22	0.14	1.19E+00
12	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	41.30	1.4	15.2	0.22	0.14	1.29E+00
13	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	47.20	1.5	15.2	0.22	0.14	1.42E+00
14	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	51.20	1.6	15.2	0.22	0.14	1.52E+00
15	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	56.70	1.6	15.2	0.21	0.14	1.60E+00
16	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	59.00	1.6	15.2	0.21	0.14	1.63E+00
17	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	70.00	1.6	15.7	0.33	0.27	1.78E+00
18	0	0	0	0	0	0	0.0	0.0	0.00	0.00	0.00	70.90	1.6	13.6	0.33	0.27	1.80E+00

Consumption Rates

Consumption rates (α FW kg^{-1} bodyweight day^{-1}) by Produce Group

Age Class	MEAN RATES						90TH PERCENTILE RATES					
	Green veg	Root veg	Tuber veg	Herb. Fruit	Shrub fruit	Tree fruit	Green veg	Root veg	Tuber veg	Herb. Fruit	Shrub fruit	Tree fruit
1	3.47E+00	5.22E+00	9.22E+00	8.90E-01	1.07E+00	1.87E+00	7.12E+00	1.07E+01	1.60E+01	1.83E+00	2.23E+00	3.82E+00
2	3.34E+00	1.61E+00	3.14E+00	1.93E+00	2.60E-01	5.84E+00	5.87E+00	2.83E+00	6.60E+00	3.39E+00	4.60E-01	1.03E+01
3	3.34E+00	1.61E+00	3.14E+00	1.93E+00	2.60E-01	5.84E+00	5.87E+00	2.83E+00	6.60E+00	3.39E+00	4.60E-01	1.03E+01
4	3.34E+00	1.61E+00	3.14E+00	1.93E+00	2.60E-01	5.84E+00	5.87E+00	2.83E+00	6.60E+00	3.39E+00	4.60E-01	1.03E+01
5	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
6	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
7	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
8	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
9	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
10	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
11	2.54E+00	1.20E+00	2.65E+00	1.25E+00	1.10E-01	2.89E+00	4.53E+00	2.14E+00	4.95E+00	2.24E+00	1.90E-01	5.16E+00
12	1.03E+00	4.90E-01	1.60E+00	5.10E-01	4.00E-02	1.18E+00	1.87E+00	8.90E-01	3.05E+00	9.30E-01	8.00E-02	2.13E+00
13	1.03E+00	4.90E-01	1.60E+00	5.10E-01	4.00E-02	1.18E+00	1.87E+00	8.90E-01	3.05E+00	9.30E-01	8.00E-02	2.13E+00
14	1.03E+00	4.90E-01	1.60E+00	5.10E-01	4.00E-02	1.18E+00	1.87E+00	8.90E-01	3.05E+00	9.30E-01	8.00E-02	2.13E+00
15	1.03E+00	4.90E-01	1.60E+00	5.10E-01	4.00E-02	1.18E+00	1.87E+00	8.90E-01	3.05E+00	9.30E-01	8.00E-02	2.13E+00
16	1.03E+00	4.90E-01	1.60E+00	5.10E-01	4.00E-02	1.18E+00	1.87E+00	8.90E-01	3.05E+00	9.30E-01	8.00E-02	2.13E+00
17	1.26E+00	6.00E-01	1.18E+00	6.90E-01	9.00E-02	1.27E+00	2.36E+00	1.12E+00	2.35E+00	1.29E+00	1.80E-01	2.38E+00
18	1.35E+00	6.40E-01	1.25E+00	7.40E-01	1.00E-01	1.36E+00	2.34E+00	1.12E+00	2.36E+00	1.28E+00	1.80E-01	2.37E+00

Top 2 applied? Yes

Where top 2 method is applied, two produce categories use 90th percentile rates, while the remainder use the mean. Produce categories vary on a chemical-by-chemical basis. Where top 2 method is not used, all produce categories for all chemicals assume 90th percentile rates.

Building Medium/large terraced house**Soil** Sand

Building footprint (m ²)	4.40E+01
Living space air exchange rate (hr ⁻¹)	5.00E-01
Living space height (above ground, m)	4.80E+00
Living space height (below ground, m)	0.00E+00
Pressure difference (soil to enclosed space, Pa)	3.10E+00
Foundation thickness (m)	1.50E-01
Floor crack area (cm ²)	5.31E+02
Dust loading factor (µg m ⁻³)	5.00E+01

Porosity, Total (cm ³ cm ⁻³)	5.40E-01
Porosity, Air-Filled (cm ³ cm ⁻³)	3.00E-01
Porosity, Water-Filled (cm ³ cm ⁻³)	2.40E-01
Residual soil water content (cm ³ cm ⁻³)	7.00E-02
Saturated hydraulic conductivity (cm s ⁻¹)	7.36E-03
van Genuchten shape parameter <i>m</i> (dimensionless)	3.51E-01
Bulk density (g cm ⁻³)	1.18E+00
Threshold value of wind speed at 10m (m s ⁻¹)	7.20E+00
Empirical function (F _x) for dust model (dimensionless)	1.22E+00
Ambient soil temperature (K)	2.83E+02
Soil pH	7.00E+00
Soil Organic Matter content (%)	6.00E+00
Fraction of organic carbon (g g ⁻¹)	3.48E-02
Effective total fluid saturation (unitless)	3.62E-01
Intrinsic soil permeability (cm ²)	9.83E-08
Relative soil air permeability (unitless)	7.68E-01
Effective air permeability (cm ²)	7.54E-08

Soil - Vapour Model

Depth to top of source (no building) (cm)	0
Depth to top of source (beneath building) (cm)	65
Default soil gas ingress rate?	No
Soil gas ingress rate (cm ³ s ⁻¹)	4.44E+01
Building ventilation rate (cm ³ s ⁻¹)	2.93E+04
Averaging time surface emissions (yr)	6
Finite vapour source model?	No
Thickness of contaminated layer (cm)	200

Air Dispersion Model

Mean annual windspeed at 10m (m s ⁻¹)	5.00
Air dispersion factor at height of 0.8m *	2400.00
Air dispersion factor at height of 1.6m *	0.00
Fraction of site cover (m ² m ⁻²)	0.75

* Air dispersion factor in g m⁻² s⁻¹ per kg m⁻³**Soil - Plant Model**

	Dry weight conversion factor	Homegrown fraction		Soil loading factor	Preparation correction factor
	g DW g ⁻¹ FW	Average	High		
		dimensionless		g g ⁻¹ DW	dimensionless
Green vegetables	0.096	0.05	0.33	1.00E-03	2.00E-01
Root vegetables	0.103	0.06	0.40	1.00E-03	1.00E+00
Tuber vegetables	0.210	0.02	0.13	1.00E-03	1.00E+00
Herbaceous fruit	0.058	0.06	0.40	1.00E-03	6.00E-01
Shrub fruit	0.166	0.09	0.60	1.00E-03	6.00E-01
Tree fruit	0.157	0.04	0.27	1.00E-03	6.00E-01

Gardener type None

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RESULTS

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