



**Phase 3: Remediation Strategy**

**Frodingham Road, Scunthorpe**

Produced for Moore Facilities Management

March 2021

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## Document control

<b><i>Title:</i></b>	Phase 3: Remediation Strategy Frodingham Road, Scunthorpe
<b><i>Client:</i></b>	Moore Facilities Management
<b><i>Report number:</i></b>	0135/5363/P/P3

<b><i>Revision</i></b>	<b><i>Purpose</i></b>	<b><i>Originated</i></b>	<b><i>Checked</i></b>	<b><i>Date</i></b>
0.0	Document for issue	D Driver <b><i>Director</i></b>	M Driver <b><i>Director</i></b>	March 2021

**Phase 3 (Remediation strategy): Frodingham Road, Scunthorpe**

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# 1 Introduction

Humberside Materials Laboratory Limited (HML) were commissioned by Moore Facilities Management to produce a remediation strategy for a proposed development on land located off Frodingham Road, Scunthorpe, North Lincolnshire. Formally Crosby Primary School. The land is hereinafter referred to as *the site*.

This document is produced solely for the above client and should only be copied in full. When transmitted electronically, the definitive copy of the report is held by Humberside Materials Laboratory Ltd.

## 1.1 Aims

The aim of this remediation strategy is to provide a robust framework of procedures to ensure the site is suitably remediated and is fit for the proposed end use.

## 1.2 Scope

The scope of this remediation strategy includes details of:

1. What remediation is required
2. Who will undertake the remediation works and
3. What remediation methods will be employed

## 1.3 Background

The site has been the subject of previous site investigation reports by Humberside Material Laboratory (HML), as follows.

- Eastwood and Partners Phase 1 (desk study) report
- Eastwood and Partners Phase 2 (ground investigation) report: Crosby Primary School, Frodingham Road, Scunthorpe, (dated January 2018, report no. CAT/RAN/DN/NG42047-001)

## 2 Site Constraints

### 2.1 Proposed development

Development proposals comprise twenty-four (plots 1 to 24) new low-rise residential properties with gardens. These will include rear gardens to all properties, some front gardens and front (off-road) parking areas.

The proposed houses plots 1 to 10 will have driveways off Frodingham Road, plots 11 to 13 will have driveways off Sheffield Street, plots 23 and 24 will have driveways off a 10foot to the rear of the site and plots 14 to 22 will be accessed from a new development road leading off Frodingham Road.

It is expected that the final ground levels will be similar to existing.

### 2.2 Location and description

The site is a parcel of land located west of Frodingham Road and north of Sheffield Street. The site is centred around national grid reference (NGR) 489050, 411830.

A site location plan is included later (in Appendix A).

The site is roughly rectangular and around 0.5 hectare in size.

The site currently contains all proposed dwellings and proposed carriageway to binder course level. The site is at an advanced progress due to a previous contractor being unable to complete the development.

Previous reports before development described the site as follows

*“The site is roughly rectangular on plan and formerly comprised buildings associated with Crosby Infant and Primary Schools, and St George’s Church Hall. Demolition of the buildings took place during 2017. It is primarily surfaced by made ground. An approximately 0.5 m tall bund of the made ground runs adjacent to much of the western site boundary. Macadam hardstanding is present in the south of the site, and as an approximately 1 m wide strip adjacent to the eastern site boundary.*

*A fenced off area of land (around 10 m x 5 m) is present in the south east corner of the site. It is surfaced by macadam, and contains a memorial.*

*The southern and eastern boundaries of the site comprise a brick wall with metal fencing, whilst the western boundary comprises metal palisade fencing. St George’s Church forms the northern site boundary. Residential properties are located to the west, east and south of the site, with occasional commercial premises to the east and south.”*

The site is mainly surrounded by residential dwellings or infrastructure, as shown below (in Table 1).

Table 1: Adjacent land use and boundaries				
<i>Direction:</i>	North	East	South	West
<i>Boundary type:</i>	Sheffield Street	Residential	St Georges Church	Frodingham Road
<i>Adjacent land use:</i>	Residential	Residential	Residential	Residential

Some photographs of the site are presented later (in Appendix A).

## 2.3 Site history

Earliest available mapping (1886) shows the site to comprise agricultural land. Structures are noted from 1907 with Crosby Junior School noted from 1964.

## 2.4 Published geology

The site is not shown by BGS online mapping to be underlain by any drift / superficial deposits.

The underlying bedrock geology is noted as ironstone of the Frodingham Ironstone Member.

### 2.4.1 Hydrogeology

The Envirocheck states the site overlies a Secondary A Aquifer. These are defined as permeable layers capable of supporting water supplies at a local rather than strategic level, and in some cases can form an important source of base flow to rivers.

### 2.4.2 Hydrology

According to the Envirocheck the nearest surface water feature is located 942 m to the north east of the site, thought to be a drainage channel.

## 2.5 Radon gas

The site as being within an intermediate radon area. This means that 3% to 5% of homes could be above an Action Level for radon gas. Accordingly, **basic radon protection measures will be required for the new properties.**

Further guidance is available from the BRE publication: *Radon: Guidance on protective measures for new buildings (BR 211- 2015 edition)*.

## 3 Ground Conditions & Contamination

### 3.1 Ground conditions

#### 3.1.1 Surface Covering

Made ground of sandy gravelly clay is present at the surface across the majority of the site. The gravel typically comprises brick fragments, macadam fragments and sandstone, along with other extraneous material including concrete, aggregate, slate and slag. Macadam hardstanding is present at the surface in the south of the site.

#### 3.1.2 Made Ground

The made ground varies across the site, and extends to depths of between 0.3 m and 1.4 m bgl. The most common form of made ground comprises sandy gravelly clay, which is encountered in four trial pits (TP1, TP2, TP3 and TP6) to depths of between 0.45 m and 0.9 m bgl (although no greater than 0.5 m thick within TP1 to TP3).

In TP4, in the west of the site, the made ground comprises sandy gravel and cobbles of aggregate, slag, limestone, bricks and a rotted tree branch. A suspected old foundation was encountered adjacent to the pit from 0.5 m to 0.8 m bgl.

The made ground encountered within TP5, in the centre of the site, is 0.3 m thick and comprises sand with gravel of macadam and brick fragments.

In TP7 in the south east of the site, the made ground comprises reworked firm gravelly clay with bricks. It is 1.4 m thick, and is immediately underlain by ironstone bedrock. Adjacent to the southern site boundary, within TP8, the macadam at the surface is 0.05 m thick, and is underlain by made ground gravel of macadam, sandstone and aggregate to a depth of 0.35 m.

