



Declaration of Compliance BS3882:2007

Soil source: British Sugar TOPSOIL

This declaration confirms that the topsoil represented by the attached Topsoil Analysis Report conforms to the requirements of the British Standard for Topsoil (BS3882:2007).

The sample was sampled and tested in accordance with the requirements of BS3882:2007

- Samples are taken for analysis every 8000 tonnes (5000 m³) of product
- Samples are taken from all TOPSOIL products ready for despatch
- *Landscape 20* and *Sports 10* are sampled after screening
- Analysis certificates are retained for a period of 5 years

- Laboratory analysis is undertaken at a **UKAS** and **MCERTS** accredited laboratory
- All laboratory methods are in accordance with BS3882:2007
- All British Sugar TOPSOIL products are produced to a **Quality Management System** approved by Lloyd's Register Quality Assurance to **ISO 9001:2000** standard

Signed

A handwritten signature in black ink, appearing to read "A. Spetch".

Andy Spetch
British Sugar TOPSOIL, National TOPSOIL Manager
Sugar Way, Peterborough, PE2 9AY
Telephone 0870 2402314



TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Mr Andy Spetch
British Sugar plc Co-Products
Oundle Road
Peterborough
PE2 9QU

8th August 2013
Our Ref: TOHA/13/4684/JU
Your Ref: O/N 45539642

Dear Mr Spetch

Topsoil Analysis Report: Bury St Edmunds – Bury 240713

We have completed the analysis of the LANDSCAPE 20 TOPSOIL sample recently submitted and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the LANDSCAPE 20 TOPSOIL sample for general landscape purposes. In addition, this sample has been assessed to determine compliance with the requirements of the British Standard for Topsoil (*BS3882:2007 - Specification for topsoil and requirements for use – 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, especially after the topsoil has left the British Sugar factory.

SAMPLE EXAMINATION

The sample was described as a dark yellowish brown, slightly moist, friable SANDY CLAY LOAM with a moderately developed, fine to medium granular structure*. The sample was slightly stony, including small, angular stones. 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(s). Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

Tim O'Hare Associates LLP
Howbery Park Wallingford Oxfordshire OX10 8BA
T:01491 822653 F:01491 822644 E:info@toha.co.uk
www.toha.co.uk

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 absence of potential contaminants. The following parameters were determined:

- particle size analysis and stone content;
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (As, Ba, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, V, Zn);
- soluble sulphate, elemental sulphur, acid volatile sulphide;
- total cyanide and total (mono) phenols;
- aromatic and aliphatic TPH (C5-C35 banding);
- speciated PAHs (US EPA16 suite);
- benzene, toluene, ethylbenzene, xylene;
- asbestos screen.

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below. The interpretation considers the use of the LANDSCAPE 20 TOPSOIL for general landscape purposes and its compliance/non-compliance with our general landscape specification.

RESULTS OF ANALYSIS

Particle Size Analysis and Stone Content

The sample fell into the *sandy clay loam* texture class, which is usually considered suitable for general landscape applications provided the soil's physical condition is maintained.

Such soils usually have good water and nutrient retention capacities, but they are also prone to structural degradation and compaction during handling, and especially when plastic in consistency. Any damage to the structural condition of this soil is likely to reduce its drainage and aeration properties.

The sample was slightly stony 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 8.0). This pH value would be considered suitable for general landscape purposes providing 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 CaSO₄ extract (*BS3882* requirement) fell below the maximum specified value (2800 µS/cm) given in *BS3882:2007 – Table 1*.

Organic Matter and Fertility Status

The sample was well supplied with organic matter and all other major plant nutrients.

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

Potential Contaminants

With reference to *BS3882:2007 - Table 1: Notes 2, 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 of selected potential contaminants that affect human health have been assessed

for *residential* end-use against the Soil Guideline Values presented in the Contaminated Land Exposure Assessment (CLEA) (EA/DEFRA: 2009) and the CIEH/LQM Generic Assessment Criteria (2nd Edition, 2009).

Of the potential contaminants determined, none was found at levels that would indicate significant contamination with respect to the proposed end use of this topsoil.

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 *BS3882:2007 – Table 1*.

CONCLUSION

The purpose of the analysis was to determine the suitability of the LANDSCAPE 20 TOPSOIL sample for general landscape purposes.

From the soil examination and subsequent laboratory analysis, the sample was described as a strongly alkaline, non-saline sandy clay loam with a good structure and low stone contents. The organic matter content and overall fertility status were moderate. The sample was free from significant contamination with respect to the parameters determined.

To conclude based on our findings, the topsoil represented by this sample would be considered suitable for general landscape purposes (trees, shrubs, amenity grass), provided species with a broad pH tolerance are selected for planting and the physical condition of the soil is maintained.

The sample was fully compliant with the requirements of the British Standard for Topsoil (*BS3882:2007 – Specification for topsoil and requirements for use – Table 1, Multipurpose Topsoil*).

RECOMMENDATIONS

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 respreading, cultivating, planting). As a consequence, soil handling operations should be carried out when soil is reasonably dry and 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.

