



**INVESTIGATE**



**REMEDiate**



**REGENERATE**



## **INTERIM REMEDIATION STRATEGY REPORT**

**FOR  
LAND AT  
BILLBERRY CLOSE  
AND ALBERT ROAD,  
WHITEFIELD,  
GREATER MANCHESTER**

**PREPARED FOR  
THOMPSON CONTRACTS  
(BLACKPOOL) LIMITED**

**REPORT NO. 8130C  
JUNE 2025**

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**INTERIM REMEDIATION STRATEGY REPORT FOR LAND AT  
BILLBERRY CLOSE AND ALBERT ROAD, WHITEFIELD,  
GREATER MANCHESTER, M45 8BL**

**CLIENT: THOMPSON CONTRACTS (BLACKPOOL) LIMITED**

**ENGINEER: KEYSTONE DESIGN ASSOCIATES LIMITED**

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## **1. INTRODUCTION**

Our brief is to provide a Phase III Remediation Strategy Report in accordance with the Planning Application Ref. 69535 dated 5<sup>th</sup> April 2023 for submission to the Local Planning Authority (Bury Council).

We have prepared this Remediation Strategy Report following receipt of an email, dated 20<sup>th</sup> June 2025, from the Client.

We have previously issued reports for the site, as follows:

- Phase I: Walkover Survey and Desk Study Report, ref. 8130 and dated March 2025
- Phase II: Ground Investigation Report, ref. 8130A and dated April 2025
- Phase II: Additional Ground Investigation Report, ref. 8130B and dated June 2025

The above reports should be read in conjunction with this report and summaries are given in Section 2.2 below.

This Phase III Remediation Strategy Report has been prepared in general accordance with the Environment Agency's Land Contamination Risk Management (LCRM) guidance (October 2020, updated July 2023) and also meets the criteria for a Remediation Statement, as defined in Section 78H of Part 2A of the Environmental Protection Act 1990.

### **1.1 Site Location and Description**

The site is located at the junction of Billberry Close and Albert Road, Whitefield, Greater Manchester, M45 8BL, as indicated in Figure 1. The approximate National Grid Reference of the centre of the site is 381696, 405920.

As shown in Figure 2, the site comprises an irregular shaped plot of land of 0.3ha. At the time of the walkover carried out for the Phase I Report (27<sup>th</sup> November 2024), the site comprised a predominantly grassed area with overgrown areas in the north, east and west and a bituminous macadam surfaced footpath running from northwest to southeast. The site is bound by 8-16 and 38 Regal Close to the north, 31-35 Brook Drive to the northeast, 17-19 Billberry Close to the southeast, Billberry Close to the south, and Albert Road to the west.

### **1.2 Proposed Development**

We understand that it is proposed to erect seven residential bungalows (three pairs of semi-detached and one detached), with driveways, gardens and landscaped areas, as shown in Figure 3.

### 1.3 Contact Details of Involved Parties

TABLE 1 INVOLVED PARTIES

| Client                                                                                                                                                                                     | Engineer                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Thompson Contracts (Blackpool) Limited</b><br><br>C/O Shane Blackburn,<br>Dales Farm,<br>Clifton Road,<br>Blackpool,<br>Lancashire,<br><br>01253 608470<br>shane@thompsonslimited.co.uk | <b>Keystone Design Associates Limited</b><br><br>C/O Amy Mansell,<br>Development House,<br>261 Church Street,<br>Blackpool,<br>Lancashire<br><br>01253 649040<br>amy@keystonedesign.co.uk |

## 2. SITE ASSESSMENT

### 2.1 Current Status

The site currently comprises a predominantly grassed area with overgrown areas in the north, east and west and a bituminous macadam surfaced footpath running from northwest to southeast.

### 2.2 Summary of Previous Reports

#### 2.2.1 Phase I: Desk Study and Walkover Survey Report (ref. 8130)

The Phase I report included a walkover survey carried out on 27<sup>th</sup> November 2024. At the time of the walkover, the site comprised a predominantly grassed area with overgrown areas in the north, east and west and a bituminous macadam surfaced footpath running from northwest to southeast. A lamppost was noted in the southwest and two manholes were noted in the northeast. The ground sloped down slightly to the northeast and the site could be accessed off Albert Road to the west and Billberry Close to the south.

The historical appraisal found that at the time of the earliest survey (1848) the site was located in undeveloped fields and split into three fields by 1932. A building was shown in the south from 1932 to 1955. The site was within the grounds of a building 15m south from 1955, which is extended to within the south of the site by 1965 and labelled as a school. Two new school buildings were then on site from 1974 to 2001 when all school buildings were demolished and the present-day footpath was added.

No Made Ground was indicated to be present within the site. However, as the site has been developed some may be present.

The drift deposits beneath the site were anticipated to be Till of the Devensian Period, generally comprising Diamicton (poorly sorted clays, sands and gravels). The bedrock underlying the site was anticipated to be mudstone, belonging to the Manchester Marls Formation.

Three watercourses were indicated to be within 250m of the site boundary, the nearest being an inland river 15m to the northeast.

There were two groundwater abstraction licences within 1km of the site boundary, which were both 838m to the northwest, three surface water abstraction licences within 2km of the site boundary, the nearest being 130m to the southeast, and three potable water abstraction licences within 2km of the site boundary, which were all 1285m to the west.

The following potential sources of contamination were identified in the desk study:

- General contaminants including asbestos in Made Ground (probably present) and past and present contaminative processes undertaken on and adjacent to the site including earthworks, construction and demolition and past site usage as a school.
- Hydrocarbon contamination from on-site spillage and leakage of oils and fuels associated with any vehicular access during past site usage as a school.
- Migrating ground gases from any made ground on site, infilled reservoirs 54m to the north, refuse heap 142m to the southwest, and infilled ponds within 250m.

