

## **1. General**

The following method statement provides guidance for the remediation of soil contamination (identified from the previous investigation or encountered in other areas of the site during groundworks) at the site of East Bay Close in Cardiff. It is proposed to It is proposed to construct a residential building for multiple occupants, including an outdoor recreation area, carparking and some soft landscaping.

## **2. Identification**

Based on the findings of the previous investigation, Earth Environmental & Geotechnical (Southern) Report reference B1994 (November 2021) elevated contaminants of arsenic, beryllium and hydrocarbons were located on parts of the site within shallow depth Made Ground in excess of the recommended guidelines for residential end use without home grown produce and public open spaces (i.e. soft landscaped areas).

A plan showing the locations of these elevated levels of contamination is attached to this document.

## **3. Remediation of Soils Beneath Hardcover Development**

Check testing and remediation of soils beneath hard cover development will not be required.

However, all service runs beneath hard cover areas will be over excavated and backfilled with suitable clean inert material in preparation for future maintenance should this be required.

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## 4. Protection & Remediation of Proposed Soft Landscape Areas

### 4.1 Check Testing

It is recommended a minimum 2 samples are tested for contamination from any proposed soft landscaped areas. Samples should be taken at formation level and analysed for a general suite of contamination to include asbestos, metals, speciated polyaromatic hydrocarbons and speciated total petroleum hydrocarbons.

### 4.2 Remediation of Soft Landscaped Areas

Unless proven otherwise by the above testing, soft landscaped areas where shrubs are to be planted should be capped with a minimum 600mm thickness of clean inert soil overlying a layer of terram or alternative marker layer. Where no shrubs are to be planted areas should be capped with a minimum 300mm thickness of clean inert soil overlying a layer of terram or alternative marker layer.

Any imported topsoil should conform to BS 3882:2015 the specification for topsoil. Any imported soils should have relevant topsoil and contamination analytical results to demonstrate that it is suitable for use on this site.

Excavated materials will require disposal at a suitable landfill site, registered to take the levels of contamination encountered. It is essential the advice of the designated landfill should be sought as to their requirements for additional testing to assist in classification of waste as non-hazardous or hazardous.

Further testing such as Waste Acceptance Criteria (WAC) testing may be required. Unless proven otherwise by laboratory testing, excavated material will not be suitable for re-use on site.

Soil Waste Classification results are attached to this statement.

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## **5. Remediation of Unanticipated Contamination Encountered During Groundworks**

### **5.1 General**

The following section describes the methods for dealing with soil contamination unexpectedly encountered during the ground works phase of construction

### **5.2 Monitoring and Watching Brief**

A watching brief will be undertaken on site by the Groundworks' Contractors Foreman.

### **5.3 Excavation**

In the event that soils with visual / olfactory evidence of contamination in proposed soft landscaped areas or gardens are encountered, these should be excavated using appropriate plant. The advice of a suitably qualified independent Engineer should be sought as to depth, extent of excavation and relevant laboratory testing.

The extent/size of the excavation should be of sufficient size to remove any visual/olfactory evidence of contamination. It is recommended excavations extend beyond the lateral and vertical extent of contamination encountered.

All plant used for excavation should be cleaned appropriately to avoid mobilization of contamination and cross contamination of soils. Products from the wash-down process should be disposed of in accordance with current legislation. Wash-off water should not be allowed to drain into existing drainage.

All excavations should be protected immediately from the effects of weather and groundwater.

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Should the laboratory tests prove the presence of contamination in the excavation, the base/sides should be extended accordingly and the process above repeated until contamination has been removed. The general principals of the soil remediation are shown in the flow chart in Section 6.

#### 5.4 Stockpiling Excavated Materials

All suspect excavated materials should be stockpiled whilst being tested.

Stockpiles of this excavated material should be separated from the natural ground to avoid cross contamination. This can be done using separating membranes or appropriate containers (such as skips).