#### 3.1.3 Natural Ground

Below the made ground, the natural ground across the site generally comprises firm clay with gravel of shelly ironstone. The exceptions are TP7, which is immediately underlain by ironstone bedrock, while in TP8 the clay is soft, becoming firm around 0.6 m bgl. Strong shelly ironstone underlies the whole of the site, and is encountered at depths of 2.1 m in the north west of the site, to 1.25 m bgl in the south of the site. The shallowing of the ironstone to the south appears to be relatively even.

### 3.1.4 Groundwater

Slight groundwater seepages were recorded at the base of two trial pits, TP3 at 1.6 m, and TP7 at 1.4 m.

## 3.2 Contamination screening

Laboratory testing was mainly carried out on near surface samples of made ground. Some testing of deeper natural soils was also undertaken.

The findings were as follows.

- Heavy metals – three GAC exceedances (Arsenic)
- PAHs – twenty-eight GAC exceedances

## 3.3 Contamination assessment

The revised risk assessment identified one pollution linkage with an unacceptable level of risk. The risk concerned harm to human health from soil contamination (e.g. PAHs and Arsenic) in the made ground – notably around TP3, TP4, TP5, TP7 and TP8. The pathway to harm is through ingestion, absorption, and inhalation of pollutants via garden areas.

## 3.4 Hazardous ground gas

The only identified source of hazardous ground gas is radon, as discussed previously. Basic radon protection measures will be needed as per BR211 (BRE, 2015) which should mitigate the risk to human health.

## 3.5 Additional contamination screening

The previous contractor had completed the proposed cover system (200mm topsoil and 500mm subsoil) within plots 18 to 22 to a previously agreed method statement. These plots were not validated before the contractor left site. These plots were subject to investigation for depth of soil cover and chemical analysis on 16<sup>th</sup> February 2021 to assess suitability before a revised method statement to the new contractors preferred method was issued.

Trial pits from rear gardens of each plot show 200mm of topsoil and subsoils ranging from 505mm to 550mm. Topsoil and subsoil samples from plots 18, 20 and 22 were subject to Metals, PAH and asbestos identification to assess suitability. Testing was undertaken by a UKAS accredited laboratory and assessed to current soil guideline values.

The three topsoil samples did not show any elevated levels. The subsoil samples show elevated PAH's for Benzo(b)fluoranthene, Benzo(a)pyrene and dibenz(ah)anthracene based on 1% soil organic matter limits.

The cover systems installed by the previous contractor for plots 18 to 22 does not meet the required standards outlined within Yorkshire and Lincolnshire Pollution Advisory Groups Verification Requirements for a Cover System.

Methods outlined within this method statement will also cover plots 18 to 22.

## 4 Remediation works

The objectives for the remediation works should include the following.

- Provide a safe environment for proposed end users (occupants and site workers)
- Minimise contamination risks to construction workers, adjacent residents and other receptors to acceptable levels
- Implement a sustainable approach to the remediation works

### 4.1 Options appraisal

Contamination linkages are generally broken by either (a) removing the source, (b) severing the pathway, (c) moving the receptors or (d) a combination of any of the three (a – c). At the site, the identified pathways for plausible contamination linkages are through the garden areas, where future site occupants might be exposed to the soil contamination (PAHs) detected.

In the absence of further sampling and testing, possible options for remediation could include the following.

1. Remove all potentially contaminated sub-surface soils. (remove the source)
2. Clean up the in-situ soil materials. (remove the source)
3. Install a hardstanding layer across the site. (break the pathway)
4. Install a cover system in garden areas. (remove source & break the pathway)

With this site being at an advanced stage the most robust and cost-effective solution might be to install cover systems in Remaining plots to be remediated (Plots 1 to 10 and plots 18 to 22). A 0.60m-thick cover system in rear gardens and 0.45m-thick in front gardens and public soft landscaped areas should be adequate.

Remediation should not be required beneath buildings / roads / hardstanding where there will be no viable pathway between site occupants and the identified contamination sources. These contaminants (e.g. some PAHs) are low in volatility and not present in concentrations to make inhalation of vapours (within buildings) a plausible contamination linkage.

Permanent hardstanding is where the asphalt, concrete, paving or compacted granular fill means there is an insignificant likelihood that the area could be converted into soft landscaping in future. This is where at least 150mm of compacted stone or 100mm of concrete/asphalt is to be laid, and the area can be classed as permanent hardstanding. However, if, say, only a 50mm-thick layer of sand is used below patio paving, then the area should be classed as temporary hardstanding only and will require a 0.60m-thick cover system (as it could potentially be converted to soft garden area in the future).

Should any unforeseen visual or olfactory evidence of contamination (e.g. strong odours or staining) be detected, then this must be investigated to the satisfaction of the local authority. Remediation measures would, in such circumstances, also be subject to review.

## 4.2 Contractors and personnel

The following parties are named key stakeholders in the remediation works.

- ***Client and project manager for the site:*** Moore Facilities Management
- ***Main contractor:*** Moore Facilities Management
- ***Appointed independent Environmental Engineer:*** Humberside Materials Laboratory
- ***The licenced landfill site for material removed from site:*** Stoneledge Southbank
- ***Local Authority:*** North Lincolnshire Council
- ***Source of imported topsoil:*** Welton Aggregates, Grasby source
- ***Source of imported granular materials:*** to be confirmed

The success of the remediation is dependent on good operational procedures and communication links between the different parties. There is a strict obligation to keep the local authority informed of any problems or requests for variations to this remediation strategy.

## 4.3 Outline remediation strategy

The remediation works shall include the following steps.

1. Commence construction works on the site.
2. Remove in-situ soils in ALL rear garden areas to 0.60m below final ground level (bfgl) and in front gardens and soft landscaped areas to 0.45m bfgl. Plots 1 to 10 and plots 18 to 22.
3. Import clean soils (sample and test, as required)
4. Install cover / barrier system in gardens and soft landscaped areas (and take suitable records)
5. Prepare and submit validation / verification report for the remediation works

All remediation works are subject to validation and verification at the completion of works. All evidence and documentation related to the remediation works must be retained and included in the verification report. Further details are presented later.

## 4.4 Detailed remediation strategy

Remediation works shall not begin until the strategy has been approved by the local authority.

### 4.4.1 Site security and working hours

The site is to be secure when work is not being undertaken once construction has started. Entry and egress shall be controlled when the site is active.