These potential sources result in potential pollutant linkages to site operatives, end users of the site, vegetation, controlled waters and adjacent properties.

The report recommended that a nominal ground investigation was required to assess the ground conditions and to obtain soil samples for contamination analysis and asbestos detection.

In addition, the report recommended that gas standpipes should be installed and monitored over an extended period of time to allow for an assessment to be made due to the conceptual ground model indicating that ground gases might be present.

#### 2.2.2 Phase II: Interpretive Ground Investigation Report (ref. 8130A and 8130B)

The Phase II Report (8130A) was undertaken by Sub Surface North West Limited in March 2025. The investigation comprised of six mini boreholes taken down to depths of between 1.42m and 5.45m, and one hand dug trial pit taken down to a depth of 1.20m.

A supplementary Phase II Report (8130B) was then undertaken by Sub Surface North West Limited in June 2025. The investigation comprised of three mini boreholes taken down to a depth of 5.45m, and six hand dug trial pits taken down to a depth of 1.20m.

The positions of the exploratory holes are given on Figure 2.

The exploratory holes generally found Made Ground to between 1.20m and greater than 2.50m depth, overlying very low to low strength, locally medium and high strength, cohesive drift deposits to depths of between 2.20m and 2.60m. This was underlain by loose, locally medium dense, granular drift deposits to depths of between 3.50m and 4.40m, then low to high strength cohesive drift deposits.

### Contamination Assessment

Eight soil samples taken from the exploratory holes (8130A) were analysed for a suite of determinants comprising a range of common contaminants. Twelve further samples taken from the exploratory holes (8130B) were analysed for lead and asbestos. The results of the soil sample chemical analysis were compared with published guideline values for a standard land use of residential with plant uptake (home grown produce).

When compared with published guideline values for this land use the contamination analysis determined an elevated level of lead, as tabulated below:

TABLE 2 ASSESSMENT OF SOIL CONTAMINATION

| Determinant | Expl. Hole No. | Depth (m)   | Recorded Level (mg/kg) | Published Guideline Value (mg/kg) |
|-------------|----------------|-------------|------------------------|-----------------------------------|
| Lead        | M3             | 0.00 – 0.20 | 210                    | 200                               |

An asbestos screen was undertaken on the twenty soil samples and asbestos was detected as tabulated below:

TABLE 3 ASBESTOS CONTAMINATION

| Exploratory Hole Number | Depth (m)   | Asbestos Type      | Recorded Level (% of soil mass) |
|-------------------------|-------------|--------------------|---------------------------------|
| M3                      | 0.00 – 0.20 | White (chrysotile) | < 0.001                         |
| M4                      | 0.20 – 1.20 | White (chrysotile) | 0.004                           |
| HD2                     | 0.40 – 0.80 | Brown (amosite)    | < 0.001                         |
| HD3                     | 0.50 – 1.20 | Brown (amosite)    | < 0.001                         |
| HD6                     | 0.00 – 0.30 | Brown (amosite)    | < 0.001                         |

Our assessment, based on twenty soil samples, indicates a single elevated level of lead is present in the near surface Made Ground in M3. This level is only marginally above the GAC and the mean concentration of lead across the eight samples is 89mg/kg, well below the GAC of 200mg/kg.

Our assessment, based on twenty soil samples, indicates that low levels of asbestos fibres are present in the near surface Made Ground in M3, M4, HD2, HD3 and HD6. The pathway from the source to site operatives during earthworks, the end users of the development and any proposed planting (receptors) will need to be removed by precautions and/ or remedial measures.

Where the contaminated materials are covered by buildings or a hard surface cover of concrete or bituminous macadam no clean cover will be required. However, in gardens and other open space areas the end users should be protected from the contaminated materials and plants should be provided with a medium in which they can safely grow.

We recommend a 600mm blanket of clean topsoil/ subsoil (equivalent to two spade depths) is provided in all back gardens as fruit and vegetables may be grown and a 450mm blanket of imported clean topsoil/ subsoil is provided in all front and side gardens and other open spaces. In addition, deeper rooted bushes and trees should be pit planted on and in clean topsoil. A geotextile membrane should also be placed at the base of the cover system to prevent any upward migration of asbestos fibres.

During any groundworks, careful observations should be maintained and if any significant pieces of asbestos are found work should be stopped and the advice of a specialist asbestos removal company sought.

S4ULs, C4SLs and CL:AIRE assume long term contact with contamination and assess chronic health risk. The risk of short-term acute exposure to site personnel is dealt with in the remit of the Health and Safety Executive under the Health and Safety at Work Act: 1974 and Regulations made under the Act, including the Control of Substances Hazardous to Health (COSHH) Regulations. The levels of contamination and risk to site personnel should be considered under the Construction Design and Management (CDM) Regulations at the planning stage and in the development of the designers and contractors Health and Safety Plans and Method Statements. The risk of contact with on-site soils should be minimised and the following precautions should be taken as a minimum requirement.

Site personnel involved in earthworks and excavations should wear gloves, overalls and boots, and smoking should be prohibited. Asbestos grade dust masks should be provided, as a precaution.

#### Ground Gas Assessment

To assess the risk of ground gases on site, ground gas monitoring standpipes were installed and monitored over an extended period. Three of six ground gas monitoring visits have been undertaken to date and levels of methane, carbon dioxide and oxygen, as well as flow rate were recorded. The results of the monitoring visits are given below:

TABLE 4 GROUND GAS CONCENTRATIONS AND FLOW RATE

| Methane<br>(% vol. in air) | Carbon Dioxide<br>(% vol. in air) | Oxygen<br>(% vol. in air) | Gas Flow Rate<br>(litres/ hour) |
|----------------------------|-----------------------------------|---------------------------|---------------------------------|
| 0.0 – 1.7                  | 0.2 – 7.1                         | 3.9 – 20.7                | < 0.1                           |

To date, it can be seen from the monitoring that elevated levels of methane and carbon dioxide and depleted levels of associated oxygen have been detected. However, no gas flows have been detected.

