



TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

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Tarmac Topsoil
Manchester Road
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11th March 2024
Our Ref: TOHA/24/1278/2/SS
Your Ref: PO 2002756108

Dear Sirs

Subsoil Analysis Report: Topsoil Subsoil (Shireoak)

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

The purpose of the analysis was to determine the suitability of the sample for use as subsoil in 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 Subsoil (*BS8601:2013 – Specification for subsoil and requirements for use – Table 1, Multipurpose Subsoil*).

This report presents the results of analysis for the sample submitted to our office, and it should be considered 'indicative' of the subsoil 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 subsoil has left the Tarmac Topsoil site.

SAMPLE EXAMINATION

The sample was described as a dark reddish brown (Munsell Colour 2.5YR 3/4), slightly moist, friable, non-calcareous LOAMY SAND with a single grain structure. The sample was slightly stony including sub-rounded stones up to 35mm in size. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

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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, 20-75mm, >75mm);
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- organic matter content;
- 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 indicates a reasonably broad particle size distribution, with relatively equal proportions of *medium sand* (0.25-0.50mm), *fine sand* (0.15-0.25mm) and *very fine sand* (0.05-0.15mm). This could increase the risk of particle interpacking once the material is compacted. In this situation, finer particles fill the voids between the larger particles, thereby reducing drainage and aeration. If this material is to be used as subsoil in general landscape applications, only species tolerant of heavy, moisture retentive subsoils should be used for planting.

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

pH and Electrical Conductivity Values

The sample was alkaline in reaction (pH 7.7). This pH value would be considered suitable as subsoil 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 low, which indicates that soluble salts were not present at levels that would be harmful to plants.

The electrical conductivity value by CaSO₄ extract (*BS8601* requirement) fell below the maximum specified value (2800 µS/cm) given in *BS8601:2013 – Table 1*.

Organic Matter Content

The organic matter content was low (0.5%) and compliant with *BS8601:2013 – Table 1*.

Potential Contaminants

With reference to *BS8601:2013 – Section 4.2: Note 2*, there is a requirement to confirm levels of potential contaminants in relation to the subsoil'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 *BS8601:2013 – Table 1*.

CONCLUSION

The purpose of the analysis was to determine the suitability of the sample for use as subsoil in 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 Subsoil (*BS8601:2013 – Specification for subsoil and requirements for use – Table 1, Multipurpose Subsoil*).

From the soil examination and subsequent laboratory analysis, the sample was described as an alkaline, non-saline, non-calcareous loamy sand with a single grain structure. The stone content of the sample was low. The organic matter content was low and consistent with that of subsoil. Of the potential contaminants determined, none was found at levels that exceeded their guideline values.

To conclude, based on our findings, the soil represented by this sample would be considered suitable as subsoil for general landscape purposes (trees, shrubs and amenity grass), provided plant species tolerant of heavy, moisture retentive soils as well as those with a wide pH tolerance or known to prefer alkaline soils are selected and the physical condition of the soil is satisfactory.

The subsoil was also fully compliant with the requirements of the British Standard for Subsoil (*BS8601:2013 – Specification for subsoil and requirements for use – Table 1, Multipurpose Subsoil*).

Soil Handling Recommendations

Reference should be made to Section 6.0 of *BS8601:2013* with regard to the handling and management of the subsoil:

"Soils generally lose strength and become less resistant to damage as they become wetter; therefore, it is essential that they are stripped, handled and trafficked only in the appropriate conditions of weather and soil moisture, and with suitable machinery. If sustained heavy rainfall (e.g. >10 mm in 24 h) occurs during soil stripping operations, work should be suspended and not restarted until the ground has had at least one dry day or until a suitable moisture content has been reached. A soil can be considered to have a suitable moisture content for stripping and handling if the whole thickness of the subsoil layer being stripped and/or handled is at a moisture content below the plastic limit as determined in accordance with BS 1377-2:1990 (incorporating Amendment No. 1).

Machinery should be selected and routed to minimize soil compaction."

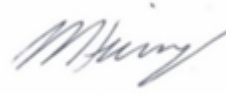
Further guidance is provided in Clauses 6.1–6.5.

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



Zoe Duffin
MBiol
Graduate Soil Scientist



Matthew Heins
BSc (Hons) MISOilSci
Senior Soil Scientist

For & on behalf of Tim O'Hare Associates LLP

Tarmac Topscape



Visual Examination
The sample was described as a dark reddish brown (Munsell Colour 2.5YR 3/4), slightly moist, friable, non-calcareous LOAMY SAND with a single grain structure. The sample was slightly stony including sub-rounded stones up to 35mm in size. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

Not-detected

Zoe Duffin
MBiol
Graduate Soil Scientist

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