



EARTH ENVIRONMENTAL  
& GEOTECHNICAL

OUR REF: A5182/24/VR/V0

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**By Email (wes@probuk.co.uk)**

Dear Wesley,

**Dobfield Road, Rochdale**  
**Garden Validation Letter Report**

**Background and Terms of Reference**

This report provides a summary of the validation of the imported soil cover material used in gardens at a new development at Dobfield Road, Rochdale.

This validation report should be read in conjunction with the remediation strategy that was developed by Earth Environmental & Geotechnical Ltd dated October 2023 (Reference: A5182/23/RMS).

The remediation strategy stipulated a soil cover system within front and rear gardens of Plots 4 to 6.

**Scope of Work**

A site visit was conducted on the 15<sup>th</sup> of October 2024 to validate the thickness of soil cover system and to take samples for laboratory chemical analysis.

Chemical samples were recovered with a sampling frequency of at least one sample for every two plots within the cover system (representing 1 sample per 50m<sup>3</sup>, as per relevant guidelines).

Chemical testing has been performed by DETS, a UKAS and MCERTS accredited laboratory. Appendix B provides a copy of the testing results.

The results have been compared to a residential end use (with plant uptake) criteria for the long-term protection of human health.

The hand dug pit sampling locations are shown in Figure 1 overleaf.

**Soil Horizons**

The imported and stockpiled soil cover material that has been placed in the garden areas on site at Dobfield Road, Rochdale, has been measured and sampled.

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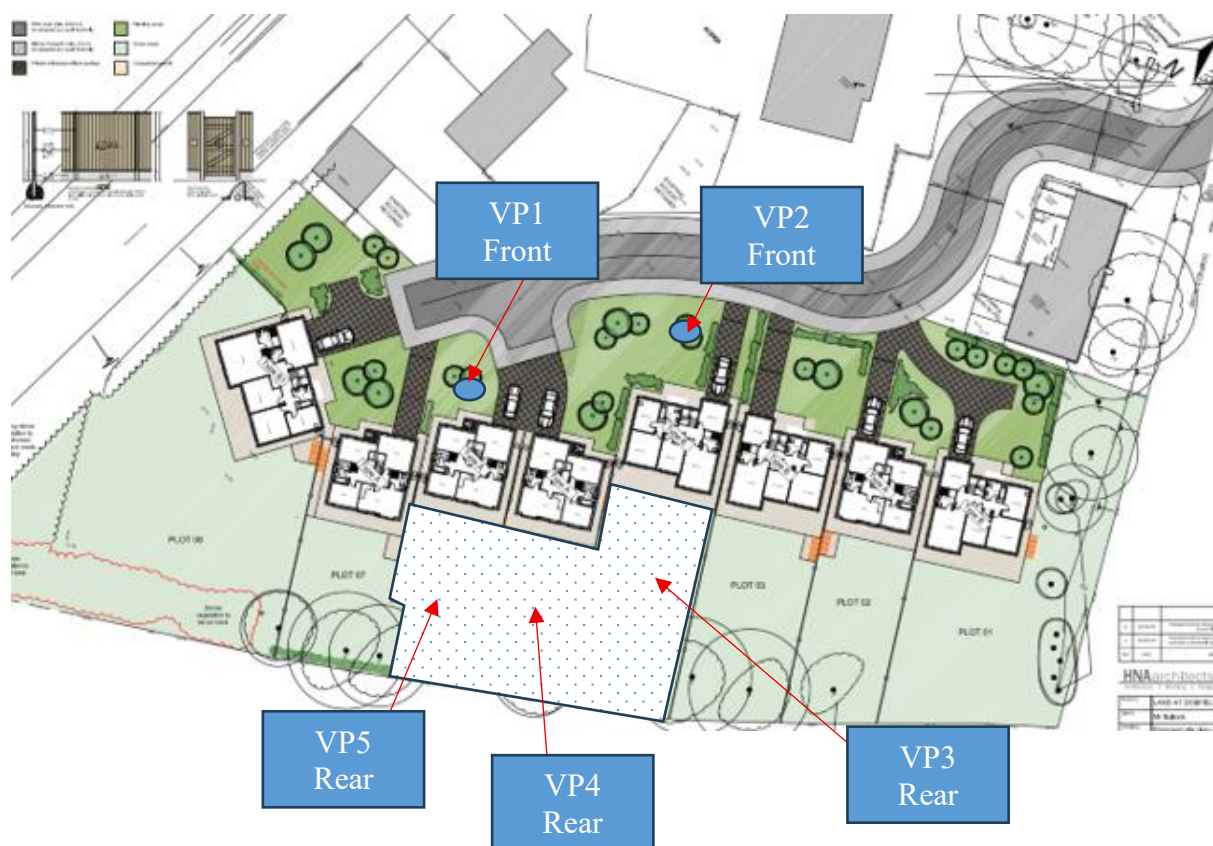
The topsoil material was encountered in all locations between ground level and a maximum depth of 0.25m bgl. The topsoil was generally described as a dark brown sandy slightly gravelly clay.