Methane gas when present between 5% volume in air (Lower Explosive Limit - L.E.L.) and 15% volume in air (Upper Explosive Limit - U.E.L.) is potentially explosive and inflammable whilst carbon dioxide in conjunction with depleted oxygen is an asphyxiant. Both methane and carbon dioxide are a by-product of the anaerobic and aerobic decomposition of biodegradable materials.

The levels of gas have been assessed in accordance with British Standard 8485, "Code of practice for the design of protective measures for methane and carbon dioxide gasses for new buildings", published in June 2015 and updated in January 2019 (BS.8485:2015+A1:2019).

The characteristic hazardous gas flow rate ( $Q_{hg}$ ) is calculated by dividing the maximum gas (methane or carbon dioxide) concentration by 100 and multiplying by the maximum flow rate in litres per hour (minimum 0.1 l/hr for Sub Surface monitoring equipment). For this site  $Q_{hg} = [7.1 / 100] \times 0.1 = 0.0071$  l/hr.

Based on the monitoring to date, BS.8485:2015+A1:2019, Table 2, indicates that the site falls into Characteristic Situation 1 (CS1).

However, as on this site methane levels have been detected that are >1% and carbon dioxide levels have been detected that are >5%, the CS1 is likely to be increased by one to CS2 on completion of the gas monitoring.

BS.8485:2015+A1:2019, Table 4, indicates that for a CS2 and the type of development proposed a score of 3.5 gives the level of protection and remedial measures required.

BS.8485:2015+A1:2019 Tables 5, 6 and 7 indicate that a combination of the following protection and remedial measures should be considered to achieve the required score:

|           |                                                                                                                                                                                                                       |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Table 5.1 | precast suspended segmental sub-floor slab (block and beam).<br>(Score 0.0)                                                                                                                                           |
| Table 5.3 | reinforced cast in-situ suspended floor slab with minimal penetrations.<br>(Score 1.0)                                                                                                                                |
| Table 5.4 | additionally reinforced cast in-situ suspended floor slab with minimal penetrations – slab of minimum 150mm thickness with reinforcement at the bottom and the top<br>(Score 1.5)                                     |
| .....     |                                                                                                                                                                                                                       |
| Table 6.1 | pressure relief pathway (low fines gravel blanket/ thin geocomposite blanket/ strips terminating in gravel trench external to the building)<br>(Score 0.5)                                                            |
| Table 6.2 | passive sub floor ventilation/ dispersal layer (clear void/ polystyrene void former/ geocomposite void former/ no fines gravel layer with gas drains/ no fines gravel layer) of very good performance.<br>(Score 2.5) |
| Table 6.3 | passive sub floor ventilation/ dispersal layer (clear void/ polystyrene void former/ geocomposite void former/ no fines gravel layer with gas drains/ no fines gravel layer) of good performance.<br>(Score 1.5)      |
| .....     |                                                                                                                                                                                                                       |

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Table 7 | <p>gas resistant membrane meeting the following criteria:</p> <ul style="list-style-type: none"> <li>• sufficiently impervious to gases with a methane gas transmission rate of &lt;40.0 ml/day/m<sup>2</sup>/atm (average) for sheets and joints (tested in accordance with BS.ISO.15105-1 manometric method).</li> <li>• sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions.</li> <li>• sufficiently strong to withstand in-service stresses due to say settlement if placed below a floor slab.</li> <li>• sufficiently strong to withstand the installation process and following trades (penetration from steel fibres in fibre reinforced concrete/ penetration from reinforcement ties/ tearing due to working above it or dropped tools) until covered.</li> <li>• after installation being capable of providing a complete barrier to the entry of the relevant gas.</li> <li>• verified in accordance with CIRIA C735 [N1].</li> </ul> <p>(Score 2.0)</p> |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

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In road, hardstanding and car park areas over-site concrete and/or bituminous macadam surfaces will prevent ground gas escaping naturally to the atmosphere. It would be advisable to provide vent pipes through which ground gases are able to escape. These vent pipes might be placed in adjoining landscaped areas or incorporated in lamp posts or other similar furniture.

All excavations of greater than 1.20m depth should be routinely checked for air quality prior to man entry and appropriate precautions taken.

Any manholes, inspection chambers or other void spaces formed beneath the sites ground surface are potential ground gas traps. Precautions, as per the excavations above, should be taken.

It should be noted that it is our intention to update this section of the report on completion of the ground gas monitoring.

## **2.3 Environmental Setting**

### **2.3.1 Topography**

The area of investigation slopes down slightly to the northeast and the immediate surroundings are predominantly flat.

### **2.3.2 Potentially Contaminative Land Use**

Within 250m of the site there are ten potentially contaminative industrial land uses identified, which include a cotton mill 54m to the north, an unspecified tank 61m to the north, five electricity substations, with the nearest being 64m to the north and a refuse heap 142m to the southwest.

### 2.3.3 Geology & Aquifer Designation

The drift deposits beneath the site are anticipated to be Till of the Devensian Period, generally comprising Diamicton (poorly sorted clays, sands and gravels). These have been designated by the Environment Agency as a Secondary (undifferentiated) aquifer, which is assigned where it is not possible to attribute either category A or B to strata.

