



TIM O'HARE ASSOCIATES  
SOIL & LANDSCAPE CONSULTANCY

Mr Nathan Birchenall  
Tarmac Topscope  
Manchester Road  
Congleton  
Cheshire, CW12 2LU

23<sup>rd</sup> October 2023  
Our Ref: TOHA/23/1136/SS  
Your Ref: PO 2002663335

Dear Sirs

**Topsoil Analysis Report: Topscope Topsoil (Eaton Hall)**

We have completed the analysis of the soil sample recently submitted, referenced *Topscope Topsoil (Eaton Hall)*, and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the sample for general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

This report presents the results of analysis for the sample submitted to our office, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification or validation testing or waste designation purposes, especially after the topsoil has left the Tarmac Topscope site.

**SAMPLE EXAMINATION**

The sample was described as a brown (Munsell Colour 10YR 4/3), slightly moist, friable, very slightly calcareous LOAMY SAND with a weakly developed, very fine to fine granular structure\*. The sample was stone-free and contained a low proportion of organic fines and occasional woody fragments. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

\*This appraisal of soil structure was made from examination of a disturbed sample. Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

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## **ANALYTICAL SCHEDULE**

The sample was submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- detailed particle size analysis (% 5 sands, silt, clay);
- stone content (2-20mm, 20-50mm, >50mm);
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn);
- total cyanide and total (mono) phenols;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX);
- asbestos screen.

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

## **RESULTS OF ANALYSIS**

### **Detailed Particle Size Analysis and Stone Content**

The sample fell into the *loamy sand* texture class. Further detailed particle size analysis found the sample to have a sufficiently narrow particle size distribution and a predominance of *medium sand* (0.25-0.50mm). This is usually ideal for topsoil in general landscape applications as reasonable porosity levels can be maintained in a consolidated state and the risk of particle interpacking is reduced. This type of grading therefore normally provides adequate water attenuation, drainage and aeration properties for general landscape applications.

The stone content of the sample was stone free and, as such, stones should not restrict the use of the soil for general landscape purposes.

### **pH and Electrical Conductivity Values**

The sample was strongly alkaline in reaction (pH 8.5). This pH value would be considered suitable for general landscape purposes provided species with a wide pH tolerance or those known to prefer alkaline soils are selected for planting, turfing and seeding.

The electrical conductivity (salinity) value (water extract) was moderate, which indicates that soluble salts should not be present at levels that would be harmful to plants.

The electrical conductivity value by CaSO<sub>4</sub> extract (BS3882 requirement) fell below the maximum specified value (3300 µS/cm) given in BS3882:2015 – Table 1.

### **Organic Matter and Fertility Status**

The sample was well supplied with extractable phosphorus, extractable potassium and extractable magnesium but was deficient in organic matter and total nitrogen. These deficiencies can be remedied by a suitable compost application.

The C:N ratio of the sample was acceptable for general landscape purposes.

## **Potential Contaminants**

With reference to *BS3882:2015 - Table 1*: Notes 3 and 4, there is a requirement to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with homegrown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels (C4SLs) for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

## **Phytotoxic Contaminants**

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in *BS3882:2015 – Table 1*.

## **CONCLUSION**

The purpose of the analysis was to determine the suitability of the sample for general landscape purposes (trees, shrubs, amenity grass). In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

From the soil examination and subsequent laboratory analysis, the sample was described as a strongly alkaline, non-saline, very slightly calcareous, stone free *loamy sand* with an adequate structure. The sample contained sufficient reserves of most major plant nutrients but was deficient in organic matter and total nitrogen. Of the potential contaminants determined, none exceeded their respective guideline values.

To conclude, based on our findings, the topsoil represented by this sample would be considered suitable for general landscape purposes (trees, shrubs and amenity grass), provided the organic matter and total nitrogen deficiencies are addressed, species with a wide pH tolerance or those known to prefer alkaline soils are selected and the physical condition of the soil is satisfactory.

The sample was largely compliant with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*) with the exception of deficient levels of organic matter and total nitrogen.

On this occasion, these non-compliances would be considered minor when reviewed in the context of all the other results, and the deficiencies are addressed by a suitable compost application.

## **RECOMMENDATIONS**

### **Compost Application**

To address the deficiencies in organic matter and total nitrogen, we recommend applying and incorporating suitable compost (e.g. PAS100:2011 /Landscape Institute/WRAP grade (10mm screened) green compost) at a rate of **15%** by volume, ensuring the soil is dry and friable.

For planting purposes, the compost should be incorporated to a depth of 200mm and for grass areas the compost should be worked into the upper 100mm.

### **Soil Handling Recommendations**

It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. stockpiling, resspreading, cultivating, planting, seeding or turfing). As a consequence, soil handling operations should be carried out when soil is sufficiently dry to be non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of

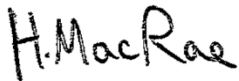
soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

Further details on soil handling are provided in Annex A of BS3882:2015.

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We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully



**Harriet MacRae**  
BSc MSc  
Graduate Soil Scientist



**Rebecca Hollands**  
BSc MSc MScSoilSci  
Senior Soil Scientist

For & on behalf of Tim O'Hare Associates LLP



Tier Environmental  
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WA3 6AE



4225



**Attention :** Eve Rowland  
**Date :** 19th October, 2023  
**Your reference :** TE1438  
**Our reference :** Test Report 23/16922 Batch 1  
**Location :** Eaton Hall  
**Date samples received :** 12th October, 2023  
**Status :** Final Report  
**Issue :** 1

Sixteen samples were received for analysis on 12th October, 2023 of which sixteen were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

The greenhouse gas emissions generated (in Carbon – Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 57.92 kg of CO2

Scope 1&2&3 emissions - 136.88 kg of CO2

**Authorised By:**



**Bruce Leslie**  
Project Manager

Please include all sections of this report if it is reproduced

## Element Materials Technology

**Client Name:** Tier Environmental  
**Reference:** TE1438  
**Location:** Eaton Hall  
**Contact:** Eve Rowland  
**EMT Job No:** 23/16922