The subsoil material was encountered below the topsoil in all locations to a maximum depth of 0.75m bgl and was generally described as brown sandy slightly gravelly clay or brown slightly sandy slightly gravelly clay.

Appendix A provides a description of the soil profile at each location.

There was no visual or olfactory evidence of contamination observed during the site sampling process.

**Figure 1: Sampling Location Plan**



## **Chemical Testing**

5no. samples were taken from the soil cover system material in the hand dug pit locations.

Chemical testing has been performed for a wide range of analytes including asbestos screen, pH, total organic carbon, total sulphate, sulphide, total cyanide, arsenic, chromium, hexavalent chromium, copper, lead, selenium, zinc, cadmium, mercury, nickel, vanadium, barium, beryllium, water soluble boron, mono phenol, speciated hydrocarbons and speciated PAH's.

At a Tier I stage the long term (chronic) human health toxicity of the soil has been assessed with reference to DEFRA/Environment Agency Contaminated Land Exposure Assessment (CLEA) Soil Guideline Values (SGV) for generic site land uses, soils, and exposure.

Where Environment Agency generic guidance is absent, reference has been made to the Chartered Institute of Environmental Health (CIEH) S4ULs for human health risk assessment.

In the case of arsenic, cadmium, hexavalent chromium, lead, benzene, naphthalene, and benzo(a)pyrene DEFRA Category 4 Screening Levels have been adopted. The results have been compared to residential with plant uptake and 1% soil organic matter (SOM).