A Secondary A aquifer comprises permeable layers capable of supporting water supplies at a local scale and in some cases forming an important source of base flow to rivers.

A Secondary B aquifer comprises predominantly lower permeability layers which may store or yield limited amounts of groundwater due to localised features such as fissures and thin permeable horizons.

The bedrock underlying the site is anticipated to be mudstone, belonging to the Manchester Marls Formation, and has been designated as a Secondary B aquifer.

### 2.3.4 Abstractions

British Geological Survey and Environment Agency data indicates that the site is not within a 1km grid where solution features are present that will enable rapid movement of a pollutant to groundwater.

Environment Agency data indicates that the site is not in an area where additional local information indicates that groundwater is vulnerable to pollution.

According to data provided by the Environment Agency and Natural Resources Wales, there are two groundwater abstraction licences within 1km of the site boundary, which are both 838m to the northwest, three surface water abstraction licences within 2km of the site boundary, the nearest being 130m to the southeast, and three potable water abstraction licences within 2km of the site boundary, which are all 1285m to the west.

There are no Source Protection Zones, set up to protect a water source within 500m of the site of boundary, present

### 2.3.5 Surface Water

The Ordnance Survey indicate that there are three watercourses (river, stream, lake or canal) within 250m of the site boundary, the nearest being an inland river 15m to the northeast.

There are no surface water features (rivers, streams or lakes) within 250m of the site boundary according to the Ordnance Survey.

The Water Framework Directive (WFD) indicates that the site is within the catchment of the River Roch, this watercourse being 1913m to the northwest, and the groundwater body is known as the Manchester and East Cheshire Permo-Triassic Sandstone Aquifers.

## 2.4 Source Pathway Receptor Linkages

Potential sources of contamination identified in the desk study and confirmed by the Phase II investigation are:

### 2.4.1 Sources

Potential sources of contamination identified in the desk study and confirmed by the Phase II investigation are:

1. Low levels of lead and asbestos within the made ground.
2. Elevated levels of carbon dioxide from made ground on site, infilled reservoirs 54m to the north, refuse heap 142m to the southwest, and infilled ponds within 250m.

### 2.4.2 Pathways

Potential pathways between sources and receptors for the proposed development are:

1. Direct contact with and ingestion of contaminated soil.
2. Inhalation of dust and gases.
3. Lateral migration of contaminants offsite.
4. Vertical migration of contaminants to the underlying aquifer.
5. Environmental deposition of airborne pollutants.
6. Consumption of contaminated fruit and vegetables.
7. Ingress of permanent ground gases into enclosed spaces.

### 2.4.3 Receptors

Potential receptors for the proposed development are:

#### Construction Phase

1. Site workers during any demolition and construction phases.
2. Adjacent properties and local residents.

#### Post Development Phase

1. The residents who will be the end users of the site.
2. Adjacent properties and local residents.
3. The building structures and buried services including water supply pipes.
4. Controlled waters including the underlying Aquifers.

### 2.4.4 Potential Pollutant Linkages

#### Construction Phase

- Direct contact with and ingestion of contaminated soil and inhalation of dust by site workers during construction.
- Inhalation of ground gases by site workers in confined spaces during construction.
- Inhalation by local residents of dust generated during construction.

### Post Development Phase

- Inhalation by local residents of airborne dust arising from exposed soil in any soft landscaping
- Direct contact with and ingestion of contaminated soil and inhalation of dust arising from exposed soil in any soft landscaping by the residents who will be the end users of the site.
- Consumption of homegrown produce grown in any soft landscaping by the residents who will be the end users of the site.
- Ingress and accumulation of ground gas and subsequent inhalation by residents.
- Ingress and accumulation of ground gas and subsequent ignition.

## 2.5 Updated Conceptual Ground Model

The conceptual ground model of a site has been updated with regards to contamination sources, pathways and receptors, following the ground investigation, as follows:

TABLE 5 CONCEPTUAL GROUND MODEL

| Potential Source   | Nature of Hazard            | Contaminants Associated with the Source | Pathway                                                                               | Receptor                | Suggested Mitigation Action                                                                                                                                                           |
|--------------------|-----------------------------|-----------------------------------------|---------------------------------------------------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Made Ground        | Contaminants in Made Ground | Lead                                    | Ingestion of soil                                                                     | Site Operatives         | Limit contact with soil by wearing adequate clothing and PPE.                                                                                                                         |
|                    |                             |                                         | Ingestion of dust                                                                     | End Users               | Buildings and hardstanding providing barrier to break pathway.<br><br>Provide clean blanket of topsoil/ subsoil in all gardens and landscaped areas.                                  |
|                    |                             |                                         | Ingestion of contaminated vegetable produce                                           |                         |                                                                                                                                                                                       |
|                    |                             |                                         | Dermal contact                                                                        |                         |                                                                                                                                                                                       |
|                    |                             |                                         | Inhalation of dust                                                                    |                         |                                                                                                                                                                                       |
|                    |                             |                                         | Inhalation of vapours                                                                 |                         |                                                                                                                                                                                       |
|                    |                             |                                         | Uptake via contaminated groundwater                                                   | Vegetation              | Provide clean blanket of topsoil/ subsoil in all gardens and landscaped areas.                                                                                                        |
|                    |                             |                                         | Vertical and lateral movement of mobile contaminants to surface water and groundwater | Controlled Waters       | Very low risk to controlled waters, no mitigation action required.                                                                                                                    |
|                    |                             |                                         | Direct contact                                                                        | Structures and Services | Provide buried concrete in line with classification.                                                                                                                                  |
| Asbestos in ground | Asbestos fibres             | Asbestos fibres                         | Inhalation of fibres                                                                  | Site Operatives         | Remove visible asbestos.                                                                                                                                                              |
|                    |                             |                                         |                                                                                       | End Users               | Buildings and hardstanding providing barrier to break pathway.<br><br>Provide clean blanket of topsoil/ subsoil with geotextile membrane beneath in all gardens and landscaped areas. |