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| EMT Sample No.                          | 1-3        | 4-6        | 7-9        | 10-12      | 13-15      | 16-18      | 19-21      | 22-24      | 25-27      | 28-30      | Please see attached notes for all abbreviations and acronyms |       |              |
|-----------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------------------------------------------------------------|-------|--------------|
| Sample ID                               | TS1        | TS2        | TS3        | TS4        | TS5        | TS6        | TS7        | TS8        | TS9        | TS10       |                                                              |       |              |
| Depth                                   |            |            |            |            |            |            |            |            |            |            |                                                              |       |              |
| COC No / misc                           |            |            |            |            |            |            |            |            |            |            |                                                              |       |              |
| Containers                              | V J T      | V J T      | V J T      | V J T      | V J T      | V J T      | V J T      | V J T      | V J T      | V J T      |                                                              |       |              |
| Sample Date                             | 10/10/2023 | 10/10/2023 | 10/10/2023 | 10/10/2023 | 10/10/2023 | 10/10/2023 | 10/10/2023 | 10/10/2023 | 10/10/2023 | 10/10/2023 |                                                              |       |              |
| Sample Type                             | Soil       | Soil       | Soil       | Soil       | Soil       | Soil       | Soil       | Soil       | Soil       | Soil       |                                                              |       |              |
| Batch Number                            | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          | 1          |                                                              |       |              |
| Date of Receipt                         | 12/10/2023 | 12/10/2023 | 12/10/2023 | 12/10/2023 | 12/10/2023 | 12/10/2023 | 12/10/2023 | 12/10/2023 | 12/10/2023 | 12/10/2023 | LOD/LOR                                                      | Units | Method No.   |
| Arsenic <sup>#</sup>                    | 3.5        | 3.1        | 3.3        | 3.6        | 3.7        | 5.1        | 4.0        | 3.8        | 3.3        | 3.4        | <0.5                                                         | mg/kg | TM30/PM15    |
| Cadmium <sup>#</sup>                    | 0.1        | <0.1       | <0.1       | 0.1        | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1                                                         | mg/kg | TM30/PM15    |
| Chromium <sup>#</sup>                   | 60.9       | 60.5       | 62.1       | 55.9       | 37.1       | 34.6       | 32.8       | 36.1       | 40.4       | 36.7       | <0.5                                                         | mg/kg | TM30/PM15    |
| Copper <sup>#</sup>                     | 15         | 13         | 15         | 18         | 17         | 15         | 18         | 17         | 23         | 15         | <1                                                           | mg/kg | TM30/PM15    |
| Lead <sup>#</sup>                       | 22         | 18         | 22         | 29         | 21         | 21         | 20         | 26         | 19         | 19         | <5                                                           | mg/kg | TM30/PM15    |
| Mercury <sup>#</sup>                    | <0.1       | <0.1       | <0.1       | 0.1        | <0.1       | <0.1       | 0.1        | <0.1       | <0.1       | <0.1       | <0.1                                                         | mg/kg | TM30/PM15    |
| Nickel <sup>#</sup>                     | 8.1        | 7.2        | 10.1       | 8.9        | 8.0        | 8.1        | 9.2        | 9.0        | 8.5        | 7.4        | <0.7                                                         | mg/kg | TM30/PM15    |
| Selenium <sup>#</sup>                   | <1         | <1         | <1         | <1         | <1         | <1         | <1         | <1         | <1         | <1         | <1                                                           | mg/kg | TM30/PM15    |
| Total Sulphate as SO4 <sup>#</sup>      | 257        | 242        | 266        | 302        | 290        | 279        | 291        | 346        | 267        | 305        | <50                                                          | mg/kg | TM50/PM29    |
| Zinc <sup>#</sup>                       | 43         | 35         | 42         | 49         | 42         | 40         | 43         | 45         | 38         | 38         | <5                                                           | mg/kg | TM30/PM15    |
| PAH MS                                  |            |            |            |            |            |            |            |            |            |            |                                                              |       |              |
| Naphthalene <sup>#</sup>                | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04                                                        | mg/kg | TM4/PM8      |
| Acenaphthylene                          | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      | <0.03                                                        | mg/kg | TM4/PM8      |
| Acenaphthene <sup>#</sup>               | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05                                                        | mg/kg | TM4/PM8      |
| Fluorene <sup>#</sup>                   | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04                                                        | mg/kg | TM4/PM8      |
| Phenanthrene <sup>#</sup>               | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      | 0.09       | 0.04       | 0.11       | <0.03      | <0.03                                                        | mg/kg | TM4/PM8      |
| Anthracene <sup>#</sup>                 | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04                                                        | mg/kg | TM4/PM8      |
| Fluoranthene <sup>#</sup>               | 0.09       | 0.12       | 0.11       | 0.10       | 0.08       | 0.11       | 0.30       | 0.12       | 0.32       | 0.07       | <0.03                                                        | mg/kg | TM4/PM8      |
| Pyrene <sup>#</sup>                     | 0.08       | 0.09       | 0.09       | 0.07       | 0.06       | 0.08       | 0.26       | 0.08       | 0.27       | 0.06       | <0.03                                                        | mg/kg | TM4/PM8      |
| Benzo(a)anthracene <sup>#</sup>         | <0.06      | 0.07       | 0.09       | <0.06      | <0.06      | 0.08       | 0.22       | 0.07       | 0.19       | <0.06      | <0.06                                                        | mg/kg | TM4/PM8      |
| Chrysene <sup>#</sup>                   | 0.06       | 0.07       | 0.07       | 0.06       | 0.06       | 0.07       | 0.22       | 0.07       | 0.19       | 0.06       | <0.02                                                        | mg/kg | TM4/PM8      |
| Benzo(b)fluoranthene <sup>#</sup>       | 0.11       | 0.13       | 0.14       | 0.11       | 0.09       | 0.13       | 0.40       | 0.11       | 0.29       | 0.10       | <0.07                                                        | mg/kg | TM4/PM8      |
| Benzo(a)pyrene <sup>#</sup>             | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | 0.07       | 0.23       | 0.05       | 0.16       | <0.04      | <0.04                                                        | mg/kg | TM4/PM8      |
| Indeno(123cd)pyrene <sup>#</sup>        | <0.04      | 0.05       | 0.07       | <0.04      | <0.04      | 0.06       | 0.18       | 0.06       | 0.09       | <0.04      | <0.04                                                        | mg/kg | TM4/PM8      |
| Dibenzo(ah)anthracene <sup>#</sup>      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04                                                        | mg/kg | TM4/PM8      |
| Benzo(ghi)perylene <sup>#</sup>         | <0.04      | 0.06       | 0.07       | <0.04      | 0.05       | 0.06       | 0.18       | 0.05       | 0.11       | <0.04      | <0.04                                                        | mg/kg | TM4/PM8      |
| PAH 16 Total                            | <0.6       | <0.6       | 0.6        | <0.6       | <0.6       | 0.7        | 2.1        | 0.7        | 1.7        | <0.6       | <0.6                                                         | mg/kg | TM4/PM8      |
| Benzo(b)fluoranthene                    | 0.08       | 0.09       | 0.10       | 0.08       | 0.06       | 0.09       | 0.29       | 0.08       | 0.21       | 0.07       | <0.05                                                        | mg/kg | TM4/PM8      |
| Benzo(k)fluoranthene                    | 0.03       | 0.04       | 0.04       | 0.03       | 0.03       | 0.04       | 0.11       | 0.03       | 0.08       | 0.03       | <0.02                                                        | mg/kg | TM4/PM8      |
| PAH Surrogate % Recovery                | 115        | 113        | 113        | 112        | 113        | 113        | 114        | 111        | 113        | 111        | <0                                                           | %     | TM4/PM8      |
| TPH CWG                                 |            |            |            |            |            |            |            |            |            |            |                                                              |       |              |
| Aliphatics                              |            |            |            |            |            |            |            |            |            |            |                                                              |       |              |
| >C5-C6 (HS_1D_AL) <sup>#</sup>          | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1                                                         | mg/kg | TM36/PM12    |
| >C6-C8 (HS_1D_AL) <sup>#</sup>          | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1                                                         | mg/kg | TM36/PM12    |
| >C8-C10 (HS_1D_AL)                      | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1                                                         | mg/kg | TM36/PM12    |
| >C10-C12 (EH_CU_1D_AL) <sup>#</sup>     | <0.2       | <0.2       | <0.2       | <0.2       | <0.2       | <0.2       | <0.2       | <0.2       | <0.2       | <0.2       | <0.2                                                         | mg/kg | TM5/PM8/PM16 |
| >C12-C16 (EH_CU_1D_AL) <sup>#</sup>     | <4         | <4         | <4         | <4         | <4         | <4         | <4         | <4         | <4         | <4         | <4                                                           | mg/kg | TM5/PM8/PM16 |
| >C16-C21 (EH_CU_1D_AL) <sup>#</sup>     | <7         | <7         | <7         | <7         | <7         | <7         | <7         | 14         | <7         | <7         | <7                                                           | mg/kg | TM5/PM8/PM16 |
| >C21-C35 (EH_CU_1D_AL) <sup>#</sup>     | 40         | <7         | 12         | 78         | 23         | 32         | 27         | 50         | 32         | <7         | <7                                                           | mg/kg | TM5/PM8/PM16 |
| >C35-C40 (EH_CU_1D_AL)                  | <7         | <7         | <7         | 11         | <7         | <7         | <7         | <7         | <7         | <7         | <7                                                           | mg/kg | TM5/PM8/PM16 |
| Total aliphatics C5-40 (EH+HS_CU_1D_AL) | 40         | <26        | <26        | 89         | <26        | 32         | 27         | 64         | 32         | <26        | <26                                                          | mg/kg | TM5/PM8/PM16 |