#### 5.5 Laboratory Testing of Excavated Materials

Suspect stockpiled material should be tested for asbestos, a general suite of contamination, speciated polyaromatic hydrocarbons and speciated total petroleum hydrocarbons.

The results of testing should be reviewed against current guideline values to assess whether the soils present a risk to the proposed development, and future re-use or disposal.

#### 5.6 Disposal

Excavated contaminated materials will require disposal at a suitable landfill site, registered to take the levels of contamination encountered. It is essential the advice of the designated landfill should be sought as to their requirements for additional testing to assist in classification of waste as non-hazardous or hazardous. Further testing such as Waste Acceptance Criteria (WAC) testing may be required. Unless proven otherwise by laboratory testing, contaminated stockpiled material will not be suitable for re-use on site.

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### 5.7 Validation Testing - Excavation Sides and Base

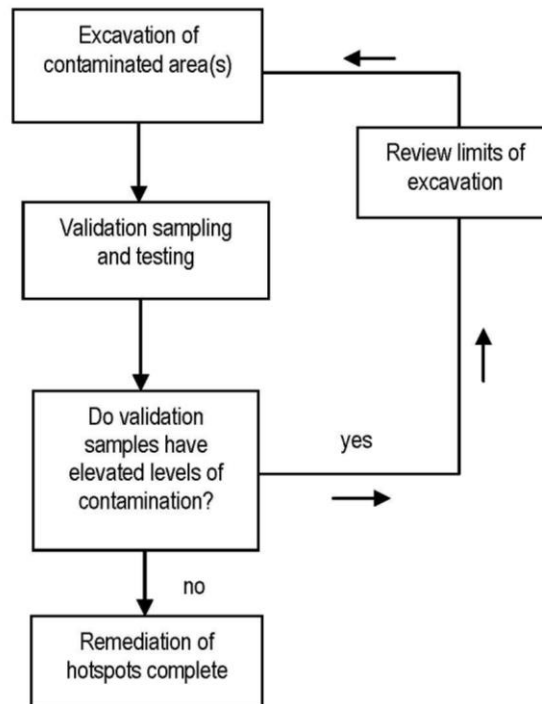
After completion of the excavation in the suspect areas, further testing will be required in the base and sides of any excavations, to validate the remediation.

The frequency and number of validation samples will depend on the size of the excavation. The smaller the excavated area, the less the number of samples required.

Samples should be taken at 1m intervals in the base and sides of the excavation. For validation purposes, testing should be carried out to suit the nature of contamination encountered.

## 6. General Method of Remediation

The following flow chart summarises the general remediation process for excavation, removal and validation testing:



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## **7. Disposal of Asbestos**

Asbestos may be present in existing buildings on site. All asbestos should be removed by specialist contractor during demolition works, prior to groundworks.

## **8. Protection of Existing Drains and Watercourses**

Under no circumstances site operations should mobilise contamination into existing drainage runs or surfaces water features. Appropriate protection measures such as bunds, barriers etc should be used to prevent any contamination entering into these features.

## **9. Gas Protection Measures**

Basic gas protection measures are required in accordance with CIRIA guidelines, the details of which are included in the EEGSL Report and summarised below:

Typical scope of protective measures is:

- a) Reinforced concrete cast in-situ floor slab (suspended, non-suspended or raft) with at least 12000gDPM.
- b) Beam and block or pre-cast concrete slab and minimum 2000gDPM/reinforced gas membrane.
- c) Possibly underfloor venting or pressurisation in combination with (a) and (b) depending on use.

All joints and penetrations must be sealed.