TABLE 5 (cont.) CONCEPTUAL GROUND MODEL

|                                                                                                                                             |                              |                |                                      |                 |                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|----------------|--------------------------------------|-----------------|--------------------------------------------------------------------------|
| Landfill<br>(made ground on site, infilled reservoirs 54m to the north, refuse heap 142m to the southwest, and infilled ponds within 250m.) | Ground Gas<br>(Asphyxiation) | Carbon Dioxide | Inhalation of gas<br>Ignition of gas | Site Operatives | Check gas levels before entering confined spaces.                        |
|                                                                                                                                             |                              |                |                                      | End Users       | Provide gas protection measures to the proposed building as recommended. |

### 3. OPTIONS APPRAISAL

After careful consideration of the risks and benefits, timeframes, costs and sustainability of the available remedial options the Client has decided to adopt the following remedial measures:

- Topsoil/ Subsoil Cover System with underlying Geotextile Membrane
- Ground Gas Barrier

### 4. SOIL CONTAMINATION REMEDIATION & VERIFICATION STRATEGY

#### 4.1 Remediation Objectives

Elevated concentrations of lead and asbestos have been determined in the made ground and remedial measures are therefore required to break the source-receptor pathways where the impacted soil is not covered by buildings or permanent hard surfacing.

The aims of the remediation strategy are:

- To provide a remediated site that is safe and suitable for the proposed end use (residential Type A Building).
- To ensure the remediation is undertaken in a sustainable manner in compliance with current guidelines and with a suitably robust verification plan.
- To satisfy the requirements of the Local Planning Authority (Bury Council).

#### 4.2 Preparatory Works

Preparations for remedial works need to address issues of health and safety, pollution and nuisance in relation to site operatives, visitors to the site and associated plant, surrounding residents and the general public who may be affected by on-site works.

The site area should be made secure to prevent unauthorised access during site remediation works when contaminated materials are to be exposed. Access to site should be regulated by the site manager with records kept of on-site personnel and visitors, lorry movements, materials imported and exported from the site etc. This information should be made available for the Phase IV Validation Report.

### 4.3 Soil Contamination Remediation: Topsoil Cover System

#### 4.3.1 Cover System Methodology

In order to break the pathway from the contaminated soils (source) to the end users of the development (receptors) the following measures are to be adopted:

- A 600mm cover system composed of:
  - 300mm verified clean topsoil
  - 300mm verified subsoil.
  - A geotextile membrane will be placed at the base of the cover system to inhibit the mixing of asbestos fibres.
- Deeper rooted bushes and trees should be planted on and in clean topsoil/subsoil. In these locations there should be a minimum 900mm of verified clean soil in order to comply with BS3882. This should be increased to 1.00m for fruit trees in accordance with the guidance given in BRE465.

The topsoil and subsoil should be compliant with BS3882:2015 and British Standard BS8601:2013 respectively.

The above depths have been determined on the basis that in the landscaped areas the soil is unlikely to be dug to a depth greater than two spade depths (approximately 600mm). The proposed depth also allows for some degree of bioturbation, which normally occurs in the upper 300mm (according to BRE Report BR465 'Cover Systems for Land Regeneration').

#### 4.3.2 Verification Plan

An appropriately qualified and experienced person should have a "watching brief" during the remediation and the observations of this person should be made available for the Phase IV Validation Report.

In order to demonstrate that the imported material used in the cover system is suitable for the intended use chemical analyses should be undertaken. The analyses should be carried out after materials have been imported to site, though it would be advisable to undertake some screening prior to import in order to reduce the risk of the imported material being rejected.

The sampling frequency should be set as a minimum of six samples or one per 100m<sup>3</sup> (whichever is greater) for a brownfield source, or a minimum of three samples or one sample per 250m<sup>3</sup> (whichever is greater) for a greenfield source, in line with the guidance given in the Yorkshire and Lincolnshire Pollution Advisory Group guidance document 'Technical Guidance for Developers, Landowners and Consultants' Version 4.1 (2021).

The analyses should be carried out at an MCERTS and UKAS accredited laboratory and the testing suite should include the following contaminants as a minimum:

|          |                                                  |
|----------|--------------------------------------------------|
| Arsenic  | Nickel                                           |
| Asbestos | pH                                               |
| Boron    | Phenols                                          |
| Cadmium  | Polynuclear Aromatic Hydrocarbons (16 EPA PAH)   |
| Chromium | Selenium                                         |
| Copper   | Sulphide                                         |
| Cyanide  | Sulphate                                         |
| Lead     | Total Petroleum Hydrocarbons (3-BAND SPECIATION) |
| Mercury  | Zinc                                             |

An appropriately qualified and experienced person should assess the results of the contamination analysis which should be compared with up-to-date UK based generic assessment criteria (GACs) for a residential with homegrown produce end use, to determine whether it is suitable for use in the cover system.

We recommended that the imported clean material is stockpiled and protected/covered until the analyses is received and assessed.

Transfer documentation for each load of imported clean topsoil/ subsoil should be made available for the Phase IV Validation Report.

The site will be visited by a suitably qualified person to inspect the cover system. The thickness of clean cover system will be by taking out an appropriate number of hand dug trial pits. A photographic record will be made during placement of the cover system or during the trial pitting. The above information will form part of the Phase IV Verification Report.

## **5. GROUND GAS REMEDIATION & VERIFICATION STRATEGY.**

### **5.1 Remediation Objectives**

The Phase II ground investigation found a potential risk to buildings constructed on the site and the end users from ground gases. Remedial measures are therefore required to prevent the ingress of ground gases into enclosed spaces within the proposed development.