Site working hours shall be Monday to Friday 07:30am to 17:30pm and 08:00am to 14:00pm on Saturday, unless written consent for extended hours is given by the local authority.

### 4.4.2 Removal of in-situ soils

Approximately 600mm of in-situ below ground material will be removed in soft landscaped rear garden areas to accommodate a 600mm deep cover system. However, should final ground levels be altered, the depth required for removal will be reduced/increased commensurately. A 0.45m deep cover system should be adequate for front gardens immediately adjacent to parking areas and for public soft landscaped areas. The cover system will need to be locally increased for tree planting to accommodate any new tree root balls.

The in-situ potentially contaminated soils from garden areas will be removed off-site to a licensed waste operator. It is roughly estimated that the total area for remediation could be about 524m<sup>2</sup> based on available drawings. Therefore, the total volume of soils for removal could be about 305m<sup>3</sup>.

Contaminated material at this stage and advanced stages will be either removed directly from site by loading into vehicles or, alternatively, stockpiled in such a manner (i.e. underlain with plastic sheeting) as to contain it and stop the spread of contamination, prior to loading for transport and disposal.

The receiving landfill / recycling site for waste material shall be supplied with available existing test data from the site (i.e. from the HML site investigation) for their classification and acceptance that the material is suitable for their landfill site. The waste handling company may well also request Waste Acceptance Criteria (WAC) tests on material for removal.

Documentary evidence must be retained to demonstrate the suitable removal of waste soils. The volumes and timings of exported material shall be recorded in site notes. Copies of all consignment, transfer and delivery notes and tickets shall be retained for inclusion within the (Phase 4) validation / verification report.

#### 4.4.3 *Importation of suitable soils*

Sampling and testing of proposed imported material should be undertaken as early as possible and prior to importation. Otherwise, there is a risk of unnecessary costs to remove or treat any unsuitable imported soils.

To help ensure that suitable topsoil material is procured, guidance (e.g. YALPAG, 2017) recommends the client should ask the supplier the following questions.

- *What proof is there of the material source? Is it greenfield, brownfield, etc.?*
- *Will all the material be coming from the same source?*
- *Is the material a suitable growing medium?*
- *Has the supplier evidence of sampling and testing the imported material including tests for the suitable contaminants, as detailed below (in Section 4.6)?*
- *Were the contamination tests performed by a laboratory with UKAS and MCERTS accreditation for the tests?*
- *Is a copy of the whole laboratory report available and does it include an interpretive section?*
- *Will the provided certificate be dated within the last 2 months?*

An Environmental Engineer should perform an initial inspection of the material prior to importation. During this inspection and all subsequent inspections, the Environmental Engineer should check the imported topsoil material is:

- A suitable growing medium
- Free from obvious contamination and signs of asbestos containing materials
- Not from a location suspected to be inhabited with invasive or injurious plants
- Free from strong or unsuitable odours
- Free from unsuitable material e.g. bricks, timber and glass

Imported topsoil shall be deposited within the site in such a manner that it cannot be cross-contaminated by any other materials (e.g. by placing on a clean plastic sheet). It shall, when required, be loaded into small dumpers or barrows and transported for deposition and levelling in the garden area to the required finished level.

#### 4.4.4 *Minimum sampling and testing requirements for imported soils*

At this stage, it is provisionally estimated that the area for remediation in gardens is about 524m<sup>2</sup>. Therefore, the required total volume of imported soil material for rear gardens could be about 305m<sup>3</sup> (460m<sup>2</sup> x 0.60m and 64m<sup>2</sup>x0.45m).

The scope of testing shall depend on the source origin (greenfield / manufactured or brownfield / screened) which must be verified with documentation. The testing provided by suppliers must be performed on the identified material destined for site. If

insufficient documentation is provided from the supplier, the minimum rates of sampling and testing are given below (in Table 3), based on YALPAG guidance.

<b>Table 3: Imported soil sampling and testing requirements</b>				
<i>Contaminant*</i>	<i>Topsoil / Subsoil</i>		<i>Capillary break layer</i>	
	<i>Greenfield / Manufactured source</i>	<i>Brownfield / Screened source</i>	<i>Virgin material</i>	<i>Recycled</i>
Metals	ü	ü	ü	ü
PAHs	ü	ü		ü
Asbestos	ü	ü	ü	ü
TPHs		ü		
<b>Minimum rate of testing:</b>	3 samples or 1 per 250m <sup>3</sup>	6 samples or 1 per 100m <sup>3</sup>	1 or 2 samples	1 per 1000m <sup>3</sup>
* other contaminants may require testing for brownfield/screened/recycled sources subject to assessment				

Any shortfall in test data shall be satisfied with testing from sampling by an Environmental Engineer of the imported material. The sample(s) will be taken either from the stockpile or from the placed soil (but typically from the placed soil as the cover system thickness can be verified at the same time).

Brownfield, screened or recycled imported soils may require testing for additional contaminants depending on the source. This will be subject to an assessment by an Environmental Engineer and will consider former land use of the source site and potential contaminants of concern and will require local authority agreement.

#### **4.4.5 Acceptability criteria for imported soils**

The acceptance criteria (or screening values) for the imported topsoil are taken from the LQM/CIEH S4ULs for human risk assessment, as reproduced below (in Tables 4 to 6). The exception to this is for lead which is taken from the report published by Defra C4SL. The testing must be undertaken by a UKAS / MCERTS laboratory, accredited for the type of tests involved.

<b>Table 4 – Metals (and metalloids) acceptance criteria</b>	
<i>Element</i>	<i>mg/kg</i>
Arsenic	37
Boron	290
Cadmium	11
Chromium III	910
Chromium VI	6
Lead	200
Mercury Element	1.2
Mercury Inorganic	40
Mercury Methyl	11
Selenium	250
Copper	2400
Nickel	130
Zinc	3700

<b>Table 5 - Total Petroleum hydrocarbons (TPHs) acceptance criteria</b>							
<i>TPH aliphatic</i>				<i>TPH aromatic</i>			
<i>Equivalent carbon fraction</i>	<i>Residential with plant uptake mg/kg</i>			<i>Equivalent carbon fraction</i>	<i>Residential with plant uptake mg/kg</i>		
	<i>1% SOM</i>	<i>2.5% SOM</i>	<i>6% SOM</i>		<i>1% SOM</i>	<i>2.5% SOM</i>	<i>6% SOM</i>
C5-6	42	78	160	C5-7	70	140	300
C6-8	100	230	530	C7-8	130	290	660
C8-10	27	65	150	C8-10	34	83	190
C10-12	130 (48)	330 (118)	760 (283)	C10-12	74	180	380
C12-16	1100 (24)	2400 (59)	4300 (142)	C12-16	140	330	660
C16-35	65000 (8.5)	92000 (21)	110000	C16-21	260	540	930
C35-44	65000 (8.5)	78	160	C21-35	1100	1500	1700
-	-	-	-	C35-44	1100	140	300

