



Haigh Huddleston & Associates

Civil & Structural Engineering Consultants

Our Ref: E22/7930/MD/02A

Date: 8 December 2022

Firth Buildings, 99 -101 Leeds Road, Dewsbury, WF12 7BU

t 01924 464342 f 01924 450662 e martin@haighhuddleston.co.uk

FAO Darren Brooke

Darren.brooke2@btinternet.com

Dear Sir,

Re: Remediation Method Statement for Proposed development at 60 Huddersfield Road, Skelmanthorpe

1. INTRODUCTION

- 1.1 Haigh Huddleston & Associates have been requested by Darren Brooke to provide a remediation statement for the proposed development at 60 Huddersfield Road, Skelmanthorpe.
- 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 Site investigation works have previously been undertaken and are detailed in HHA Report E22/7930/R002 dated June 2022. In addition to this, following gas monitoring on site, gas protection measures were recommended in HHA letter reference E22/7930/JF/001 dated 18th July 2022. These reports have been utilised to compile this Remediation Statement.

2. RESULTS OF THE INVESTIGATION

- 2.1 The fieldwork generally proved a shallow depth of topsoil overlying clays with a mudstone bedrock encountered at 1.3-1.5m below existing ground levels.
- 2.2 The samples submitted for chemical analysis proved a single elevated level of Dibenzo(a,h)anthracene (1.0 mg/kg) in the topsoil on site. This is approximately three times the tier 1 trigger level and believed to be a result of fertilisers used for growing vegetables on the site.
- 2.3 No further elevated levels of heavy or phytotoxic metals or PAH compounds were recorded in the samples from site.
- 2.4 No asbestos recorded in the samples taken from site.
- 2.5 Due to the elevated level of dibenzo(a,h)anthracene recorded on site, the relatively small volume of topsoil on site and the restrictive size of the site would make stockpiling material difficult. It is proposed to remove the existing topsoil from site and import clean material to provide a 300mm thick layer of topsoil as a growing medium.

- 2.6 The gas monitoring report states that on site, no methane was detected. Carbon dioxide values were found between 0.3 and 8.9% with oxygen levels between 5.7 and 20.5%. The reduced oxygen levels are associated with the slightly higher carbon dioxide readings. No flow rates were detected during the duration of the visits.
- 2.7 Due to the elevated carbon dioxide and low oxygen levels encountered within the first 3 visits, we have concluded that it would be prudent to classify the site as **Amber 1** using the NHBC traffic light system as a precautionary measure.

2.8 REMEDIATION OBJECTIVES

- 2.8.1 From the above, the remediation works required can be stated as follows:

- Removal of the existing contaminated topsoil from site.
- Validation of the installation of the gas protection measures.
- Validation of the imported material to provide a growing medium.

3. REMEDIAL PROPOSALS

3.1 REMOVAL OF CONTAMINATED TOPSOIL

- 3.1.1 The existing topsoil on site is to be scraped and excavated to the underlying natural clay strata and removed from site to a licensed waste facility.
- 3.1.2 Photographs of the exposed underlying natural clay strata should be taken to confirm the removal of the material from site for inclusion in the validation report.
- 3.1.3 Documentation confirming the removal of the contaminated material from site should be retained for inclusion in a final validation report.

3.2 GAS PROTECTION MEASURES

- 3.2.1 Due to the elevated carbon dioxide and low oxygen levels encountered within the first 3 visits, we have concluded that it would be prudent to classify the site as **Amber 1** as a precautionary measure. Therefore, Consulting BS 8485:2015 we would recommend the following to achieve a score of **4.5** due the potential for long term build-up of gases beneath the ground floor slab:

- | | |
|---|-------------------|
| - Beam and block floor slab. | 0 Points |
| - 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 |
| - A Suitable Gas Barrier meeting all of the following criteria: | 2.0 Points |
| <ul style="list-style-type: none"> • 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. • Inspected and verified in accordance with CIRIA C735 [N1] | |

Total	4.5 Points
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Following the installation of gas protection measures, these are to be inspected and verified in accordance with CIRIA C735 [N1]. As this is an Amber 1 site, the inspection and verification can be undertaken by Haigh Huddleston & Associates if requested and signed off by the same.

4. REMEDIATION VALIDATION

- 4.1 Final gas protection measures strategy to be confirmed and validated accordingly.
- 4.2 Photographic evidence to be recorded of the excavation of all contaminated topsoil and documentation provided and submitted to the local authority and warranty provider confirming the completion of the works.
- 4.3 If further 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 removed from the site and replaced by equivalent uncontaminated material.
- 4.4 As there is no suitable topsoil on site, clean material will need to be imported to site to provide a growing medium to soft landscaped areas. All imported material to be used for the growing medium 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.
- 4.5 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.
- 4.6 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.
- 4.7 All site records and results of the shallow trial pits 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'.
- 4.8 All topsoil must be in place and notification given to the validation engineers at least 2 weeks prior to the expected completion date. This will allow time for onsite investigation and chemical analysis to be undertaken and report compiled in line with the CML initiative.
- 4.9 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,

A handwritten signature in black ink, appearing to read 'M Dean', with a stylized flourish at the end.

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

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	180 (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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