**Table 1: Assessment of Soil Chemical Data**

| Determinand                             | C4SL/S4UL<br>Levels<br>Resi w/ HP<br>SOM 1%<br>(mg/kg) | VP1<br>0.40m<br>Subsoil | VP2<br>0.10m<br>Topsoil | VP3<br>0.10m<br>Topsoil | VP4<br>0.60m<br>Subsoil | VP4<br>0.20m<br>Topsoil | No of<br>Exceedances |
|-----------------------------------------|--------------------------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------------------|
| <b>Metals</b>                           |                                                        |                         |                         |                         |                         |                         |                      |
| Arsenic                                 | 37                                                     | 9                       | 14                      | 14                      | 13                      | 10                      | 0                    |
| Beryllium                               | 1.7                                                    | < 0.5                   | 0.6                     | 0.6                     | 0.6                     | 0.5                     | 0                    |
| Boron                                   | 290                                                    | < 1                     | < 1                     | < 1                     | < 1                     | < 1                     | 0                    |
| Cadmium                                 | 22                                                     | 0.2                     | 0.3                     | 0.3                     | 0.2                     | 0.2                     | 0                    |
| Chromium                                | 910                                                    | 15                      | 16                      | 16                      | 15                      | 14                      | 0                    |
| Chromium VI                             | 21                                                     | < 2                     | < 2                     | < 2                     | < 2                     | < 2                     | 0                    |
| Copper                                  | 2400                                                   | 24                      | 38                      | 39                      | 33                      | 29                      | 0                    |
| Lead                                    | 200                                                    | 63                      | 73                      | 85                      | 72                      | 54                      | 0                    |
| Inorganic Mercury                       | 40                                                     | < 1                     | < 1                     | < 1                     | < 1                     | < 1                     | 0                    |
| Nickel                                  | 130                                                    | 16                      | 16                      | 17                      | 16                      | 16                      | 0                    |
| Selenium                                | 250                                                    | < 2                     | < 2                     | < 2                     | < 2                     | < 2                     | 0                    |
| Vanadium                                | 410                                                    | 21                      | 24                      | 24                      | 23                      | 20                      | 0                    |
| Zinc                                    | 3700                                                   | 66                      | 69                      | 72                      | 65                      | 63                      | 0                    |
| <b>Petroleum Hydrocarbons</b>           |                                                        |                         |                         |                         |                         |                         |                      |
| Benzene                                 | 0.087                                                  | < 0.002                 | < 0.002                 | < 0.002                 | < 0.002                 | < 0.002                 | 0                    |
| Toluene                                 | 130                                                    | < 0.005                 | < 0.005                 | < 0.005                 | < 0.005                 | < 0.005                 | 0                    |
| Ethylbenzene                            | 47                                                     | < 0.002                 | < 0.002                 | < 0.002                 | < 0.002                 | < 0.002                 | 0                    |
| o-xylenes                               | 56                                                     | < 0.002                 | < 0.002                 | < 0.002                 | < 0.002                 | < 0.002                 | 0                    |
| m-xylenes                               | 56                                                     | < 0.002                 | < 0.002                 | < 0.002                 | < 0.002                 | < 0.002                 | 0                    |
| p-xylenes                               | 56                                                     | < 0.002                 | < 0.002                 | < 0.002                 | < 0.002                 | < 0.002                 | 0                    |
| Aliphatic EC >5-6                       | 42                                                     | < 0.01                  | < 0.01                  | < 0.01                  | < 0.01                  | < 0.01                  | 0                    |
| Aliphatic EC >6-8                       | 100                                                    | < 0.05                  | < 0.05                  | < 0.05                  | < 0.05                  | < 0.05                  | 0                    |
| Aliphatic EC >8-10                      | 27                                                     | < 2                     | < 2                     | < 2                     | < 2                     | < 2                     | 0                    |
| Aliphatic EC >10-12                     | 130                                                    | < 2                     | < 2                     | < 2                     | < 2                     | < 2                     | 0                    |
| Aliphatic EC >12-16                     | 1100                                                   | < 3                     | < 3                     | < 3                     | < 3                     | < 3                     | 0                    |
| Aliphatic EC >16-21                     | 65000                                                  | < 3                     | < 3                     | < 3                     | < 3                     | < 3                     | 0                    |
| Aliphatic EC >21-35                     | 65000                                                  | < 10                    | 13                      | < 10                    | < 10                    | < 10                    | 0                    |
| Aromatic EC >5-7                        | 70                                                     | < 0.01                  | < 0.01                  | < 0.01                  | < 0.01                  | < 0.01                  | 0                    |
| Aromatic EC >7-8                        | 130                                                    | < 0.05                  | < 0.05                  | < 0.05                  | < 0.05                  | < 0.05                  | 0                    |
| Aromatic EC >8-10                       | 34                                                     | < 2                     | < 2                     | < 2                     | < 2                     | < 2                     | 0                    |
| Aromatic EC >10-12                      | 74                                                     | < 2                     | < 2                     | < 2                     | < 2                     | < 2                     | 0                    |
| Aromatic EC >12-16                      | 140                                                    | < 2                     | < 2                     | < 2                     | < 2                     | < 2                     | 0                    |
| Aromatic EC >16-21                      | 260                                                    | < 3                     | < 3                     | < 3                     | < 3                     | < 3                     | 0                    |
| Aromatic EC >21-35                      | 1100                                                   | < 10                    | 22                      | < 10                    | < 10                    | < 10                    | 0                    |
| <b>Polycyclic Aromatic Hydrocarbons</b> |                                                        |                         |                         |                         |                         |                         |                      |
| Naphthalene                             | 2.3                                                    | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Acenaphthylene                          | 170                                                    | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Acenaphthene                            | 210                                                    | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Fluorene                                | 170                                                    | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Phenanthrene                            | 95                                                     | < 0.1                   | 0.17                    | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Anthracene                              | 2400                                                   | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Fluoranthene                            | 280                                                    | < 0.1                   | 0.35                    | 0.14                    | 0.15                    | 0.11                    | 0                    |
| Pyrene                                  | 620                                                    | < 0.1                   | 0.42                    | 0.13                    | 0.15                    | < 0.1                   | 0                    |
| Benzo(a)anthracene                      | 7.2                                                    | < 0.1                   | 0.18                    | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Chrysene                                | 15                                                     | < 0.1                   | 0.18                    | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Benzo(a)pyrene                          | 5                                                      | < 0.1                   | 0.26                    | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Benzo(b)fluoranthene                    | 2.6                                                    | 0.27                    | < 0.1                   | < 0.1                   | < 0.1                   | 0.27                    | 0                    |
| Benzo(k)fluoranthene                    | 77                                                     | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Indeno(1,2,3-cd)pyrene                  | 27                                                     | < 0.1                   | 0.19                    | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Dibenz(a,h)anthracene                   | 0.24                                                   | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| Benzo(ghi)perylene                      | 320                                                    | < 0.1                   | 0.22                    | < 0.1                   | < 0.1                   | < 0.1                   | 0                    |
| <b>Phenols</b>                          |                                                        |                         |                         |                         |                         |                         |                      |
| Phenol                                  | 120                                                    | < 2                     | < 2                     | < 2                     | < 2                     | < 2                     | 0                    |