Figure in parentheses is the vapour or soluble saturation limit

<b>Table 6 – Polycyclic aromatic hydrocarbons (PAHs) acceptance criteria</b>							
<i>Compound</i>	<i>Residential with plant uptake mg/kg</i>			<i>Compound</i>	<i>Residential with plant uptake mg/kg</i>		
	1% SOM	2.5% SOM	6% SOM		1% SOM	2.5% SOM	6% SOM
Acenaphthene	210	510	1100	Chrysene	15	22	27
Acenaphthylene	170	420	920	Dibenzo anthracene	0.24	0.28	0.3
Anthracene	2400	5400	11000	Fluoranthene	280	560	890
Benzo a anthracene	7.2	11	13	Fluorene	170	400	860
Benzo pyrene	2.2	2.7	3	Indenopyrene	27	36	41
Benzo b fluoranthene	2.6	3.3	3.7	Naphthalene	2.3	5.6	13
Benzo k fluoranthene	77	93	100	Phenanthrene	95	220	440
Benzo perylene	320	340	350	Pyrene	620	1200	2000

PAH and TPH assessment criteria are based on a 1% soil organic matter content, which is relatively onerous. If required, organic matter testing will be undertaken per batch of samples and the assessment criteria adjusted.

No imported material found to contain contamination above the assessment criteria limits shall be allowed to remain on site.

#### **4.4.6 Installation of cover / barrier system in rear gardens**

Following successful completion of the structural works, the cover system can be installed in the soft garden areas (e.g. below lawns or plant beds). This shall be placed to a thickness of 0.60m below final ground levels in rear gardens (and 0.45m in front gardens and public soft landscaped areas), which is recommended by BRE Report 465 (Tedd et al., 2004).

The imported material should include at least 200mm of topsoil (e.g. compliant with BS 3882:2015, Specification for topsoil).

Allowance shall be made to increase the cover system thickness at the location of proposed trees to accommodate the root balls.

A section of the proposed cover system is shown later (in Appendix A) along with a plan of the anticipated remediation area.

A geotextile, Fastrack™ 1800 or similar, shall be placed over the garden areas prior to the laying of imported granular fill and soils. This will fulfil the role of separation and marker layer between the cover system and underlying remaining made ground.

A minimum 100mm thickness of granular gravel material, or at least three times the nominal size of the aggregate, whichever is the lesser, shall be placed on the geotextile

as a capillary break. This will be proven clean inert material, e.g. sampled and tested to the above requirements (in Tables 4 to 6). It is recommended that a virgin material be used from a reputable local quarry.

Extensive photographs shall be taken during installation of the cover system in **each plot** to show the following.

- Location of the geotextile
- Close-up photos to show the quality and thickness of the capillary break layer
- Close-up photos to show the quality and thickness of imported soils
- Background features to prove the location of the close-up photos
- Site stockpile or quarantine areas

Tape measures or measuring staffs will need to be included in the close-ups to demonstrate the thickness of the cover system elements. Site identification boards or other media should also be included to detail the dates, photo locations and site name.

## 5 Site Management Procedures

The proposed remediation measures, discussed previously, consider the long-term risk at the site to human health and other environmental receptors. However, in the short-term, there are potential health, safety and environmental risks during the construction works.

The contractor at site is fully responsible for devising their own suitable working practices to address all existing health, safety and environmental risks during the construction phase. The following guidance is provided to highlight some of these hazards and risks which should be dealt with by the contractor's method statements and risk assessments.

### 5.1 Health and safety

The Eastwood and Partners site investigation report identified some contamination in the near surface made ground at the site. Some elevated levels of PAHs and Arsenic were detected in shallow made ground soils. These PAHs can be potentially toxic and carcinogenic.

No asbestos fibres were detected. Nevertheless, the risk from asbestos especially in made ground should never be entirely discounted.

Some basic minimum measures to protect site workers from the hazards of contaminated soil could include the following.

- Inform site staff about anticipated soil contaminants and related hazards and safety measures, e.g. through site inductions, toolbox talks, etc.
- Provide personnel protective equipment (PPE), e.g. boots, helmets and gloves, for the use of ground workers
- Provide and enforce designated safe areas for smoking, eating and drinking
- Provide suitable hygiene facilities for washing, drying and changing
- Display contact details for emergency services
- Ensure there are no naked flames or other ignition sources where hazardous ground gas is a potential risk (e.g. in confined spaces)
- Implement suitable procedures to prevent the generation and spread of dust

The site is near some existing residential dwellings. Appropriate safety precautions should be employed for working near to domestic properties.

### 5.2 Dust, odours and fumes

The contractor should minimise emissions to air and take all necessary precautions to prevent the accumulation and spread of smoke emissions, fumes, dust or odours from

site plant, stored fuel or other substances and prevent them from drifting around the site or into the nearby properties and public space. A record of any complaints received should be kept for comparison against daily work logs.

### 5.2.1 Dust

During excavations, soil stockpiling and other earth movements, measures will need to be implemented to prevent migration of dust.

The contractor should introduce suitable working methods and dust suppression techniques to mitigate the generation and spread of dust. Suitable health and safety protocols should be determined through appropriate consultations with qualified asbestos specialists. The following measures are options that should help minimise and control dust.

- Soil dampening (e.g. on bare earth and stockpiles) especially during dry weather
- Dust curtains
- Wheel washing and street sweeping
- Sheets/hoarding around site, plant or other locations
- Sheeting for lorries entering/leaving the site
- Liaison with neighbours
- Designated areas for parking and loading/unloading
- Low drop heights during movement of soils
- Cessation of potential dust-spreading activities during high winds

### 5.2.2 Odours

No strong odours are anticipated during the remediation works, i.e. during the excavation and movement of soil materials. If unexpected odours are detected, such works should halt, and the local authority should be informed. Works should only continue after further investigation by an environmental specialist with appropriate local authority approval.

### 5.2.3 Fumes

All work plant should be maintained in good repair and should meet legal emission standards. Plant should not be left running for long periods when not directly in use. Consideration should be given to the use of electrically powered plant instead of diesel.