## Element Materials Technology

**Client Name:** Tier Environmental  
**Reference:** TE1438  
**Location:** Eaton Hall  
**Contact:** Eve Rowland  
**EMT Job No:** 23/16922

**Report : Solid**

**Solids:** V=60g VOC jar. J=250g glass jar. T=plastic tub

[illegible]

## Element Materials Technology

**Client Name:** Tier Environmental  
**Reference:** TE1438  
**Location:** Eaton Hall  
**Contact:** Eve Rowland  
**EMT Job No:** 23/16922

**Report : Solid**

**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub

| EMT Sample No.                          | 31-33      | 34-36      | 37-39      | 40-42      | 43-45      | 46-48      |  |  |  |  | Please see attached notes for all abbreviations and acronyms |       |                        |
|-----------------------------------------|------------|------------|------------|------------|------------|------------|--|--|--|--|--------------------------------------------------------------|-------|------------------------|
| Sample ID                               | TS11       | TS12       | TS13       | SS1        | SS2        | SS3        |  |  |  |  |                                                              |       |                        |
| Depth                                   |            |            |            |            |            |            |  |  |  |  |                                                              |       |                        |
| COC No / misc                           |            |            |            |            |            |            |  |  |  |  |                                                              |       |                        |
| Containers                              | V J T      | V J T      | V J T      | V J T      | V J T      | V J T      |  |  |  |  |                                                              |       |                        |
| Sample Date                             | 10/10/2023 | 10/10/2023 | 10/10/2023 | 10/10/2023 | 10/10/2023 | 10/10/2023 |  |  |  |  |                                                              |       |                        |
| Sample Type                             | Soil       | Soil       | Soil       | Soil       | Soil       | Soil       |  |  |  |  |                                                              |       |                        |
| Batch Number                            | 1          | 1          | 1          | 1          | 1          | 1          |  |  |  |  |                                                              |       |                        |
| Date of Receipt                         | 12/10/2023 | 12/10/2023 | 12/10/2023 | 12/10/2023 | 12/10/2023 | 12/10/2023 |  |  |  |  | LOD/LOR                                                      | Units | Method No.             |
| Arsenic #                               | 3.2        | 3.6        | 3.5        | 3.9        | 3.3        | 3.9        |  |  |  |  | <0.5                                                         | mg/kg | TM30/PM15              |
| Cadmium #                               | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  | <0.1                                                         | mg/kg | TM30/PM15              |
| Chromium #                              | 58.1       | 39.0       | 56.8       | 37.3       | 40.8       | 37.6       |  |  |  |  | <0.5                                                         | mg/kg | TM30/PM15              |
| Copper #                                | 14         | 8          | 15         | 11         | 16         | 10         |  |  |  |  | <1                                                           | mg/kg | TM30/PM15              |
| Lead #                                  | 18         | 5          | 20         | <5         | 19         | <5         |  |  |  |  | <5                                                           | mg/kg | TM30/PM15              |
| Mercury #                               | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  | <0.1                                                         | mg/kg | TM30/PM15              |
| Nickel #                                | 7.3        | 10.5       | 8.4        | 13.2       | 7.8        | 13.4       |  |  |  |  | <0.7                                                         | mg/kg | TM30/PM15              |
| Selenium #                              | <1         | <1         | <1         | <1         | <1         | <1         |  |  |  |  | <1                                                           | mg/kg | TM30/PM15              |
| Total Sulphate as SO4 #                 | 286        | 58         | 324        | 52         | 264        | <50        |  |  |  |  | <50                                                          | mg/kg | TM50/PM29              |
| Zinc #                                  | 38         | 20         | 40         | 22         | 42         | 21         |  |  |  |  | <5                                                           | mg/kg | TM30/PM15              |
| PAH MS                                  |            |            |            |            |            |            |  |  |  |  |                                                              |       |                        |
| Naphthalene #                           | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Acenaphthylene                          | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      |  |  |  |  | <0.03                                                        | mg/kg | TM4/PM8                |
| Acenaphthene #                          | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      | <0.05      |  |  |  |  | <0.05                                                        | mg/kg | TM4/PM8                |
| Fluorene #                              | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Phenanthrene #                          | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      | <0.03      |  |  |  |  | <0.03                                                        | mg/kg | TM4/PM8                |
| Anthracene #                            | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Fluoranthene #                          | 0.09       | 0.11       | 0.09       | <0.03      | <0.03      | <0.03      |  |  |  |  | <0.03                                                        | mg/kg | TM4/PM8                |
| Pyrene #                                | 0.08       | 0.08       | 0.07       | <0.03      | <0.03      | <0.03      |  |  |  |  | <0.03                                                        | mg/kg | TM4/PM8                |
| Benzo(a)anthracene #                    | 0.07       | 0.07       | 0.07       | <0.06      | <0.06      | <0.06      |  |  |  |  | <0.06                                                        | mg/kg | TM4/PM8                |
| Chrysene #                              | 0.06       | 0.07       | 0.07       | <0.02      | <0.02      | <0.02      |  |  |  |  | <0.02                                                        | mg/kg | TM4/PM8                |
| Benzo(b)fluoranthene #                  | 0.10       | 0.13       | 0.12       | <0.07      | <0.07      | <0.07      |  |  |  |  | <0.07                                                        | mg/kg | TM4/PM8                |
| Benzo(a)pyrene #                        | 0.06       | 0.06       | 0.06       | <0.04      | <0.04      | <0.04      |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Indeno(123cd)pyrene #                   | <0.04      | 0.06       | 0.06       | <0.04      | <0.04      | <0.04      |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Dibenzo(ah)anthracene #                 | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      | <0.04      |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| Benzo(ghi)perylene #                    | 0.05       | 0.06       | 0.06       | <0.04      | <0.04      | <0.04      |  |  |  |  | <0.04                                                        | mg/kg | TM4/PM8                |
| PAH 16 Total                            | <0.6       | 0.6        | 0.6        | <0.6       | <0.6       | <0.6       |  |  |  |  | <0.6                                                         | mg/kg | TM4/PM8                |
| Benzo(b)fluoranthene                    | 0.07       | 0.09       | 0.09       | <0.05      | <0.05      | <0.05      |  |  |  |  | <0.05                                                        | mg/kg | TM4/PM8                |
| Benzo(k)fluoranthene                    | 0.03       | 0.04       | 0.03       | <0.02      | <0.02      | <0.02      |  |  |  |  | <0.02                                                        | mg/kg | TM4/PM8                |
| PAH Surrogate % Recovery                | 110        | 115        | 115        | 131        | 114        | 118        |  |  |  |  | <0                                                           | %     | TM4/PM8                |
| TPH CWG                                 |            |            |            |            |            |            |  |  |  |  |                                                              |       |                        |
| Aliphatics                              |            |            |            |            |            |            |  |  |  |  |                                                              |       |                        |
| >C5-C6 (HS_1D_AL) #                     | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  | <0.1                                                         | mg/kg | TM36/PM12              |
| >C6-C8 (HS_1D_AL) #                     | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  | <0.1                                                         | mg/kg | TM36/PM12              |
| >C8-C10 (HS_1D_AL)                      | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       | <0.1       |  |  |  |  | <0.1                                                         | mg/kg | TM36/PM12              |
| >C10-C12 (EH_CU_1D_AL) #                | <0.2       | <0.2       | <0.2       | <0.2       | <0.2       | <0.2       |  |  |  |  | <0.2                                                         | mg/kg | TM5/PM8/PM16           |
| >C12-C16 (EH_CU_1D_AL) #                | <4         | <4         | <4         | <4         | <4         | <4         |  |  |  |  | <4                                                           | mg/kg | TM5/PM8/PM16           |
| >C16-C21 (EH_CU_1D_AL) #                | 10         | <7         | <7         | <7         | <7         | <7         |  |  |  |  | <7                                                           | mg/kg | TM5/PM8/PM16           |
| >C21-C35 (EH_CU_1D_AL) #                | 55         | 29         | 29         | <7         | <7         | <7         |  |  |  |  | <7                                                           | mg/kg | TM5/PM8/PM16           |
| >C35-C40 (EH_CU_1D_AL)                  | <7         | <7         | <7         | <7         | <7         | <7         |  |  |  |  | <7                                                           | mg/kg | TM5/PM8/PM16           |
| Total aliphatics C5-40 (EH+HS_CU_1D_AL) | 65         | 29         | 29         | <26        | <26        | <26        |  |  |  |  | <26                                                          | mg/kg | TM5/PM8/PM16/PM12/PM15 |