**Notes for Table 1**

All units in mg/kg.

Concentrations in **red** above assessment criteria for residential.

Based on the above table, no samples tested from the imported soil cover material contained concentrations of contaminants in exceedance of the screening criteria relevant to residential end use with plant uptake.

No asbestos fibres or fragments were identified in the samples taken from the tested areas.

Table 2 below provides a summary of the ground conditions at each location.

**Table 2: Summary of Cover System Thickness**

| Location | Cover System Thickness (mm) | Sufficient Cover Thickness (Y/N) |
|----------|-----------------------------|----------------------------------|
| VP1      | 200 Topsoil & 400 Subsoil   | Y                                |
| VP2      | 200 Topsoil & 550 Subsoil   | Y                                |
| VP3      | 150 Topsoil & 500 Subsoil   | Y                                |
| VP4      | 210 Topsoil & 490 Subsoil   | Y                                |
| VP5      | 250 Topsoil & 650 Subsoil   | Y                                |

### **Conclusions & Recommendations**

The imported soil cover system material used in the residential gardens and landscaped areas at Dobfield Road, Rochdale, has been validated by Earth Environmental & Geotechnical Ltd.

The thickness of the cover system in the rear and front gardens of all plots is considered suitable and adheres to the remediation strategy for the site.

Should you have any queries regarding the contents of this report, please feel free to contact me.

Yours sincerely,

**Adam Czarnecki**

**Director**

**For and on behalf of Earth Environmental & Geotechnical Ltd**

Appendix A Hand-Dug Pit Logs  
Appendix B Soil Chemical Testing Results  
Appendix C Soil Assessment Criteria