## **10. Final Verification Soils Report**

To facilitate the discharge of the outstanding planning condition a Final Verification Soils Report will have to be completed. This report will contain a log of all remediation activities undertaken on the site, all of the chemical testing undertaken on the site and all of the waste transfer notes of exported material. Details and photographic proof of

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## SOIL REMEDIATION METHOD STATEMENT

East Bay Close, Cardiff

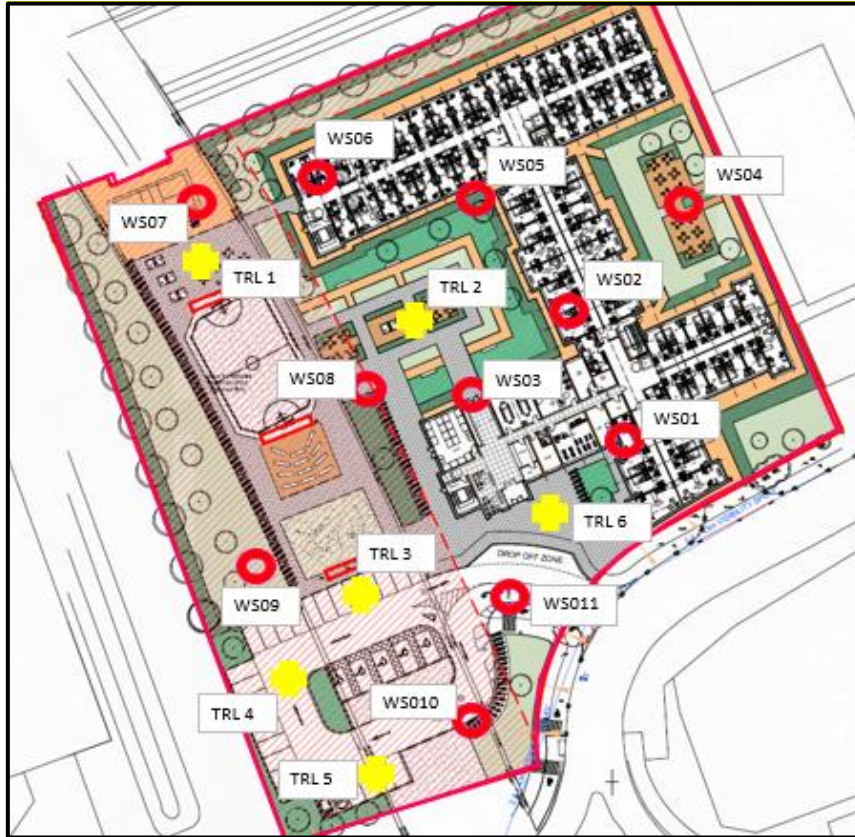
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gas protection measures installed in buildings will also be required. The Verification Report will also need to confirm that service providers were consulted and that any requirements they had requested be included with in the report.

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**SOIL CONTAMINATION LOCATION PLAN & DETAILS**



**Details of Elevated Levels of Contamination**

Location	Depth	Stratum	Elevated Levels of Contamination
WS08	0.5-0.8m	Made Ground	Beryllium
WS09	0.4-0.9m	Made Ground	Beryllium
WS10	1.5-2.0m	Made Ground	Arsenic, Polyaromatic Hydrocarbons (PAH), Total Petroleum Hydrocarbons (TPH)

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**SOIL WASTE CLASSIFICATION**

Location	Depth (m)	Stratum	Hazardous Waste Classification	Comments
WS01	0.20-1.00	Made Ground	Non-Hazardous	-
WS01	1.50-1.80	Made Ground	Non-Hazardous	-
WS01	1.80-2.00	Natural Clay	Non-Hazardous	-
WS02	1.60-1.90	Made Ground	Non-Hazardous	-
WS03	0.80-1.00	Made Ground	Non-Hazardous	-
WS03	2.00-2.20	Natural Sand	Non-Hazardous	-
WS04	0.80-1.00	Made Ground	Non-Hazardous	-
WS05	GL-0.40	Made Ground	Non-Hazardous	-
WS06	0.10-0.40	Made Ground	Non-Hazardous	-
WS08	0.50-0.80	Made Ground	Non-Hazardous	-
WS08	1.40-1.60	Made Ground	Non-Hazardous	-
WS09	0.40-0.80	Made Ground	Non-Hazardous	-
WS09	1.80-2.00	Made Ground	Non-Hazardous	-
WS10	1.50-2.00	Made Ground	Hazardous	Elevated TPH

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