## Element Materials Technology

**Client Name:** Tier Environmental  
**Reference:** TE1438  
**Location:** Eaton Hall  
**Contact:** Eve Rowland  
**EMT Job No:** 23/16922

**Report : Solid**

**Solids:** V=60g VOC jar. J=250g glass jar. T=plastic tub

[illegible]

**Client Name:** Tier Environmental  
**Reference:** TE1438  
**Location:** Eaton Hall  
**Contact:** Eve Rowland

**Note:**

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Asbestos sub-samples are retained for not less than 6 months from the date of analysis unless specifically requested.

The LOQ of the Asbestos Quantification is 0.001% dry fibre of dry mass of sample.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

Where trace asbestos is reported the amount of asbestos will be <0.1%.

| EMT Job No. | Batch | Sample ID | Depth | EMT Sample No. | Analyst Name     | Date Of Analysis | Analysis                                   | Result                       |
|-------------|-------|-----------|-------|----------------|------------------|------------------|--------------------------------------------|------------------------------|
| 23/16922    | 1     | TS1       |       | 3              | Bart Kuznicki    | 13/10/2023       | <b>General Description (Bulk Analysis)</b> | Brown Loose soil with stones |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos Fibres</b>                     | NAD                          |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos ACM</b>                        | NAD                          |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos Type</b>                       | NAD                          |
| 23/16922    | 1     | TS2       |       | 6              | Bart Kuznicki    | 13/10/2023       | <b>General Description (Bulk Analysis)</b> | Brown Loose soil with stones |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos Fibres</b>                     | NAD                          |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos ACM</b>                        | NAD                          |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos Type</b>                       | NAD                          |
| 23/16922    | 1     | TS3       |       | 9              | Bart Kuznicki    | 13/10/2023       | <b>General Description (Bulk Analysis)</b> | Brown Loose soil with stones |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos Fibres</b>                     | NAD                          |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos ACM</b>                        | NAD                          |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos Type</b>                       | NAD                          |
| 23/16922    | 1     | TS4       |       | 12             | Bart Kuznicki    | 13/10/2023       | <b>General Description (Bulk Analysis)</b> | Brown Loose soil with stones |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos Fibres</b>                     | NAD                          |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos ACM</b>                        | NAD                          |
|             |       |           |       |                | Bart Kuznicki    | 13/10/2023       | <b>Asbestos Type</b>                       | NAD                          |
| 23/16922    | 1     | TS5       |       | 15             | Catherine Coles  | 17/10/2023       | <b>General Description (Bulk Analysis)</b> | brown soil,vegetation        |
|             |       |           |       |                | Catherine Coles  | 17/10/2023       | <b>Asbestos Fibres</b>                     | NAD                          |
|             |       |           |       |                | Catherine Coles  | 17/10/2023       | <b>Asbestos ACM</b>                        | NAD                          |
|             |       |           |       |                | Catherine Coles  | 17/10/2023       | <b>Asbestos Type</b>                       | NAD                          |
| 23/16922    | 1     | TS6       |       | 18             | Catherine Coles  | 17/10/2023       | <b>General Description (Bulk Analysis)</b> | brown soil,vegetation        |
|             |       |           |       |                | Catherine Coles  | 17/10/2023       | <b>Asbestos Fibres</b>                     | NAD                          |
|             |       |           |       |                | Catherine Coles  | 17/10/2023       | <b>Asbestos ACM</b>                        | NAD                          |
|             |       |           |       |                | Catherine Coles  | 17/10/2023       | <b>Asbestos Type</b>                       | NAD                          |
| 23/16922    | 1     | TS7       |       | 21             | Charlotte Taylor | 17/10/2023       | <b>General Description (Bulk Analysis)</b> | brown soil/stones            |
|             |       |           |       |                | Charlotte Taylor | 17/10/2023       | <b>Asbestos Fibres</b>                     | NAD                          |
|             |       |           |       |                | Charlotte Taylor | 17/10/2023       | <b>Asbestos ACM</b>                        | NAD                          |
|             |       |           |       |                | Charlotte Taylor | 17/10/2023       | <b>Asbestos Type</b>                       | NAD                          |
| 23/16922    | 1     | TS8       |       | 24             | Emily Anderton   | 17/10/2023       | <b>General Description (Bulk Analysis)</b> | Brown soil with vegetation   |
|             |       |           |       |                | Emily Anderton   | 17/10/2023       | <b>Asbestos Fibres</b>                     | NAD                          |
|             |       |           |       |                | Emily Anderton   | 17/10/2023       | <b>Asbestos ACM</b>                        | NAD                          |
|             |       |           |       |                | Emily Anderton   | 17/10/2023       | <b>Asbestos Type</b>                       | NAD                          |

**Client Name:** Tier Environmental  
**Reference:** TE1438  
**Location:** Eaton Hall  
**Contact:** Eve Rowland

[illegible]

**Client Name:** Tier Environmental

Reference: TE1438

**Location:** Eaton Hall

**Contact:** Eve Rowland

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating. Only analyses which are accredited are recorded as deviating if set criteria are not met.

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

# NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/16922

## SOILS and ASH

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overestimate when other sulphides such as Barite (Barium Sulphate) are present.

## WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

## STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

## DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

## SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

## DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

## BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

**NOTE**

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a requirement of our Accreditation Body for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Laboratory records are kept for a period of no less than 6 years.

**REPORTS FROM THE SOUTH AFRICA LABORATORY**

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

**Measurement Uncertainty**

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

**Customer Provided Information**

Sample ID and depth is information provided by the customer.

## ABBREVIATIONS and ACRONYMS USED

|         |                                                                                                                                                                          |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #       | ISO17025 (UKAS Ref No. 4225) accredited - UK.                                                                                                                            |
| SA      | ISO17025 (SANAS Ref No.T0729) accredited - South Africa                                                                                                                  |
| B       | Indicates analyte found in associated method blank.                                                                                                                      |
| DR      | Dilution required.                                                                                                                                                       |
| M       | MCERTS accredited.                                                                                                                                                       |
| NA      | Not applicable                                                                                                                                                           |
| NAD     | No Asbestos Detected.                                                                                                                                                    |
| ND      | None Detected (usually refers to VOC and/SVOC TICs).                                                                                                                     |
| NDP     | No Determination Possible                                                                                                                                                |
| SS      | Calibrated against a single substance                                                                                                                                    |
| SV      | Surrogate recovery outside performance criteria. This may be due to a matrix effect.                                                                                     |
| W       | Results expressed on as received basis.                                                                                                                                  |
| +       | AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.                                                               |
| >>      | Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher. |
| *       | Analysis subcontracted to an Element Materials Technology approved laboratory.                                                                                           |
| AD      | Samples are dried at 35°C ±5°C                                                                                                                                           |
| CO      | Suspected carry over                                                                                                                                                     |
| LOD/LOR | Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS                                                                                                |
| ME      | Matrix Effect                                                                                                                                                            |
| NFD     | No Fibres Detected                                                                                                                                                       |
| BS      | AQC Sample                                                                                                                                                               |
| LB      | Blank Sample                                                                                                                                                             |
| N       | Client Sample                                                                                                                                                            |
| TB      | Trip Blank Sample                                                                                                                                                        |
| OC      | Outside Calibration Range                                                                                                                                                |