## 5.3 Noise and Vibration

Some noise is unavoidable during construction works. Nevertheless, the following measures should help minimise the generation of noise and vibration:

- Maintenance of plant
- The use of silencers on plant, if required
- Switching off plant when not in use
- Unloading and loading of material within designated areas
- Coordinating plant and lorry movements to reduce site traffic
- Liaison with neighbours

The site is adjacent to a residential area. Therefore, any activities likely to generate unusually large amounts of noise and ground vibration (e.g. sheet pile driving) might be potentially unsuitable. Any such works should be approved in advance by the local authority.

Procedures to reduce noise and vibration are detailed in BS 5228-1:2009+A1:2014 (Code of practice for noise and vibration control on construction and open sites).

## 5.4 Fuel, oils and chemicals

Measures and procedures should be put in place to prevent leaks and spills of oil, fuel or chemicals. Further information on this is provided in Guidance for Pollution Prevention, GPP2, produced by the EA and other organisations, available free online. The measures and procedures include:

- Suitable bunding or overflow storage (110% capacity of liquid storage volume)
- Locks on valves and covers to prevent vandalism
- Drip trays for diesel-fired engines, pumps and generators
- Suitably maintained diesel-engined plant
- Spill kits with staff suitably trained in their application
- An oil, chemical and product inventory for the site
- Site drainage plans
- Emergency procedures (included in the site induction)

Regular inspections should be made of on-site discharge points, bunding, drainage systems, oil separators (and drip-trays) to check that these are in good condition.

The storage, itinerary, and use of hazardous materials on-site should be conducted in accordance with the Control of Substances Hazardous to Health (COSHH) regulations (2002). Records should be maintained of all hazardous materials on-site.

## 5.5 Unforeseen Contamination

Protocols shall be in place to deal with unforeseen potentially contaminated materials identified by visual or olfactory evidence (i.e. the presence of staining, odours or harmful substances, etc.). The protocols should include the following.

- Cessation of work in the area followed by immediately informing an Environmental Engineer and the local authority to agree how to deal with the material
- Testing of potentially contaminated material, as required
- Removal of contaminated soils for segregation, storage or stockpiling within a bunded and covered area, as appropriate
- Extraction of contaminated groundwater to be placed in suitable containers
- Transfer off-site of contaminated soil, if necessary
- Testing of samples from the base/ sides of excavations
- Recording of the locations, quantities and nature of any removed materials, results of tests and the subsequent actions taken

## 5.6 Other pollution control measures

Any discharges to local watercourses or surface water drainage should only be made with the appropriate discharge consents. These can be obtained from the Environment Agency and or local water authority. For example, appropriate consents should be obtained where wastewater, e.g. from a wheel wash, needs to be poured into drains.

Procedures will be required to reduce the migration of suspended solids (e.g. silts and fine sands). All soil should be stockpiled away from surface water features and drains and where the gradient is at a minimum. Rain protection covers and/or water collection gutters should be used where surface run-off of silty water could occur. These measures can also mitigate any risks of migration of potentially contaminated leachate from stockpiled or surface soils.

## 5.7 Utilities

Service locations should be investigated at an early stage in the development to minimise project costs and potential disruptions. Services should be turned off / disconnected as appropriate to make safe during development and minimise any health, safety or environmental risks.

## 6 Validation and Verification

### 6.1 Verification requirements

Validation of the remediation works comprises two elements:

- 1 Verification of the suitability and depth of the cover system
- 2 Verification of the removal of potentially contaminated soils

Validation shall be carried out by suitably qualified and experienced environmental specialists (e.g. from HML). Validation will be achieved with the aid of appropriate inspections, sampling, testing, photographing and collection of relevant documentation.

Validation and verification shall meet the requirements of suitable guidance, e.g. as outlined in the latest version of YALPAG's *Verification Requirements for Cover Systems: Technical Guidance for Developers, Landowners and Consultants*.

The purpose of the validation / verification phase (Phase 4) is to ensure that all the remediation works have been carried out as specified. Therefore, the following items shall be directly checked and verified to be satisfactory (or otherwise) compared with the requirement specified within this document.

- Imported soil sampling and testing
- Visual / olfactory inspection records of imported materials
- Photos to show placement and thicknesses of suitable layers in the cover system
- Documentary evidence of import/export of soil to or from the site

### 6.2 Phase 4 (validation / verification) report

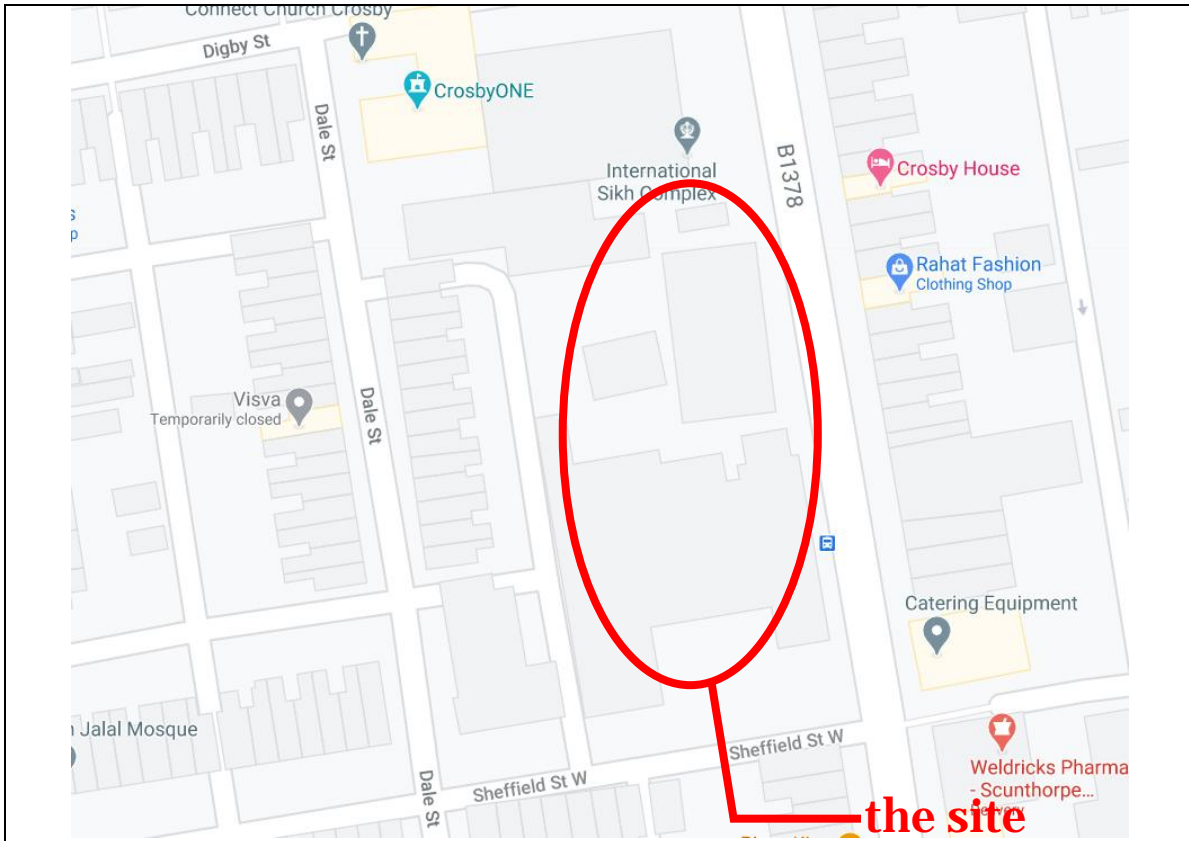
A verification / validation report shall be produced by the appointed independent engineer at the end of all remediation works. The report shall include the following (e.g. as per YALPAG 2017 requirements).