The aims of the remediation strategy are:

- To provide a remediated site that is safe and suitable for the proposed end use (residential Type A Building).
- To ensure the remediation is undertaken in a sustainable manner in compliance with current guidelines and with a suitably robust verification plan.
- To satisfy the requirements of the Local Planning Authority (Bury Council).

## 5.2 Ground Gas Remediation: Membrane & Sub Floor Ventilation.

### 5.2.1 Ground Gas Remediation Methodology

As the gas monitoring has not yet been completed, the following is a preliminary assessment based on the results to date. If the site is to be CS2, we would recommend that, of the remedial options presented in BS.8485:2015+A1:2019, the following remedial measures should be chosen:

Table 5.1      precast suspended segmental sub-floor slab (block and beam).  
(Score 0.0)

Table 6.3      passive sub floor ventilation/ dispersal layer (clear void/ polystyrene void former/ geocomposite void former/ no fines gravel layer with gas drains/ no fines gravel layer) of good performance.  
(Score 1.5)

Table 7      gas resistant membrane meeting the following criteria:

- sufficiently impervious to gases with a methane gas transmission rate of <40.0 ml/day/m<sup>2</sup>/atm (average) for sheets and joints (tested in accordance with BS.ISO.15105-1 manometric method).
- sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions.
- sufficiently strong to withstand in-service stresses due to say settlement if placed below a floor slab.
- sufficiently strong to withstand the installation process and following trades (penetration from steel fibres in fibre reinforced concrete/ penetration from reinforcement ties/ tearing due to working above it or dropped tools) until covered.
- after installation being capable of providing a complete barrier to the entry of the relevant gas.
- verified in accordance with CIRIA C735 [N1].

(Score 2.0)

The subfloor ventilation scheme should comprise a minimum 100mm deep void vented with air bricks to create a minimum vent area of 1500mm<sup>2</sup> per metre run to comply with the minimum requirements set out in BS.8485.

### 5.2.2 Verification Plan

The membrane installation will be subjected to verification inspections by a suitably qualified person to ensure that the correct installation procedures have been followed.

The verification methodology should include the following as a minimum:

- Verification that the chosen membrane meets the required specification.
- Inspection of the membrane immediately after installation to ensure there are no puncture risks, gaps or breaches in the membrane.
- Inspection of the taping and sealing of the membrane and details of where it crosses the wall cavity and door openings.
- Inspection of the cavity wall and vent placement to ensure adequate ventilation will be achieved.

Photographs should be taken during the inspections and technical data sheets for the membrane and sealing tape, etc. should be provided for inclusion in the Phase IV verification report.

## **6. RISKS TO SITE OPERATIVES**

Measures need to be put in place to prevent site operatives coming into direct contact with contaminated materials either by skin contact or by breathing in dust.

Site personnel involved in earthworks and excavations should be made aware of the hazards of working with contaminated materials found on site. Strict personal hygiene should be observed, and gloves, overalls, boots and asbestos grade dust masks should be worn. Washing and messing facilities should be made available on site and smoking should be prohibited.

Consideration needs to be given to site operatives who may be at risk from elevated levels of methane and/or carbon dioxide and/or depleted levels of oxygen in confined spaces below ground. All excavations of greater than 1.20m depth should be routinely checked for air quality prior to man entry and appropriate precautions taken. Any manholes, inspection chambers or other void spaces formed beneath the sites ground surface are potential ground gas traps. Precautions, as per the excavations above, should be taken.

## **7. ENVIRONMENTAL MITIGATION MEASURES & WASTE MANAGEMENT**

### **7.1 Earthworks**

Earthworks undertaken during dry weather might generate dust and in this instance dust should be damped down and asbestos grade dust masks made available to site operatives. In addition stockpiled materials should be sheeted over to prevent excessive airborne dust being formed which could potentially migrate off site.

If groundwater is to be pumped out of excavations, then contamination analyses should be undertaken for groundwater to be disposed of, and the results submitted to the appropriate authority or a waste disposal operator to determine the most cost-effective method of disposal. Groundwater should not be discharged to a sewer without firstly obtaining a discharge consent from the appropriate authority.

### **7.2 Controlled Waters**

The proposed remedial measures will not significantly alter the groundwater regime on site and in our opinion the risks to controlled waters do not warrant any further consideration.

### **7.3 Waste Soil Management**

If it is necessary to reduce levels to accommodate the proposed remediation scheme, then classification of the waste soil arisings should be undertaken prior to removing it to a licensed waste disposal or treatment facility.

All vehicles carrying contaminated material should be securely sheeted and the wheels and undercarriages cleaned before leaving site to ensure that hazardous materials are not dropped onto public roads.

Transfer documentation for each load of contaminated material exported from the site should be obtained and made available for the Phase IV Validation Report.

## **8. CAVEATS, ASSUMPTIONS AND CONTINGENCY PLAN**

It should be appreciated that only a small proportion of the area to be developed has been sampled and consequently the recommendations made and opinions expressed in our reports can only be applied to such conditions as were encountered in the exploratory holes.

The exploratory holes indicate a nature and degree of similarity to the extent that we consider them likely to be representative of the natural ground conditions. However, no guarantee can be given. For the purposes of this remediation strategy it is assumed that the findings of the Phase I and Phase II investigations are representative of the site conditions, however with any site it is possible that unrecorded potentially contaminative activities may have taken place, or that zones of contamination exist which have not been encountered by the intrusive investigation.