## HWOL ACRONYMS AND OPERATORS USED

|       |                                                                      |
|-------|----------------------------------------------------------------------|
| HS    | Headspace Analysis.                                                  |
| EH    | Extractable Hydrocarbons - i.e. everything extracted by the solvent. |
| CU    | Clean-up - e.g. by florisil, silica gel.                             |
| 1D    | GC - Single coil gas chromatography.                                 |
| Total | Aliphatics & Aromatics.                                              |
| AL    | Aliphatics only.                                                     |
| AR    | Aromatics only.                                                      |
| 2D    | GC-GC - Double coil gas chromatography.                              |
| #1    | EH_Total but with humics mathematically subtracted                   |
| #2    | EU_Total but with fatty acids mathematically subtracted              |
| _     | Operator - underscore to separate acronyms (exception for +).        |
| +     | Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total   |
| MS    | Mass Spectrometry.                                                   |

EMT Job No: 23/16922

| Test Method No. | Description                                                                                                                                                                                                                                                                                                                        | Prep Method No. (if appropriate) | Description                                                                                                                                                                                       | ISO 17025 (UKAS/ANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|-------------------------------------------------|------------------------------|
| PM4             | Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465:1993(E) and BS1377-2:1990.                                                                                                                                                                      | PM0                              | No preparation is required.                                                                                                                                                                       |                       |                        | AR                                              |                              |
| TM4             | Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.                                                                                                                                                                                                                                 | PM8                              | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.                                                                             |                       |                        | AR                                              | Yes                          |
| TM4             | Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.                                                                                                                                                                                                                                 | PM8                              | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.                                                                             | Yes                   |                        | AR                                              | Yes                          |
| TM5             | Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GC/FID. For waters the solvent extracts dissolved phase plus a sheen if present.                                                                                                                | PM8/PM16                         | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE. |                       |                        | AR                                              | Yes                          |
| TM5             | Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GC/FID. For waters the solvent extracts dissolved phase plus a sheen if present.                                                                                                                | PM8/PM16                         | End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE. | Yes                   |                        | AR                                              | Yes                          |
| TM5/TM36        | please refer to TM5 and TM36 for method details                                                                                                                                                                                                                                                                                    | PM8/PM12/PM16                    | please refer to PM8/PM16 and PM12 for method details                                                                                                                                              |                       |                        | AR                                              | Yes                          |
| TM21            | Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.        | PM24                             | Preparation of Soil and Marine Sediment Samples for Total Organic Carbon.                                                                                                                         | Yes                   |                        | AD                                              | Yes                          |
| TM26            | Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.                                                                                                                                                                                                                 | PM21B                            | As Received samples are extracted in Methanol: Water (60:40) by reciprocal shaker.                                                                                                                |                       |                        | AR                                              | Yes                          |
| TM30            | Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP 6010B, Rev.2, Dec.1996; Modified EPA Method 3050B, Rev.2, Dec.1996 | PM15                             | Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.                                                     | Yes                   |                        | AD                                              | Yes                          |
| TM36            | Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GC/FID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested.   | PM12                             | Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.                                                                                          |                       |                        | AR                                              | Yes                          |

EMT Job No: 23/16922

| Test Method No. | Description                                                                                                                                                                                                                                                                                                                     | Prep Method No. (if appropriate) | Description                                                                                                                                                                                                                                                                                                           | ISO 17025 (UKAS/ANAS) | MCERTS (UK soils only) | Analysis done on As Received (AR) or Dried (AD) | Reported on dry weight basis |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------|-------------------------------------------------|------------------------------|
| TM36            | Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results will be re-run using GC-MS to double check, when requested. | PM12                             | Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.                                                                                                                                                                                                              | Yes                   |                        | AR                                              | Yes                          |
| TM38            | Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I                          | PM20                             | Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker. | Yes                   |                        | AD                                              | Yes                          |
| TM38            | Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993) – All anions comparable to BS ISO 15923-1: 2013I                          | PM20                             | Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker. | Yes                   |                        | AR                                              | Yes                          |
| TM50            | Acid soluble sulphate (Total Sulphate) analysed by ICP-OES                                                                                                                                                                                                                                                                      | PM29                             | A hot hydrochloric acid digest is performed on a dried and ground sample, and the resulting liquor is analysed.                                                                                                                                                                                                       | Yes                   |                        | AD                                              | Yes                          |
| TM65            | Asbestos Bulk Identification method based on HSG 248 Second edition (2021)                                                                                                                                                                                                                                                      | PM42                             | Modified SCA Blue Book V.12 draft 2017 and WM3 1st Edition v1.1:2018. Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.                                                                                                                            | Yes                   |                        | AR                                              |                              |
| TM73            | Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.                                                                                                                                                                                       | PM11                             | Extraction of as received solid samples using one part solid to 2.5 parts deionised water.                                                                                                                                                                                                                            | Yes                   |                        | AR                                              | No                           |
|                 |                                                                                                                                                                                                                                                                                                                                 |                                  |                                                                                                                                                                                                                                                                                                                       |                       |                        |                                                 |                              |
|                 |                                                                                                                                                                                                                                                                                                                                 |                                  |                                                                                                                                                                                                                                                                                                                       |                       |                        |                                                 |                              |
|                 |                                                                                                                                                                                                                                                                                                                                 |                                  |                                                                                                                                                                                                                                                                                                                       |                       |                        |                                                 |                              |
|                 |                                                                                                                                                                                                                                                                                                                                 |                                  |                                                                                                                                                                                                                                                                                                                       |                       |                        |                                                 |                              |

## **APPENDIX E**

### **Quarried Aggregate Provenance Information**

# AGGREGATE PROPERTIES REPORT



|                     |                         |
|---------------------|-------------------------|
| Unit :-             | Tunstead                |
| Rock Type           | Carboniferous Limestone |
| Aggregate Colour :- |                         |

TARMAC A CRH COMPANY (Central)  
The Hub, Loughborough Rd, Mountsorrel,  
Leicestershire  
LE12 7GZ  
Tel: +44 (0)116 2465000  
Fax: +44 (0)

|                          | Test Standard | Test Result | Aggregate Size | Date     |
|--------------------------|---------------|-------------|----------------|----------|
| Aggregate Abrasion Value | EN 1097-8     | 5.7         | 6/14mm         | Jan 2023 |
| Los Angeles Coefficient  | EN 1097-2     | 24          | 6/14mm         | Jan 2023 |
| Magnesium Sulfate Value  | EN 1367-2     | 1           | 6/14mm         | Jan 2023 |
| Micro-Deval Coefficient  | EN 1097-1     | 14          | 6/14mm         | Jan 2023 |
| PSV                      | EN 1097-8     | 41          | 4/10mm         | Jan 2023 |