## **APPENDIX A**

### **HAND DUG PIT LOGS**

**APPENDIX B**

**SOIL CHEMICAL TESTING RESULTS**

## **APPENDIX C**

### **SOIL ASSESSMENT CRITERIA**

### Assessment Criteria for Imported Soils in Garden Areas

| Inorganic Compounds      | Assessment Criteria - Residential with Homegrown Produce (mg/kg) |                               |                            |
|--------------------------|------------------------------------------------------------------|-------------------------------|----------------------------|
| Arsenic                  | 37                                                               |                               |                            |
| Cadmium                  | 22                                                               |                               |                            |
| Chromium (III)           | 910                                                              |                               |                            |
| Chromium (VI)            | 6                                                                |                               |                            |
| Lead                     | 200                                                              |                               |                            |
| Inorganic Mercury        | 40                                                               |                               |                            |
| Nickel                   | 130                                                              |                               |                            |
| Selenium                 | 250                                                              |                               |                            |
| Copper                   | 2400                                                             |                               |                            |
| Zinc                     | 3700                                                             |                               |                            |
| Organic Compounds        | 1% SOM                                                           | 2.5% SOM                      | 6% SOM                     |
| Naphthalene              | 15                                                               | 36                            | 85                         |
| Acenaphthene             | 210                                                              | 510                           | 1100                       |
| Acenaphthylene           | 170                                                              | 420                           | 920                        |
| Fluorene                 | 170                                                              | 400                           | 860                        |
| Phenanthrene             | 95                                                               | 220                           | 440                        |
| Anthracene               | 2400                                                             | 5400                          | 11000                      |
| Fluoranthene             | 280                                                              | 560                           | 890                        |
| Pyrene                   | 620                                                              | 1200                          | 2000                       |
| Benzo(a)anthracene       | 7.2                                                              | 11                            | 13                         |
| Chrysene                 | 15                                                               | 22                            | 27                         |
| Benzo(b)fluoranthene     | 2.6                                                              | 3.3                           | 3.7                        |
| Benzo(k)fluoranthene     | 77                                                               | 93                            | 100                        |
| Benzo(a)pyrene           | 5.0                                                              | 5.0                           | 5.0                        |
| Dibenz (a, h) anthracene | 0.24                                                             | 0.28                          | 0.3                        |
| Indeno(1,2,3-cd) pyrene  | 27                                                               | 36                            | 41                         |
| Benzo (g, h, i) perylene | 320                                                              | 340                           | 350                        |
| Benzene                  | 0.2                                                              | 0.41                          | 0.87                       |
| Toluene                  | 130                                                              | 290                           | 660                        |
| Ethylbenzene             | 47                                                               | 110                           | 260                        |
| o-Xylene                 | 60                                                               | 140                           | 330                        |
| m-Xylene                 | 59                                                               | 140                           | 320                        |
| p-Xylene                 | 56                                                               | 130                           | 310                        |
| TPH Fractions            | 1% SOM                                                           | 2.5% SOM                      | 6% SOM                     |
| Aliphatic EC 5-6         | 42                                                               | 78                            | 160                        |
| Aliphatic EC >6-8        | 100                                                              | 230                           | 530                        |
| Aliphatic EC >8-10       | 27                                                               | 65                            | 150                        |
| Aliphatic EC >10-12      | 130 (48) <sup>vap</sup>                                          | 330 (118) <sup>vap</sup>      | 760 (283) <sup>vap</sup>   |
| Aliphatic EC >12-16      | 1100 (24) <sup>sol</sup>                                         | 2400 (59) <sup>sol</sup>      | 4,300 (142) <sup>sol</sup> |
| Aliphatic EC >16-35      | 65,000 (8.48) <sup>f, sol</sup>                                  | 92,000 (21) <sup>f, sol</sup> | 110,000 <sup>f</sup>       |
| Aliphatic EC >35-44      | 65,000 (8.48) <sup>f, sol</sup>                                  | 92,000 (21) <sup>f, sol</sup> | 110,000 <sup>f</sup>       |
| Aromatic EC 5-7          | 70                                                               | 140                           | 300                        |
| Aromatic EC >7-8         | 130                                                              | 290                           | 660                        |

| Assessment Criteria - Residential with Homegrown Produce (mg/kg) |                    |                    |                    |
|------------------------------------------------------------------|--------------------|--------------------|--------------------|
| TPH Fractions                                                    | 1% SOM             | 2.5% SOM           | 6% SOM             |
| Aromatic EC>8-10                                                 | 34                 | 83                 | 190                |
| Aromatic EC >10-12                                               | 74                 | 180                | 380                |
| Aromatic EC >12-16                                               | 140                | 330                | 660                |
| Aromatic EC >16-21                                               | 260 <sup>f</sup>   | 540 <sup>f</sup>   | 930 <sup>f</sup>   |
| Aromatic EC >21-35                                               | 1,100 <sup>f</sup> | 1,500 <sup>f</sup> | 1,700 <sup>f</sup> |
| Aromatic EC >35-44                                               | 1,100 <sup>f</sup> | 1,500 <sup>f</sup> | 1,700 <sup>f</sup> |
| <b>Asbestos Fibres</b>                                           | < 0.001%           |                    |                    |

| Purpose                              | Classification | Testing Frequency                                          | Chemical Analysis                                                                                                                                                                                                |
|--------------------------------------|----------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Source Testing & Suitability For Use | Topsoil        | 1 sample per 50m <sup>3</sup><br>[Minimum of 3 per source] | <ul style="list-style-type: none"> <li>➤ Inorganic Compounds.</li> <li>➤ Speciated Polycyclic Aromatic Hydrocarbons.</li> <li>➤ Speciated Petroleum hydrocarbons.</li> <li>➤ Asbestos Identification.</li> </ul> |
|                                      | Sub-Soil       | 1 sample per 50m <sup>3</sup><br>[Minimum of 3 per source] |                                                                                                                                                                                                                  |