- Site details including planning application reference
- Summary of areas and remediation works undertaken
- Diary of events
- Details of quantity, location for disposal, conveyance notes for contamination materials removed from site
- Details of source, test data and quantity for capillary break layer
- Details of geotextile
- Details of imported topsoil including the location, quantity and test data at the specified rate
- Photographic record of the works and depths of soil cover
- Results of chemical analyses
- Details of any non-conformances and rectifications

An example of a barrier system verification report proforma is provided by YALPAG (2017) guidance. A full copy of the final verification report shall be forwarded to the local authority for their review.



**Appendix A**  
**Plans & Photographs**



**Site location plan**

**Date copied:** March 2021

**Source:** Google maps



**Aerial photograph: 1**

**Date copied:** March 2021

**Source:** Grid reference finder



**Photo: 1**      **Date:** February 2018  
**Photo direction:** North  
**Description:** General site after demolition



**Photo: 2**      **Date:** February 2018  
**Photo direction:** South  
**Description:** General site after demolition





**Photo: 3**      **Date:** February 2018  
**Photo direction:** Northwest  
**Description:** General site after demolition






**Photo: 4**      **Date:** February 2018  
**Photo direction:** Southeast  
**Description:** General site after demolition



**Notes:**

1. Do not scale
2. Locations of all features are approximate only. Features are anticipated only based on currently available drawings
3. This drawing should be read in conjunction with HML Phase 3 Remediation Strategy (HML ref: 0135/5363/P/P3) and HML Cover System Drawing 0135-5363-P3-02.
4. Proposed REAR gardens will require 600mm deep cover system. Front gardens and public soft landscaped areas will require a 0.45m deep cover system.
5. Remainder of site expected to become permanent hardstanding of concrete, asphalt or paving
6. Background image taken from BSB Architecture, drawing number 15824/211 revision D, dated 27/07/18
7. Proposed remediation is provisional only and subject to agreement with local planning authority



	Rear garden remediation areas		Soft landscaped areas		Previously Remediated areas
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**HUMBERSIDE MATERIALS LABORATORY LIMITED**

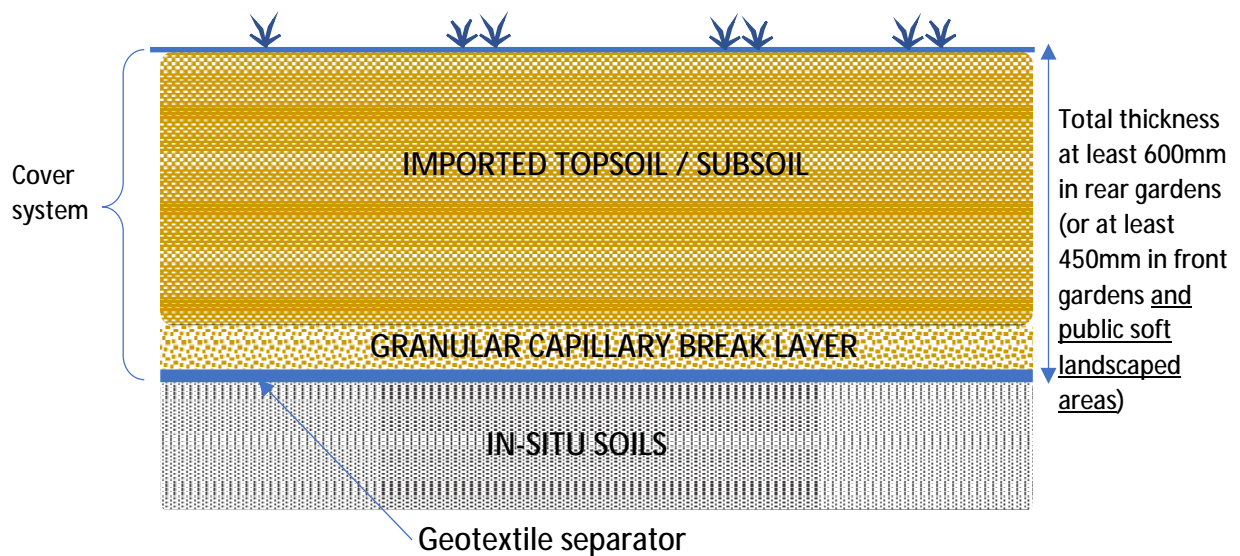
Atherton Way  
Brigg  
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DN20 8AR  
Telephone & Fax 01652 652753  
[www.humbersidematerialslab.co.uk](http://www.humbersidematerialslab.co.uk)



Drawing Title: Remediation plan  
Drawing No.: 0135-5363-P3-01      Revision: 0.0  
Site: Frodingham Rd, Scunthorpe  
Client: Moore Facilities Management  
Project No.: 0135/5363/P  
Date: 01/03/2021