|                              |                |                   |                      |          |
|------------------------------|----------------|-------------------|----------------------|----------|
| Acid Soluble Sulfate Content | EN 1744-1 cl12 | <0.1 (SO3/SO4)    | 0/2mm / 0-4mm Washed | Jan 2023 |
| Acid Soluble Sulfate Content | EN 1744-1 cl12 | <0.1(SO3/SO4)     | 0/4mm                | Jan 2023 |
| Acid Soluble Sulfate Content | EN 1744-1 cl13 | 0.04 / 0.53 (SO4) | 0/2mm / 0-4mm Washed | Jan 2023 |
| Acid Soluble Sulfate Content | EN 1744-1 cl13 | 0.13              | 0/4mm                | Jan 2023 |
| Water Soluble Sulfate        | EN 1744-1 cl10 | <0.01(SO3/SO4)    | 0/2mm / 0-4mm Washed | Jan 2023 |
| Water Soluble Sulfate        | EN 1744-1 cl10 | <0.01(SO3/SO4)    | 0/4mm                | Jan 2023 |
| Water Soluble Chloride       | EN 1744-1 cl7  | <0.001            | 0/2mm / 0-4mm Washed | Jan 2023 |
| Water Soluble Chloride       | EN 1744-1 cl7  | 0.007             | 0/4mm                | Jan 2023 |
| Total Sulfur                 | EN 1744-1 cl11 | <0.1 / <0.1       | 0/2mm / 0-4mm Washed | Jan 2023 |
| Total Sulfur                 | EN 1744-1 cl11 | <0.1              | 0/4mm                | Jan 2023 |
| Carbon Dioxide               | EN 196         | 38.68% / 37.8%    | 0/2mm / 0-4mm Washed | Jan 2023 |
| Carbon Dioxide               | EN 196         | 40.73%            | 0/4mm                | Jan 2023 |
| Calcium Carbonate Equivalent | EN 196         | 87.91% / 85.91%   | 0/2mm / 0-4mm Washed | Jan 2023 |
| Calcium Carbonate Equivalent | EN 196         | 92.57%            | 0/4mm                | Jan 2023 |
| pH Value                     | BS 1377-3      | 8.3 / 8.4         | 0/2mm / 0-4mm Washed | Jan 2023 |
| pH Value                     | BS 1377-3      | 8.5               | 0/4mm                | Jan 2023 |

|                           |           | 0/2mm | 0/4mm | 0/4mm Washed | 10-63 Feb22 | 20/32mm | Date   |
|---------------------------|-----------|-------|-------|--------------|-------------|---------|--------|
| Loose Bulk Density        | EN 1097-3 | 1.55  | 1.62  | 1.44         | 1.34        | 1.35    | Jan-23 |
| Compacted Bulk Density    | EN 1097-3 | 1.8   | 1.82  | 1.81         | 1.49        | 1.52    | Jan-23 |
| Apparent Particle Density | EN 1097-6 | 2.69  | 2.71  | 2.68         | 2.7         |         | Jan-23 |
| S.S.D. Density            | EN 1097-6 | 2.67  | 2.7   | 2.67         | 2.68        |         | Jan-23 |
| Oven Dry Density          | EN 1097-6 | 2.67  | 2.69  | 2.67         | 2.67        |         | Jan-23 |
| Water Absorption          | EN 1097-6 | 0.3   | 0.3   | 0.1          | 0.4         |         | Jan-23 |
| Void Content%             | EN 1097-3 |       |       |              | 50          |         |        |
| Void Content Compacted%   | EN 1097-3 |       |       |              | 44          |         |        |

| Chemical Analysis - XRF %      |       |                      |       |                       |
|--------------------------------|-------|----------------------|-------|-----------------------|
| 0/2mm / 0/4mm / 0/4mm Washed   | Al2O3 | 0.16 / 0.54 / 0.31   | CaO   | 54.65 / 54.44 / 54.03 |
| 0/2mm Jan 2023                 | Fe2O3 | 0.24 / 0.14 / 0.55   | K2O   | <0.01 / 0.04 / 0.05   |
| 0/4mm 2023 & 0-4mm Wsh 2023    | TiO2  | <0.01 / <0.01 / 0.02 | P2O5  | 0.03 / 0.03 / 0.03    |
| 0/4mm Loss on Ignition 43.1%   | MgO   | 0.53 / 0.35 / 0.49   | Mn2O3 | 0.02 / 0.01 / 0.03    |
| 0/4 Wsh Loss on Ignition 42.7% | SiO2  | 1.09 / 1.37 / 1.62   | BaO   | <0.01 / <0.01 / 0.03  |
| 0/2mm Loss on Ignition 43.2%   | So3   | 0.15 / 0.06 / 0.23   | Na2O  | <0.02 / <0.02 / 0.02  |

| Additional Tests               | Test Standard    | Test Result     | Aggregate Size               | Date     |
|--------------------------------|------------------|-----------------|------------------------------|----------|
| Methylene Blue Value           | BS:933-9         | 0.5 / 0.5       | 0/2mm / 0/4mm Washed         | Jan 2023 |
| Methylene Blue Value           | BS:933-9         | 1.3             | 0/4mm                        | Jan 2023 |
| Bond Work Index                | EPRI             | 9.6kWhr/t       | 14mm-dust FGD                | Feb 2023 |
| Mass of lightweight particles  | BS:1744-1        | <0.1            | 0/2mm / 0/4mm Washed         | Jan 2023 |
| Mass of lightweight particles  | BS:1744-1        | <0.1            | 0/4mm                        | Jan 2023 |
| Organic Content                | BS:1377-3        | 0.2 / 0.3 / 0.2 | 0/2mm / 0/4mm / 0/4mm Washed | Feb 2019 |
| Organic Contaminators (Mortar) | BS:1744-1 Cl15.3 | on request      | 0/2mm / 0/4mm / 0/4mm Washed | Jan 2023 |

## AGGREGATE PROPERTIES REPORT



|                     |                         |
|---------------------|-------------------------|
| Unit :-             | Tunstead                |
| Rock Type           | Carboniferous Limestone |
| Aggregate Colour :- |                         |

TARMAC A CRH COMPANY (Central)  
 The Hub, Loughborough Rd, Mountsorrel,  
 Leicestershire  
 LE12 7GZ  
 Tel: +44 (0)116 2465000  
 Fax: +44 (0)

|                              | Test Standard    | Test Result                              | Aggregate Size | Date     |
|------------------------------|------------------|------------------------------------------|----------------|----------|
| Acid Soluble Sulfate Content | EN 1744-1 cl12   | <0.1                                     | 4/20mm         | Jan 2023 |
| Acid Soluble Sulfate Content | EN 1744-1 cl13   | <0.03 (SO <sub>4</sub> )                 | 4/20mm         | Jan 2023 |
| Water Soluble Sulfate        | EN 1744-1 cl10   | <0.01(SO <sub>3</sub> /SO <sub>4</sub> ) | 4/20mm         | Jan 2023 |
| Water Soluble Sulphate       | BS 1377(TRL 447) | 62mg/L (SO <sub>4</sub> )                | 4/20mm         | Mar 2020 |
| Water Soluble Chloride       | EN 1744-1 cl7    | <0.001                                   | 4/20mm         | Jan 2023 |
| Total Potential Sulphate     | BS 1377(TRL 447) | 0.06                                     | 4/20mm         | Mar 2020 |
| Total Sulphur                | BS 1377(TRL 447) | 0.02                                     | 4/20mm         | Mar 2020 |
| Total Sulfur                 | EN 1744-1 cl11   | <0.1                                     | 4/20mm         | Jan 2023 |
| Oxidisable Sulphides         | BS 1377(TRL 447) | 0.02                                     | 4/20mm         | Mar 2020 |
| Carbon Dioxide               | EN 196           | 41.32%                                   | 4/20mm         | Jan 2023 |
| Calcium Carbonate Equivalent | EN 196           | 93.91%                                   | 4/20mm         | Jan 2023 |
| pH Value                     | BS 1377-3        | 8.5                                      | 4/20mm         | Jan 2023 |

