



Haigh Huddleston & Associates

Civil & Structural Engineering Consultants

Unit 4, Midgley Business Park, Bar Lane, Midgley WF4 4JJ

t 01924 574074 e info@haighhuddleston.co.uk

Our Ref: E18/7342/MD/001

Date: 13 August 2026

FAO Sid Singh

sid@lakeland@yahoo.co.uk

Dear Sir,

Re: Remediation Method Statement for proposed development at former Parkham Foods, Halifax Road, Liversedge

1. INTRODUCTION

- 1.1 Haigh Huddleston & Associates have been requested by Lakeland Properties to provide a remediation statement for the proposed development at the former Parkham Foods, Halifax Road, Liversedge.
- 1.2 The purpose of the document is to specify the remediation philosophy for the site and to specify the fill materials that are required for the controlled backfilling and capping of the site.
- 1.3 A preliminary rotary borehole investigation was undertaken and is discussed in HHA report ref: E18/7342/R001A dated October 2019. A combined desk top study and intrusive investigation works were undertaken and are discussed in HHA report ref: E18/7342/R002 dated March 2025, which includes discussion of the gas monitoring undertaken on site. These reports have been utilised to compile this Remediation Statement.

2. RESULTS OF THE INVESTIGATION

- 2.1 The site investigation works generally proved made ground overlying a weathered mudstone bedrock encountered at 1.3-1.8m below existing ground levels. The made ground consisted of crushed brick, clays, sections of concrete, gravels and topsoil.
- 2.2 The rotary borehole investigation work has proven two intact coal seams on site. An intact 0.3-0.6m thick coal seam was encountered at 2.8-4.6m and an intact 0.4-1.2m thick seam was encountered at 6.0-9.7m below existing ground levels.
- 2.3 Elevated levels of contaminants were only identified in two of the trial pits undertaken on site:
 - TP07 in the north west proved a minorly elevated level of Arsenic of 45 mg/kg.
 - TP06 in the north west proved elevated levels of PAH (Total) and individual PAH compounds (Benzo(a)anthracene (11.0mg/kg), Benzo(b)fluoranthene (7.1mg/kg), Benzo(a)pyrene (11.0mg/kg) and Dibenzo(a,h)anthracene (1.5mg/kg)).

- 2.4 Only the sample from TP02 proved positive for asbestos in the form of Amosite fibre bundles in board fragments. Asbestos quantification undertaken on this sample has proved the sample to be 0.003% asbestos by mass, however all the fibre bundles are bound within the board fragments, relatively immobile and considered non-respirable.
- 2.5 Initial gas monitoring was undertaken between June and September 2019 and recorded Carbon Dioxide concentrations of 1.8-3.3% and a methane concentration of 0.1% on two occasions. Six further rounds of gas monitoring were undertaken between 22 November 2024 and 18 February 2025. These recorded carbon dioxide concentrations of 2.3-5.6% and no methane. No flow rates were detected on site.
- 2.6 Due to the carbon dioxide being repeatedly over 5.0%, and the presence of shallow coal seams, the site has therefore been characterised as **CS2** in accordance with BS8485:2015+A1:2019 and gas protection measures are required.

2.8 REVISED CONCEPTUAL MODEL

- 2.8.1 Site investigation works have proved the made ground on site to have elevated levels of Arsenic, PAH (Total) and individual PAH compounds when compared to the levels for residential use with plant uptake.
- 2.8.2 In addition to this, gas monitoring on site has recorded elevated levels of carbon dioxide and the site has been characterised as CS2 in accordance with BS8485:2015+A1:2019 and gas protection measures are required.
- 2.8.3 The development of the site therefore exposes the developers and future site users to the following risks:
i) Elevated levels of contaminants within the made ground on site.
ii) Elevated levels of carbon dioxide associated with the shallow mine workings beneath site
The risk to the developers and future site residents is therefore considered to be moderate and remediation measures will be required to address there.

2.9 REMEDIATION OBJECTIVES

- 2.9.1 From the above, the remediation works required can be stated as follows:
- Site to be re-levelled to suit final ground levels
 - Gas protection measures to be installed and validated
 - Importation of clean topsoil and subsoil to provide a 600mm thick clean growing medium to soft landscaped areas where made ground is retained on site.