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 sincerely

Joanna Uglov
BSc MSc
Junior Soil Scientist

Laura Hathaway-Jenkins
BSc MSc EngD MISOilSci
Soil Scientist

For & on behalf of Tim O'Hare Associates LLP



Client:	British Sugar plc Co-Products
Client Ref:	Topsoil Analysis - Bury St Edmunds
Date:	August 2013
Job Ref No:	TOHA/13/4684/JU

Sample Reference		
Clay (<0.002mm)	%	U
Silt (0.002-0.063mm)	%	U
Sand (0.063-2.0mm)	%	U
Texture Class (UK Classification)	--	U
Stones (2-20mm)	% DW	G
Stones (20-50mm)	% DW	G
Stones (>50mm)	% DW	G

Bury 240713	
20	✓
25	✓
55	✓
SCL	--
1	✓
2	✓
0	✓

pH Value (1:2.5 water extract)	units	G
Electrical Conductivity (1:2.5 water extract)	uS/cm	U
Electrical Conductivity (1:2 CaSO4 extract)	uS/cm	U
Exchangeable Sodium Percentage	%	U
Moisture Content	%	U
Organic Matter (LOI)	%	U
Total Nitrogen (Dumas)	%	U
C : N Ratio	:1	U
Extractable Phosphorus	mg/l	U
Extractable Potassium	mg/l	U
Extractable Magnesium	mg/l	U

8.0	✓
1490	✓
2705	✓
3.8	✓
10	--
4.4	✓
0.23	✓
11	✓
57	✓
729	✓
149	✓

Total Arsenic (As)	mg/kg	M
Total Barium (Ba)	mg/kg	M
Total Beryllium (Be)	mg/kg	M
Total Cadmium (Cd)	mg/kg	M
Total Chromium (Cr)	mg/kg	M
Hexavalent Chromium (Cr VI)	mg/kg	M
Total Copper (Cu)	mg/kg	M
Total Lead (Pb)	mg/kg	M
Total Mercury (Hg)	mg/kg	M
Total Nickel (Ni)	mg/kg	M
Total Selenium (Se)	mg/kg	M
Total Vanadium (V)	mg/kg	M
Total Zinc (Zn)	mg/kg	M
Water Soluble Boron (B)	mg/kg	M
Total Cyanide (CN)	mg/kg	M
Total (mono) Phenols	mg/kg	M
Elemental Sulphur (S)	mg/kg	M
Acid Volatile Sulphide (S)	mg/kg	M
Water Soluble Sulphate (SO4)	g/l	M

10	✓
45	✓
0.6	✓
0.4	✓
24	✓
< 4.0	✓
19	✓
21	✓
< 0.3	✓
16	✓
< 1.0	✓
31	✓
57	✓
0.8	✓
< 1	✓
< 2.0	✓
< 20	✓
1.9	✓
1.1	✓

Naphthalene	mg/kg	M
Acenaphthylene	mg/kg	M
Acenaphthene	mg/kg	M
Fluorene	mg/kg	M
Phenanthrene	mg/kg	M
Anthracene	mg/kg	M
Fluoranthene	mg/kg	M
Pyrene	mg/kg	M
Benzo(a)anthracene	mg/kg	M
Chrysene	mg/kg	M
Benzo(b)fluoranthene	mg/kg	M
Benzo(k)fluoranthene	mg/kg	M
Benzo(a)pyrene	mg/kg	M
Indeno(1,2,3-cd)pyrene	mg/kg	M
Dibenzo(a,h)anthracene	mg/kg	M
Benzo(g,h,i)perylene	mg/kg	M
Total PAHs (sum USEPA16)	mg/kg	M

< 0.05	✓
< 0.20	✓
< 0.10	✓
< 0.20	✓
< 0.20	✓
< 0.10	✓
< 0.20	✓
< 0.20	✓
< 0.20	✓
< 0.05	✓
< 0.10	✓
< 0.20	✓
< 0.10	✓
< 0.20	✓
< 0.20	✓
< 0.05	✓
< 1.6	✓

Aliphatic TPH (C5-C6)	mg/kg	M
Aliphatic TPH (C6-C8)	mg/kg	M
Aliphatic TPH (C8-C10)	mg/kg	M
Aliphatic TPH (C10-C12)	mg/kg	M
Aliphatic TPH (C12-C16)	mg/kg	M
Aliphatic TPH (C16-C21)	mg/kg	M
Aliphatic TPH (C21-C35)	mg/kg	M
Aliphatic TPH (C5-C35)	mg/kg	M
Aromatic TPH (C5-C7)	mg/kg	M
Aromatic TPH (C7-C8)	mg/kg	M
Aromatic TPH (C8-C10)	mg/kg	M
Aromatic TPH (C10-C12)	mg/kg	M
Aromatic TPH (C12-C16)	mg/kg	M
Aromatic TPH (C16-C21)	mg/kg	M
Aromatic TPH (C21-C35)	mg/kg	M
Aromatic TPH (C5-C35)	mg/kg	M

< 0.1	✓
< 0.1	✓
< 0.1	✓
< 1.0	✓
< 2.0	✓
< 8.0	✓
< 8.0	✓
< 10	✓
< 0.1	✓
< 0.1	✓
< 0.1	✓
< 1.0	✓
< 2.0	✓
< 10	✓
< 10	✓

Benzene	mg/kg	M
Toluene	mg/kg	M
Ethylbenzene	mg/kg	M
o-xylene	mg/kg	M
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	M

< 0.001	✓
< 0.001	✓
< 0.001	✓
< 0.001	✓
< 0.001	✓

Asbestos	--	I
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Absent	✓
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Visual Examination

The sample was described as a dark yellowish brown, slightly moist, friable SANDY CLAY LOAM with a moderately developed, fine to medium granular structure. The sample was slightly stony, including small, angular stones. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

✓	Meets General Landscape Specification
X	Fails General Landscape Specification
SCL	Sandy Clay Loam Texture Class
M	MCERTS accredited method (& UKAS accredited method)
I	ISO 17025 accredited method
U	UKAS accredited method
G	GLP accredited method

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