|                           | Test Standard | 4/20mm | 2/6mm | 4/10mm | 6/14mm | 10/20mm | Date   |
|---------------------------|---------------|--------|-------|--------|--------|---------|--------|
| Loose Bulk Density        | EN 1097-3     | 1.42   | 1.36  | 1.33   | 1.36   | 1.36    | Jan-23 |
| Compacted Bulk Density    | EN 1097-3     | 1.6    | 1.53  | 1.50   | 1.53   | 1.5     | Jan-23 |
| Apparent Particle Density | EN 1097-6     | 2.69   | 2.7   | 2.67   | 2.7    | 2.69    | Jan-23 |
| S.S.D. Density            | EN 1097-6     | 2.67   | 2.61  | 2.64   | 2.68   | 2.67    | Jan-23 |
| Oven Dry Density          | EN 1097-6     | 2.66   | 2.55  | 2.63   | 2.67   | 2.65    | Jan-23 |
| Water Absorption          | EN 1097-6     | 0.4    | 2.2   | 0.6    | 0.5    | 0.5     | Jan-23 |
| Flakiness Index           | EN 933-3      |        |       |        |        |         |        |
| Shape                     | EN 933-4      |        |       |        |        |         |        |
| Void Content %            | EN 1097-3     |        |       |        |        |         |        |
| Void Content Compacted %  | EN 1097-3     |        |       |        |        |         |        |

| Additional Tests              | Test Standard | Test Result | Aggregate Size               | Date       |
|-------------------------------|---------------|-------------|------------------------------|------------|
| Mass of lightweight particles | BS:1744-1     | <0.1        | 4/20mm                       | Jan 2023   |
| MSV                           | DWFS          | 12          | 0/4mm                        | March 2019 |
| MSV                           | DWFS          | 3           | 2/6mm                        | March 2019 |
| MSV                           | DWFS          | 2           | 4/10mm                       | July 2021  |
| MSV                           | DWFS          | 2           | 6/14mm                       | March 2019 |
| MSV                           | DWFS          | 1           | 10/20mm                      | July 2021  |
| Petrographic Report           | EN 932-3      | Limestone   | 6/14mm                       | June 2022  |
| Major>10%                     |               | LOW ASR     |                              |            |
| Dry Shrinkage                 | EN 1367-4     | 0.026%      | 0/2mm                        | Jan 2023   |
| Dry Shrinkage                 | EN 1367-4     | 0.016%      | 0/4mm washed                 | Jan 2023   |
| Dry Shrinkage                 | EN 1367-4     | 0.007%      | Tunstead Coarse/Washed Fines | Aug 2020   |
| Dry Shrinkage                 | EN 1367-4     | 0.023%      | 0/4mm                        | Jan 2022   |

Issued By :

Date of Issue : 28 February 2023

David St Dennis

Technical Systems Manager

Notes

1. The above data is provided in good faith as a guide to typical values and does not constitute a specification
2. The company reserves the right to revise the data at any time
3. Individual Certification available on request

## **APPENDIX F**

### **Site Visit Records and Photographs**

## SITE VISIT RECORD

**Site Name:** Star Academy, Radcliffe  
(Temps)

**Job No:** C5394

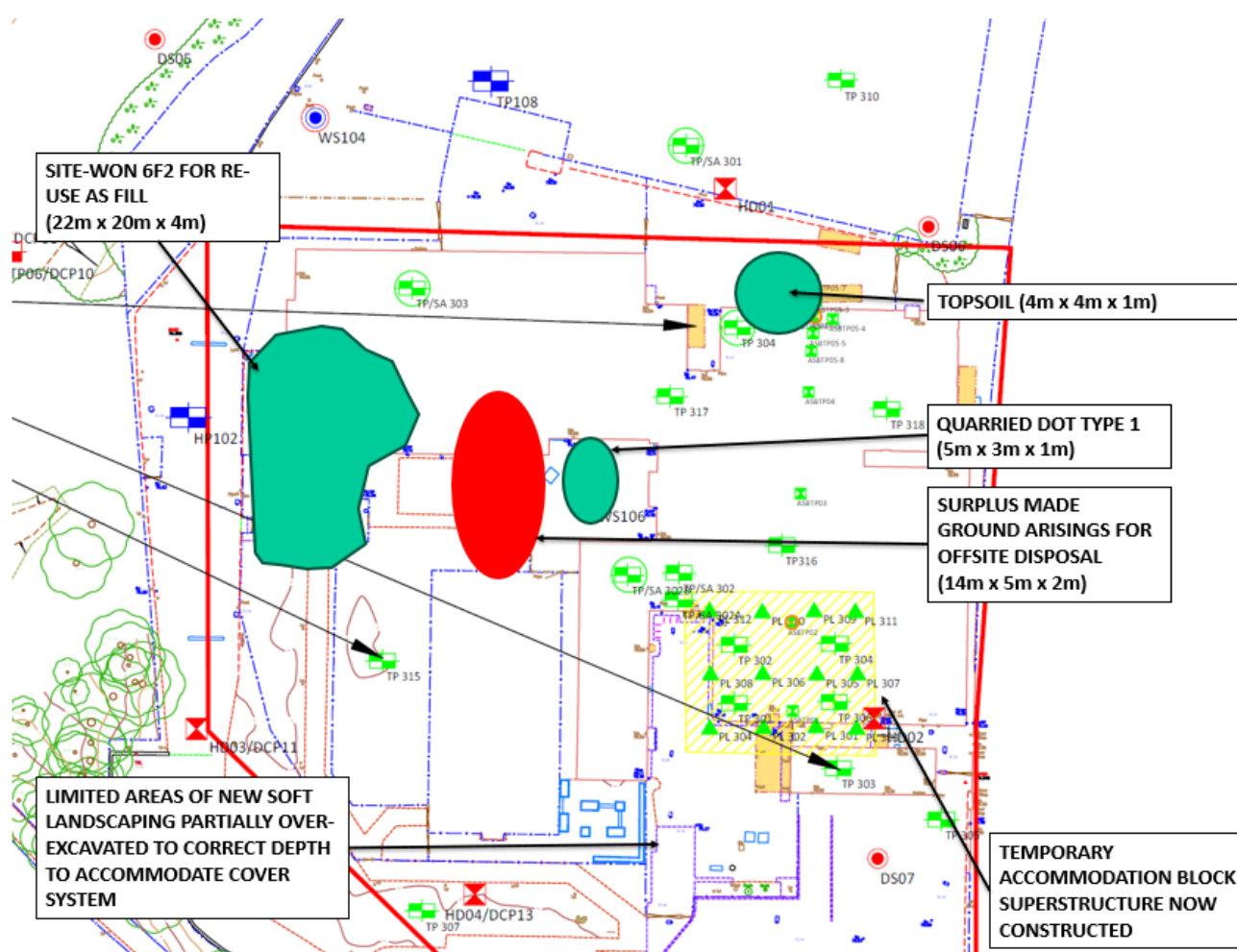
**Engineer(s):** Tim Mayall

**Date of Visit:** 30/07/2024

**Visit Purpose:** Inspect Topsoil and Quarried MOT Type 1 post-import to inform interim validation report for temporary accommodation.

**Secondary visit purpose** was a general site progress visit / MMP verification visit to view engineered fill in situ and review stockpile volumes.

Drawing detailing current stockpile locations and other observations made during the site visit:



Stockpiles inspected:

1. Imported topsoil – approximately 16m<sup>3</sup> (1 load delivered on 29/07/24). From discussions with Chartrange a further 2 loads are due to be delivered for all soft landscaping – no subsoil being used within the temporary accommodation.  
Topsoil described as a dark brown fine to coarse sand topsoil with fine rootlets with no evidence of contamination, no anthropogenic constituents.  
TM satisfied that topsoil matches description within the laboratory testing report and associated

| Form No | Revision | Date   |
|---------|----------|--------|
| CMR 04  | 0.1      | Nov 18 |

certification provided by Tim O'Hare Associates.

2. Imported DOT Type 1 – approximately 15m<sup>3</sup>, confirmed clean, quarried limestone by visual inspection. No anthropogenic constituents. Being used as sub-base for footpaths and proposed hard standing.
3. Site won 6F2 – dimensions equate to 1760m<sup>3</sup> (likely significant overestimate, more realistic estimate is circa 800-1000m<sup>3</sup> due to irregular shape and spalling of sides). For re-use as general fill across external areas, works ongoing.
4. Surplus made ground, for offsite disposal.