3. REMEDIAL PROPOSALS

3.1 REMOVAL OF CONTAMINATED MADE GROUND

- 3.1.1 The made ground on site should be reduced in level to accommodate the proposed 600mm thick clean capping layer or proposed hard standing construction. Where this material cannot be relocated beneath the hardstanding areas, this material should be removed from site.
- 3.1.2 Should the made ground be removed from site, waste transfer tickets confirming the removal of the material from site to a licensed waste transfer facility should be retained for inclusion within a validation report.

3.2 CLEAN CAPPING LAYER

- 3.2.1 As there is no clean topsoil on site, clean topsoil will need to be imported to provide a minimum 600mm thick clean capping layer to soft landscaped areas on site. The capping layer should be formed of 300mm clean topsoil over 300mm clean subsoils.
- 3.2.2 All imported material to be used for the capping/topsoil layer should be uncontaminated and comply with the specification for Engineering Fill. All imported material should be tested for the full range of contaminants listed to the rear of this report. Only material found to be below published trigger levels should be deemed uncontaminated and accepted for use on site.
- 3.2.3 If the imported material is from a Greenfield site, a minimum of 3 samples or 1 per 250m³ of imported material should be taken for testing, whichever is greater. If it is from a brownfield site, a minimum of 6 samples, or 1 per 100m³ of imported material should be taken for testing, whichever is greater. Material provided by a commercial supplier should be certified to the same level of testing, with the certificate less than two months old.
- 3.2.4 All imported certified material should be placed immediately. If this is not possible, or the material is not certified and sampling is to be carried out prior to being laid, it should be securely stored on site prior to use to prevent possible contamination from any materials on site.

3.3 GAS PROTECTION MEASURES

- 3.3.1 Due to the elevated level of carbon dioxide recorded, the site has been classified as CS23 by BS 8485:2015+A1:2019 Table 2. We can confirm that **Gas Protection Measures are required** for the proposed development.

3.3.2 We would recommend the following construction details based on a **CS2** classification to achieve a score of 4.5 for type A properties in accordance with BS 8485:1015 tables 5-7:

- Fully vented minimum 150mm deep void below suspended slab. To be increased to 250mm where the proximity of trees affect the foundation construction. 2.5 Points
- Continuous membrane across the cavity/party walls. 0 Points
- Cavity tray in the external walls. 0 Points
- Fully sealed service entries and ducts to manufactures specification. 0 Points
- Beam and block floor slab 0 Points
- A Proprietary Gas Membrane meeting all of the following criteria: 2.0 Points
 - Sufficiently impervious to gasses with a methane gas Transmission rate <40.0ml/day/m2/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 (eg. Settlement if placed below a flood slab).
 - Sufficiently strong to withstand the installation process And following trades until covered (eg. Penetrations From steel fibres in fibre reinforced concrete, Penetration from reinforcement ties, tearing due to Working above it, dropping tools etc.)
 - Capable, after installation, of providing a complete Barrier to the entry of the relevant gas.
 - Verified in accordance with CIRIA C735 [N1]

Total 4.5 Points

3.3.3 Due to the small nature of the site, it is recommended that the gas protection measures are validated for each property.

4. REMEDIATION VALIDATION

- 4.1 Validation reports for the installation of the gas membrane installation to be prepared for each property.
- 4.2 Photographic evidence to be recorded of the excavation of all contaminated material and waste transfer tickets provided and submitted to the local authority and warranty provider confirming the completion of the works.
- 4.3 If suspected contaminated material is found during remediation works, the independent consultant must be contacted and the extent of it must be established by further testing. All contaminated material must be relocated beneath the building footprint, or beneath the hardstanding away from buried utilities. Where this is not possible, the material should be removed from site to a licensed waste facility site and replaced by equivalent uncontaminated material.
- 4.4 All imported certified material should be placed immediately. If this is not possible, or the material is not certified and sampling is to be carried out prior to being laid, it should be securely stored on site prior to use to prevent possible contamination from any materials on site.
- 4.5 All site records of material removed from and imported to site should be consolidated into a validation report. The report shall be completed in accordance with 'Yorkshire and Lincolnshire Pollution Advisory Group: Verification Requirements For Cover Systems'.
- 4.6 Shallow trial pits to be undertaken in soft landscaped areas as shown on the attached plan to confirm the depth of clean capping material is in accordance with paragraph 3.2.1.
- 4.7 Clean material imported should be visually inspected to confirm it doesn't contain unsuitable materials (i.e. glass, brick, etc)

We trust that the above is sufficient for your current requirements, however should you need any further information please do not hesitate to contact me direct.