We recommend that a contingency plan is put in place to deal with unforeseen contaminated ground or a significant presence of asbestos containing material being found. In this regard a “watching brief” should be employed during earthworks and the following procedure followed if unforeseen ground conditions are encountered:

- Cease earthworks.
- Liaise with the Client and/ or Regulator.
- Agree revised course of action with the Client and/ or Regulator.
- Revise Remediation Statement, if necessary.

## **9. VERIFICATION REPORT**

On completion of the remedial works a Phase IV Verification Report should be produced by the independent suitably qualified person. The report should include records of on-site observations together with contamination analysis certificates, transfer notes, discharge consents, specifications etc.

## **10. GENERAL**

It should be noted that this is an Interim Remediation Statement, which will be updated once the gas monitoring has been completed.

The completed Remediation Statement should be submitted to the Regulator, for approval in writing, prior to commencement. On completion of the actions set out in the Phase III Remediation Statement and receipt of an instruction, we would be happy to validate the remedial works and prepare a Phase IV Validation Report.

Should the proposed development of the site be undertaken in stages, we would be happy to provide a Phase IV Validation Report at each stage of the development.

We trust that this report fulfils your present requirements but if you have any queries or we can be of further assistance please contact the undersigned or Mr Ben Osborne at our Preston office.

SUB SURFACE CONSULTANTS LIMITED  
REPORT No. 8130C  
JUNE 2025

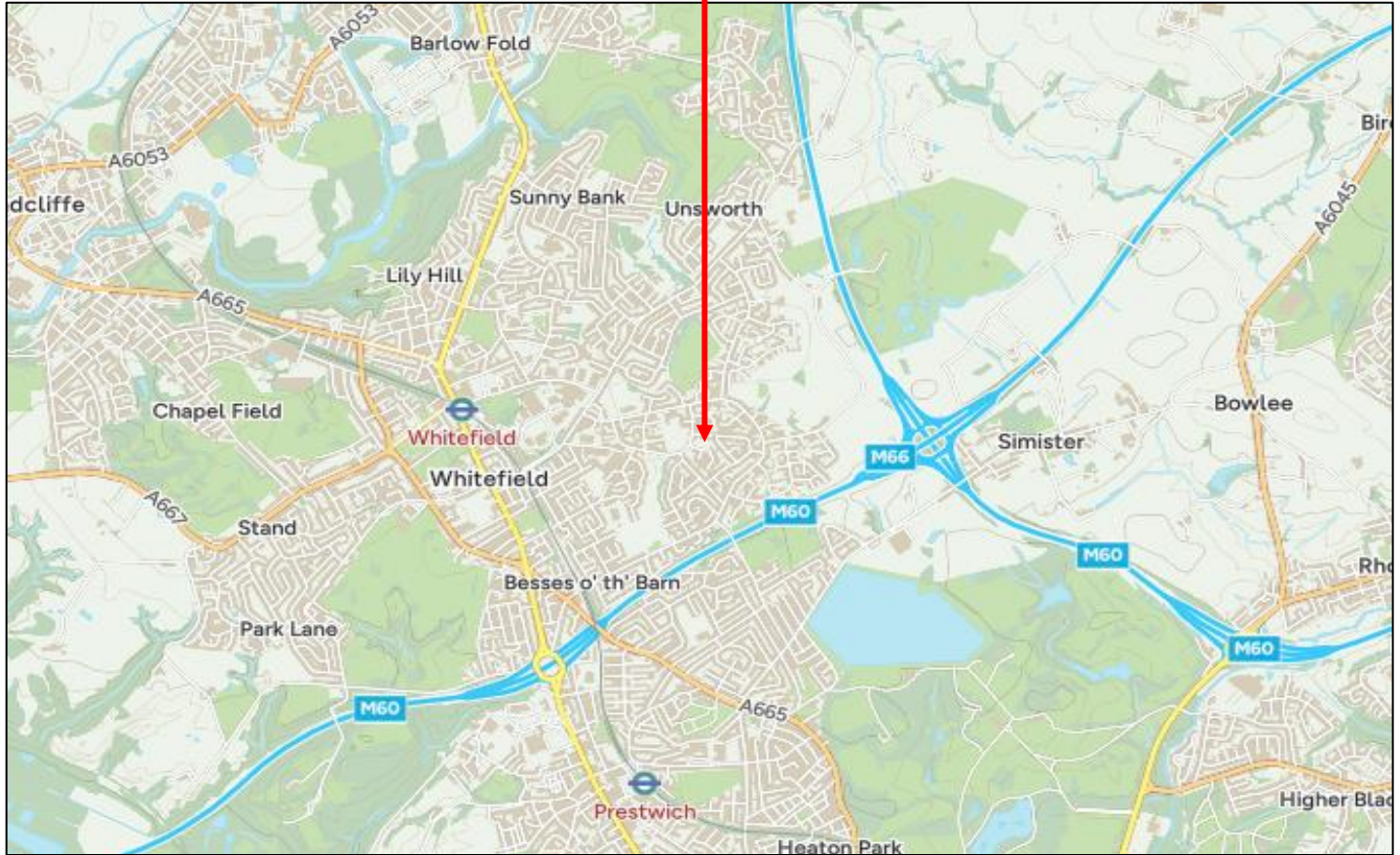
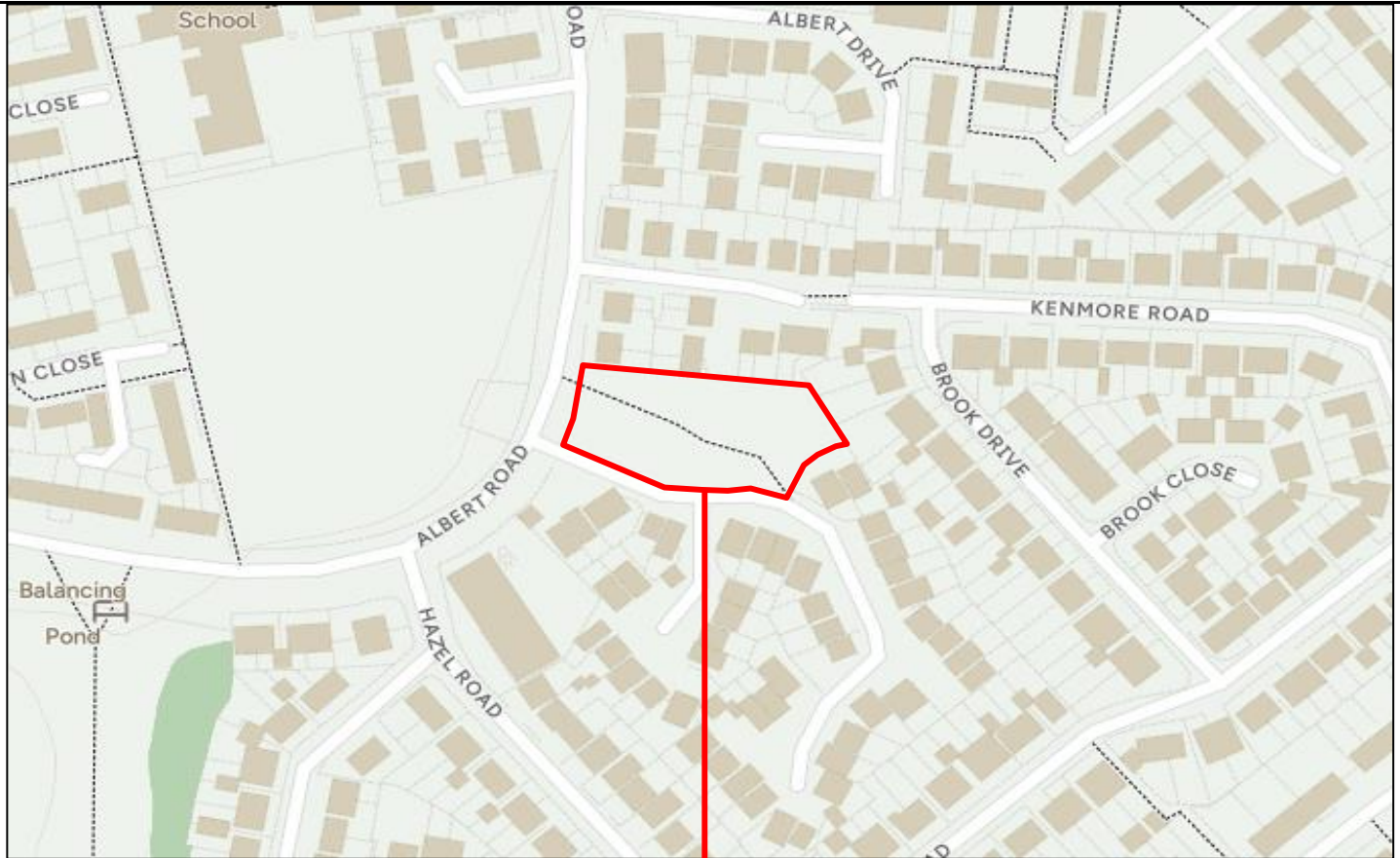