**Notes:**

1. Do not scale from this drawing
2. This drawing should be read in conjunction with HML Phase 3 Remediation Strategy (HML ref: 0135/5363/P/P3) and HML Remediation Plan Drawing number 0135-5363-P3-01
3. Imported topsoil shall meet British Standards BS 3882:2015 topsoil specification for at least uppermost 200mm
4. Topsoil and subsoil shall be a suitable growing medium
5. Cover system soils shall be free from obvious contamination and signs of asbestos containing materials
6. Cover system soils shall not be from a location suspected to be inhabited with invasive or injurious plants
7. Cover system soils shall be free from strong or unsuitable odours
8. Cover system soils shall be free from unsuitable material e.g. bricks, timber and glass
9. Cover system shall meet requirements of Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG) guidance for cover systems including proposed sampling and testing regime
10. Geotextile shall be a suitable separator layer (Fastrack 1800 or similar)
11. Granular capillary break layer shall be 100mm thick or 3 times nominal diameter of particles
12. Allowance shall be made for increasing the cover system thickness below new trees to accommodate the root ball



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*Drawing Title:* Cross-section through cover system

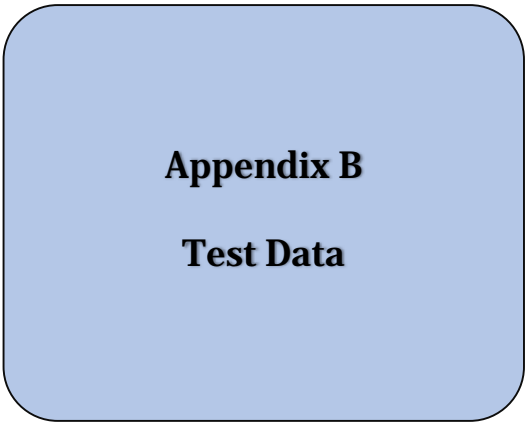
*Drawing No.:* 0135-5363-P3-02      *Revision:* 0.0

*Site:* Frodingham Rd, Scunthorpe

*Client:* Moore Facilities Management

*Project No.:* 0135/5363/P

*Date:* 01/03/2021



**Appendix B**  
**Test Data**




## ANALYTICAL TEST REPORT

**Contract no:** 93559  
**Contract name:** Frodingham Road, Scunthorpe - Ongo Site  
**Client reference:** 0135/5363  
**Clients name:** Humberside Materials Laboratory  
**Clients address:** Atherton Way  
Brigg  
North Lincolnshire  
DN20 8AR

**Samples received:** 18 February 2021  
**Analysis started:** 18 February 2021  
**Analysis completed:** 25 February 2021  
**Report issued:** 25 February 2021

**Notes:** Opinions and interpretations expressed herein are outside the UKAS accreditation scope. Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling. All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing. Methods, procedures and performance data are available on request. Results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without prior written approval. Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

**Key:** U UKAS accredited test  
M MCERTS & UKAS accredited test  
\$ Test carried out by an approved subcontractor  
I/S Insufficient sample to carry out test  
N/S Sample not suitable for testing  
NAD No Asbestos Detected

**Approved by:**   
Rachael Burton  
Customer Support Squad Leader

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## SAMPLE INFORMATION

### MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
93559-1	S/58490	-	Sandy Loam	-	-	26.3
93559-2	S/58493	-	Sandy Loam	-	-	25.7
93559-3	S/58494	-	Sandy Loam	-	-	20.6
93559-4	S/58495	-	Sandy Loam	-	-	17.0
93559-5	S/58496	-	Sandy Loam	-	-	17.9
93559-6	S/58497	-	Sandy Loam	-	-	15.0
93559-7	S/58498	-	Sandy Loam	-	-	16.4
93559-8	S/58499	-	Sandy Loam	-	-	15.5
93559-9	S/58500	-	Sandy Loam	-	-	17.7

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## SOILS

Lab number	93559-1	93559-2	93559-3	93559-4	93559-5	93559-6		
Sample id	S/58490	S/58493	S/58494	S/58495	S/58496	S/58497		
Location	Plot 20 Topsoil	Plot 18 Topsoil	Plot 22 Topsoil	Plot 20 Sub- Soil	Plot 18 Sub- Soil	Plot 22 Sub- Soil		
Depth (m)	-	-	-	-	-	-		
Date sampled	16/02/2021	16/02/2021	16/02/2021	16/02/2021	16/02/2021	16/02/2021		
Test	Method	Units						
Arsenic (total)	CE127 <sup>M</sup>	mg/kg As	6.3	4.7	4.8	9.2	11	10
Beryllium (total)	CE127 <sup>U</sup>	mg/kg Be	<1	<1	<1	1.0	1.3	1.1
Boron (water soluble)	CE063	mg/kg B	1.6	1.8	1.9	2.6	3.2	3.7
Cadmium (total)	CE127 <sup>M</sup>	mg/kg Cd	0.3	0.5	0.3	0.5	0.6	0.6
Chromium (total)	CE127 <sup>M</sup>	mg/kg Cr	105	97	113	131	132	152
Copper (total)	CE127 <sup>M</sup>	mg/kg Cu	14	15	18	53	52	57
Lead (total)	CE127 <sup>M</sup>	mg/kg Pb	34	20	28	91	92	103
Mercury (total)	CE127 <sup>M</sup>	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel (total)	CE127 <sup>M</sup>	mg/kg Ni	12	10	15	22	19	22
Selenium (total)	CE127 <sup>M</sup>	mg/kg Se	1.1	0.9	0.9	1.3	1.4	1.3
Vanadium (total)	CE127 <sup>M</sup>	mg/kg V	22	18	29	39	50	42
<b>PAH</b>								
Naphthalene	CE087 <sup>M</sup>	mg/kg	0.02	<0.02	<0.02	0.11	0.14	0.11
Acenaphthylene	CE087 <sup>M</sup>	mg/kg	<0.02	<0.02	<0.02	0.27	0.14	0.09
Acenaphthene	CE087 <sup>M</sup>	mg/kg	0.05	<0.02	<0.02	0.21	0.19	0.30
Fluorene	CE087 <sup>U</sup>	mg/kg	0.04	<0.02	<0.02	0.26	0.19	0.27
Phenanthrene	CE087 <sup>M</sup>	mg/kg	0.48	0.17	0.10	3.23	2.87	3.33
Anthracene	CE087 <sup>U</sup>	mg/kg	0.13	0.05	0.04	1.00	0.73	0.73
Fluoranthene	CE087 <sup>M</sup>	mg/kg	0.82	0.45	0.24	8.14	8.44	6.07
Pyrene	CE087 <sup>M</sup>	mg/kg	0.70	0.42	0.20	6.86	7.52	5.20
Benzo(a)anthracene	CE087 <sup>U</sup>	mg/kg	0.42	0.30	0.19	3.98	3.74	3.06
Chrysene	CE087 <sup>M</sup>	mg/kg	0.38	0.26	0.17	3.39	3.40	2.57
Benzo(b)fluoranthene	CE087 <sup>M</sup>	mg/kg	0.55	0.44	0.28	4.51	4.22	3.94
Benzo(k)fluoranthene	CE087 <sup>M</sup>	mg/kg	0.21	0.16	0.10	1.80	1.71	1.58
Benzo(a)pyrene	CE087 <sup>U</sup>	mg/kg	0.45	0.35	0.20	3.86	3.59	3.46
Indeno(123cd)pyrene	CE087 <sup>M</sup>	mg/kg	0.38	0.29	0.18	3.09	2.83	2.79
Dibenz(ah)anthracene	CE087 <sup>M</sup>	mg/kg	0.07	0.06	0.04	0.62	0.60	0.59
Benzo(ghi)perylene	CE087 <sup>M</sup>	mg/kg	0.32	0.26	0.16	2.54	2.38	2.36
PAH (total of USEPA 16)	CE087	mg/kg	5.02	3.20	1.89	43.9	42.7	36.5
<b>Subcontracted analysis</b>								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	NAD	NAD