Yours faithfully,



MICHAEL DEAN BSc (Hons) HND
m.dean@haighhuddleston.co.uk



KEY:

 PROPOSED HAND DUG
VALIDATION TRIAL PIT



Haigh Huddleston & Associates

Civil Structural Engineering Consultants

Unit 4, Midgley business Park, Bar Lane, Midgley, WF4 4JJ

t 01924 574074

e martin@haighhuddleston.co.uk

Client

Lakeland Properties

Project

Parkham Foods, Halifax Road, Liversedge

Detail

Remediation Validation Plan

Scale

1:500@A3

Dwn

MD

Chkd

Aug'26

Date

Aug'26

Dwg No.

E18/7342/003

TIER 1 SOIL GUIDANCE VALUES FOR USE IN DOMESTIC GARDENS
(WITH PLANT UPTAKE)

<u>CONTAMINANT</u>	<u>ICRCL – TTV / DEFRA – SGV</u>
	<u>MG/KG</u>
Arsenic	37 (4)
Cadmium	22 (4)
Chromium	130 (2)
Lead	200 (4)
Mercury	40 (1,5)
Selenium	250 (1)
Copper	2400 (1)
Nickel	130 (1)
Zinc	3700 (1)
Cyanide (total)	25
Sulphate	0.24% (3)
Sulphide	250
Thiocyanate	50
PAH (Total)	40
TPH (Total)	250
Phenols	280 (1)
PH	6-8
Asbestos	No fibres present

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- (2) DEFRA CLR SGV's withdrawn used for initial comparison
- (3) BS 8110 1985 Table 6.1
- (4) Category 4 Screening Level
- (5) Unless there is considered to be historical site usage that would result in elemental and methylmercury compounds to be present, the inorganic mercury SGV is used as this is the most prevalent for of mercury present in the natural environment.

**TIER 1 SOIL GUIDANCE VALUES FOR USE IN DOMESTIC GARDENS WITH
PLANT UPTAKE (SPECIATED PAH)**

<u>CONTAMINANT</u>	<u>SCREENING CRITERIA FOR PAH</u> <u>(mg/kg)</u>		
	1% SOM	2.5% SOM	6% SOM
Acenaphthlene	210 (1)	510 (1)	1100 (1)
Acenaphthylene	170 (1)	420 (1)	920 (1)
Anthracene	2400 (1)	5400 (1)	11000 (1)
Benzo[a]anthracene	7.2 (1)	11 (1)	13 (1)
Benzo(a)pyrene	5 (2)	5 (2)	5 (2)
Benzo[b]fluoranthene	2.6 (1)	3.3 (1)	3.7 (1)
Benzo[ghi]perylene	320 (1)	340 (1)	350 (1)
Benzo[k]fluoranthene	77 (1)	93 (1)	100 (1)
Chrysene	15 (1)	22 (1)	27 (1)
Dibenzo[ah]anthracene	0.24 (1)	0.28 (1)	0.3 (1)
Fluoranthene	280 (1)	560(1)	890 (1)
Fluorene	170 (1)	400 (1)	860 (1)
Indeno[123-cd]pyrene	27 (1)	36 (1)	41 (1)
Naphthalene	2.3 (1)	5.6 (1)	13 (1)
Phenanthrene	95 (1)	220 (1)	440 (1)
Pyrene	620 (1)	1200 (1)	2000 (1)

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- (2) Category 4 Screening Level

LQM S4UL SCREENING VALUES FOR SPECIATED TOTAL TPH
(RESIDENTIAL WITH PLANT UPTAKE 1% SOM)

Petroleum Hydrocarbons	LQM S4UL Screening Values (mg/kg)
Aliphatics	
C5-C6	42
C6-C8	100
C8-C10	27
C10-C12	130 (38)
C12-C16	1100 (24)
C16-C35	65000 (8.48)
Aromatics	
C5-C7	70
C7-C8	130
C8-C10	34
C10-C12	74
C12-C16	140
C16-C21	260
C21-C35	1100

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