M. S. Banwell B.Sc.(Hons.)  
Geotechnical Engineer  
For and on behalf of  
Sub Surface Consultants Limited



C. A. Marsden B.Sc.(Hons.), C.Eng., M.I.C.E.  
Director  
For and on behalf of  
Sub Surface Consultants Limited.

## FIGURES



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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------------------|----------------------------|------------------|----------------------|
| <div><div><div>S</div><div>S</div></div><div><div><b>SUB SURFACE</b></div><div>SITE INVESTIGATION SPECIALISTS, GEOTECHNICAL &amp; ENVIRONMENTAL CONSULTANTS</div><div>3 Peel Street, Preston, Lancashire, PR2 2QS. Tel: (01772) 561135 Fax: (01772) 204907</div></div></div> |  | Site Location Plan       |                            |                  |                      |
| Site:<br>LAND AT BILLBERRY CLOSE & ALBERT ROAD, WHITEFIELD,<br>GREATER MANCHESTER                                                                                                                                                                                            |  | Date Drawn:<br>26-Jun-25 | Date Checked:<br>27-Jun-25 | Orientation:<br> | Job Number:<br>8130C |
| Client:<br>THOMPSON CONTRACTS (BLACKPOOL) LIMITED                                                                                                                                                                                                                            |  | Drawn By:<br>MSB         | Checked By:<br>CAM         | Scale:<br>NTS    | Figure Number:<br>1  |



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| Drawn By:<br>MSB         | Checked By:<br>CAM         | Scale:<br>NTS                                                                                         | Figure Number:<br>2  |



Street Scene Elevation Along Billberry Close  
(Scale 1:100)



Street Scene Elevation Along Albert Road  
(Scale 1:100)

## SS SUB SURFACE

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Site:  
LAND AT BILLBERRY CLOSE & ALBERT ROAD, WHITEFIELD,  
GREATER MANCHESTER

Client:  
THOMPSON CONTRACTS (BLACKPOOL) LIMITED

## Proposed Development

|                          |                            |                  |                      |
|--------------------------|----------------------------|------------------|----------------------|
| Date Drawn:<br>26-Jun-25 | Date Checked:<br>27-Jun-25 | Orientation:<br> | Job Number:<br>8130C |
| Drawn By:<br>MSB         | Checked By:<br>CAM         | Scale:<br>NTS    | Figure Number:<br>3  |