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## SOILS

Lab number			93559-7	93559-8	93559-9
Sample id			S/58498	S/58499	S/58500
Location			Plot 2 Topsoil	Plot 4 Topsoil	Plot 6 Topsoil
Depth (m)			-	-	-
Date sampled			16/02/2021	16/02/2021	16/02/2021
Test	Method	Units			
Arsenic (total)	CE127 <sup>M</sup>	mg/kg As	9.0	6.7	6.3
Beryllium (total)	CE127 <sup>U</sup>	mg/kg Be	<1	<1	<1
Boron (water soluble)	CE063	mg/kg B	0.8	0.6	0.6
Cadmium (total)	CE127 <sup>M</sup>	mg/kg Cd	0.2	<0.2	<0.2
Chromium (total)	CE127 <sup>M</sup>	mg/kg Cr	154	111	99
Copper (total)	CE127 <sup>M</sup>	mg/kg Cu	17	3.8	3.3
Lead (total)	CE127 <sup>M</sup>	mg/kg Pb	33	11	9.3
Mercury (total)	CE127 <sup>M</sup>	mg/kg Hg	<0.5	<0.5	<0.5
Nickel (total)	CE127 <sup>M</sup>	mg/kg Ni	14	6.2	6.3
Selenium (total)	CE127 <sup>M</sup>	mg/kg Se	1.0	0.7	0.7
Vanadium (total)	CE127 <sup>M</sup>	mg/kg V	34	23	23
<b>PAH</b>					
Naphthalene	CE087 <sup>M</sup>	mg/kg	<0.02	<0.02	<0.02
Acenaphthylene	CE087 <sup>M</sup>	mg/kg	<0.02	<0.02	<0.02
Acenaphthene	CE087 <sup>M</sup>	mg/kg	<0.02	<0.02	<0.02
Fluorene	CE087 <sup>U</sup>	mg/kg	<0.02	<0.02	<0.02
Phenanthrene	CE087 <sup>M</sup>	mg/kg	<0.02	<0.02	<0.02
Anthracene	CE087 <sup>U</sup>	mg/kg	<0.02	<0.02	<0.02
Fluoranthene	CE087 <sup>M</sup>	mg/kg	0.03	0.03	0.02
Pyrene	CE087 <sup>M</sup>	mg/kg	0.03	0.03	<0.02
Benzo(a)anthracene	CE087 <sup>U</sup>	mg/kg	<0.02	0.02	<0.02
Chrysene	CE087 <sup>M</sup>	mg/kg	<0.03	<0.03	<0.03
Benzo(b)fluoranthene	CE087 <sup>M</sup>	mg/kg	0.03	0.05	<0.02
Benzo(k)fluoranthene	CE087 <sup>M</sup>	mg/kg	<0.03	<0.03	<0.03
Benzo(a)pyrene	CE087 <sup>U</sup>	mg/kg	0.02	0.04	<0.02
Indeno(123cd)pyrene	CE087 <sup>M</sup>	mg/kg	0.02	0.04	<0.02
Dibenz(ah)anthracene	CE087 <sup>M</sup>	mg/kg	<0.02	<0.02	<0.02
Benzo(ghi)perylene	CE087 <sup>M</sup>	mg/kg	<0.02	0.03	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	<0.34	<0.34	<0.34
<b>Subcontracted analysis</b>					
Asbestos (qualitative)	\$	-	NAD	NAD	NAD

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## SOLIDS

<b>Lab number</b>			93559-10
<b>Sample id</b>			S/58501
<b>Location</b>			Plot 4 Cap Layer
<b>Date sampled</b>			16/02/2021
<b>Test</b>	<b>Method</b>	<b>Units</b>	
Arsenic (total)	CE127	mg/kg As	2.9
Beryllium (total)	CE127	mg/kg Be	<1
Boron (water soluble)	CE063	mg/kg B	<0.5
Cadmium (total)	CE127	mg/kg Cd	<0.2
Chromium (total)	CE127	mg/kg Cr	18
Copper (total)	CE127	mg/kg Cu	<1
Lead (total)	CE127	mg/kg Pb	<1
Mercury (total)	CE127	mg/kg Hg	<0.5
Nickel (total)	CE127	mg/kg Ni	2.7
Selenium (total)	CE127	mg/kg Se	0.3
Vanadium (total)	CE127	mg/kg V	8.9

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## METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Beryllium (total)	Aqua regia digest, ICP-MS	Dry	U	1	mg/kg Be
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry		0.5	mg/kg B
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Vanadium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg V
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

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## METHOD DETAILS

METHOD	SOLIDS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry		1	mg/kg As
CE127	Beryllium (total)	Aqua regia digest, ICP-MS	Dry		1	mg/kg Be
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry		0.5	mg/kg B
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry		0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry		1	mg/kg Cr
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry		1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry		1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry		0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry		1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry		0.3	mg/kg Se
CE127	Vanadium (total)	Aqua regia digest, ICP-MS	Dry		1	mg/kg V

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## DEVIATING SAMPLE INFORMATION

### Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

### Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
93559-1	S/58490	-	N	
93559-2	S/58493	-	N	
93559-3	S/58494	-	N	
93559-4	S/58495	-	N	
93559-5	S/58496	-	N	
93559-6	S/58497	-	N	
93559-7	S/58498	-	N	
93559-8	S/58499	-	N	
93559-9	S/58500	-	N	