Other elements inspected include proposed new planting areas which have been dug down by at least 450mm to accommodate new planters. There is a further area of new soft landscaping which will comprise new hedge planting along the south-western boundary – this area has been significantly overdug to circa 600-800mm below ground level.

Contractor Chartrange is aware of the cover system requirements – 450mm underlain by barrier membrane.

Photographs:

| Form No | Revision | Date   |
|---------|----------|--------|
| CMR 04  | 0.1      | Nov 18 |

**Time of Visit**    From:    11:25    To:    13:30

**Photos Taken:**    N



PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4

## Photo Descriptions

| PHOTO NO. | DETAILS                                                                                                                                                                                                 |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1         | Overview of 3 No. Stockpiles. Left to right / front to back: Imported Quarried Limestone (MOT Type 1), Surplus Made Ground for disposal off-site, Site won crushed material for re-use as general fill. |
| 2         | Site won crushed material for re-use as general fill                                                                                                                                                    |
| 3         |                                                                                                                                                                                                         |
| 4         | Imported Quarried Limestone MOT Type 1                                                                                                                                                                  |

| REV | DATE | DESCRIPTION | BY | CKD |
|-----|------|-------------|----|-----|
|     |      |             |    |     |



|                             |            |                                 |
|-----------------------------|------------|---------------------------------|
| CLIENT                      |            | MORGAN SINDALL                  |
| PROJECT TITLE               |            | STAR ACADEMY, RADCLIFFE         |
| TITLE                       |            | TEMPS VALIDATION VISIT 30/07/24 |
| Associated Document Ref No. | PAGE       |                                 |
| TM/C5394/13333              | 1 of 2     |                                 |
| COMPLIED BY                 | CHECKED BY |                                 |
| TM                          | DRAFT      |                                 |



PHOTO 5

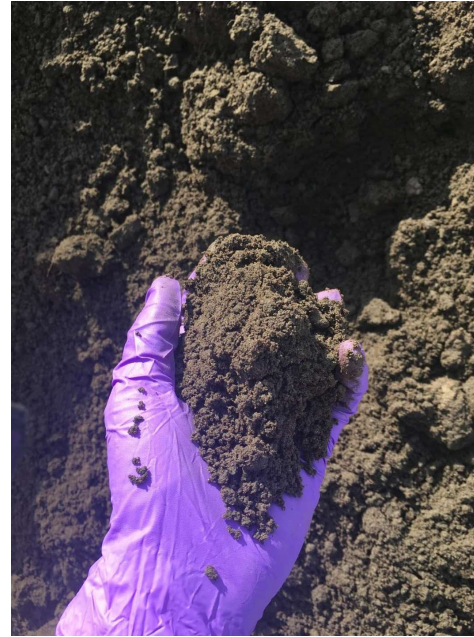


PHOTO 6



PHOTO 7



PHOTO 8

## Photo Descriptions

| PHOTO NO. | DETAILS                                                                                                                                              |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5         | Imported topsoil stockpile. No anthropogenic constituents noted during physical inspection and topsoil is as expected based on samplers description. |
| 6         |                                                                                                                                                      |
| 7         | New soft landscaping areas being over-excavated, ready for placement of clean topsoil over membrane                                                  |
| 8         | Membrane geotextile to be placed at base of clean cover system to provide physical barrier and prevent soils mixing.                                 |

| REV | DATE | DESCRIPTION | BY | CKD |
|-----|------|-------------|----|-----|
|     |      |             |    |     |



|                             |                                 |
|-----------------------------|---------------------------------|
| CLIENT                      | MORGAN SINDALL                  |
| PROJECT TITLE               | STAR ACADEMY, RADCLIFFE         |
| TITLE                       | TEMPS VALIDATION VISIT 30/07/24 |
| Associated Document Ref No. | PAGE                            |
| TM/C5394/13333              | 2 of 2                          |
| COMPLIED BY                 | CHECKED BY                      |
| TM                          | DRAFT                           |



PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4

## Photo Descriptions

| PHOTO NO. | DETAILS                                                            |
|-----------|--------------------------------------------------------------------|
| 1         | HP01 overview of location near site entrance                       |
| 2         | HP01 depth >450mm                                                  |
| 3         | HP01 view of membrane at base of cover system                      |
| 4         | HP01 and HP02 arisings – clean topsoil as per previous inspections |

| REV | DATE | DESCRIPTION | BY | CKD |
|-----|------|-------------|----|-----|
|     |      |             |    |     |



|                             |                                                      |
|-----------------------------|------------------------------------------------------|
| CLIENT                      | MORGAN SINDALL                                       |
| PROJECT TITLE               | STAR ACADEMY, RADCLIFFE<br>(TEMPORARY ACCOMMODATION) |
| TITLE                       | TEMPORARY ACCOMMODATION<br>COVER SYSTEM VALIDATION   |
| Associated Document Ref No. | PAGE                                                 |
| TM/C5394/13333              | 1 of 4                                               |
| COMPLIED BY                 | CHECKED BY                                           |
| KB                          | TM                                                   |



PHOTO 5

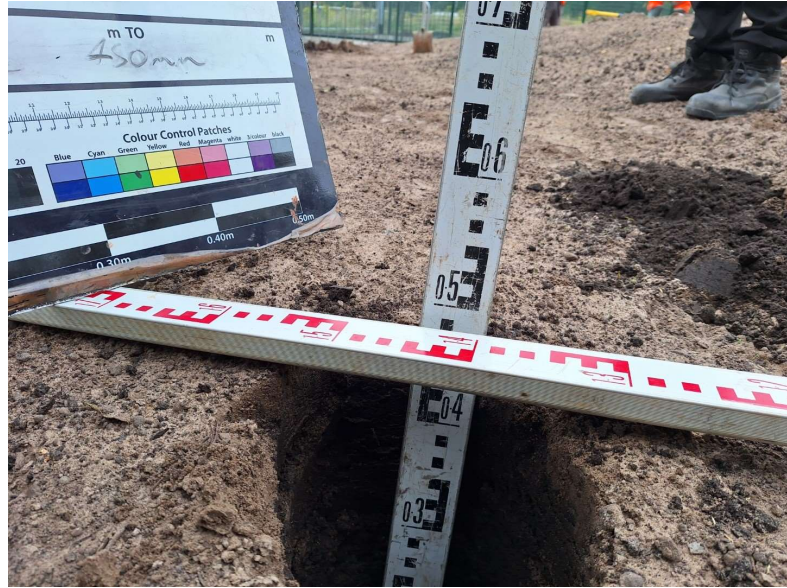


PHOTO 6



PHOTO 7



PHOTO 8

## Photo Descriptions

| PHOTO NO. | DETAILS                                       |
|-----------|-----------------------------------------------|
| 5         | HP02 overview of location                     |
| 6         | HP02 depth >450mm                             |
| 7         | HP01 view of membrane at base of cover system |
| 8         | HP03 overview of location                     |

| REV | DATE | DESCRIPTION | BY | CKD |
|-----|------|-------------|----|-----|
|     |      |             |    |     |



|                             |                                                      |
|-----------------------------|------------------------------------------------------|
| CLIENT                      | MORGAN SINDALL                                       |
| PROJECT TITLE               | STAR ACADEMY, RADCLIFFE<br>(TEMPORARY ACCOMMODATION) |
| TITLE                       | TEMPORARY ACCOMMODATION<br>COVER SYSTEM VALIDATION   |
| Associated Document Ref No. | PAGE                                                 |
| TM/C5394/13333              | 2 of 4                                               |
| COMPLIED BY                 | CHECKED BY                                           |
| KB                          | TM                                                   |