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30<sup>th</sup> October 2023  
Our Ref: TOHA/23/1152/1/SS  
Your Ref: see below

Dear Sirs

**Topsoil Analysis Report: Bury Hill Horsham Yard - GP10 Plus Topsoil (S)**

We have completed the analysis of the soil sample recently submitted, referenced *GP10 Plus Topsoil (S)*, 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, waste designation purposes or for any project-specific application, especially after the topsoil has left the Bury Hill Landscape Supplies Ltd site.

**SAMPLE EXAMINATION**

The sample was described as a very dark brown (Munsell Colour 10YR 2/2), slightly moist, friable, very slightly calcareous SANDY LOAM with weakly developed, fine to medium granular structure\*. The sample was very slightly stony and contained moderate proportions 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(s). Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

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Plate 1: Sample GP10 Plus Topsoil (S)

### **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);
- saturated hydraulic conductivity;
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (Sb, As, B, Ba, Be, Cd, Cr, Cu, Pb, Hg, Ni, Se, V, 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**

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

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

Further detailed particle size analysis found the sample to have a reasonably narrow particle size distribution and a predominance of *medium sand* (0.25-0.50mm) and *coarse sand* (0.50-1.0mm). This is usually acceptable 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 very low and as such, stones should not restrict the use of the soil for general landscape purposes.

### **Saturated Hydraulic Conductivity**

The saturated hydraulic conductivity test is designed to test the sample's drainage potential under a moderate degree of compaction. The saturated hydraulic conductivity of the sample was moderately low (6 mm/hr) and would be considered suitable for general landscape purposes.

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

The sample was strongly alkaline in reaction (pH 8.1). 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 (3352 µS/cm - BS3882 requirement) slightly exceeded the maximum specified value (3300 µS/cm) given in BS3882:2015 – Table 1.

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

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

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 exceeded their respective 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 sandy loam with a weakly developed structure and very low stone content. The sample contained sufficient reserves of organic matter and all major plant nutrients. 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 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 topsoil was also fully compliant with the requirements of the British Standard for Topsoil (*BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil*).

### 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, 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*.

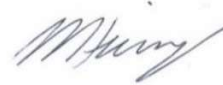
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We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully



**Harriet MacRae**  
BSc MSc  
Graduate Soil Scientist



**Matthew Heins**  
BSc (Hons) MSc SoilSci  
Senior Soil Scientist

For & on behalf of Tim O'Hare Associates LLP



Client:	Bury Hill Landscape Supplies Ltd
Project:	Bury Hill Horsham Yard
Job:	Topsoil Analysis - BS3882:2015
Date:	30/10/2023
Job Ref No:	TOHA/23/1152/1/SS

Sample Reference		Accreditation	
Clay (<0.002mm)	%	UKAS	
Silt (0.002-0.05mm)	%	UKAS	
Very Fine Sand (0.05-0.15mm)	%	UKAS	
Fine Sand (0.15-0.25mm)	%	UKAS	
Medium Sand (0.25-0.50mm)	%	UKAS	
Coarse Sand (0.50-1.0mm)	%	UKAS	
Very Coarse Sand (1.0-2.0mm)	%	UKAS	
Total Sand (0.05-2.0mm)	%	UKAS	
Texture Class (UK Classification)	--	UKAS	
Stones (2-20mm)	% DW	GLP	
Stones (20-50mm)	% DW	GLP	
Stones (>50mm)	% DW	GLP	

Saturated Hydraulic Conductivity (m)	mm/hr	A2LA
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pH Value (1:2.5 water extract)	units	UKAS
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS
Electrical Conductivity (1:2 CaSO <sub>4</sub> extract)	uS/cm	UKAS
Exchangeable Sodium Percentage	%	UKAS

Organic Matter (LOI)	%	UKAS
Total Nitrogen (Dumas)	%	UKAS
C : N Ratio	ratio	UKAS
Extractable Phosphorus	mg/l	UKAS
Extractable Potassium	mg/l	UKAS
Extractable Magnesium	mg/l	UKAS

Total Antimony (Sb)	mg/kg	MCERTS
Total Arsenic (As)	mg/kg	MCERTS
Total Barium (Ba)	mg/kg	MCERTS
Total Beryllium (Be)	mg/kg	MCERTS
Total Cadmium (Cd)	mg/kg	MCERTS
Total Chromium (Cr)	mg/kg	MCERTS
Hexavalent Chromium (Cr VI)	mg/kg	MCERTS
Total Copper (Cu)	mg/kg	MCERTS
Total Lead (Pb)	mg/kg	MCERTS
Total Mercury (Hg)	mg/kg	MCERTS
Total Nickel (Ni)	mg/kg	MCERTS
Total Selenium (Se)	mg/kg	MCERTS
Total Vanadium (V)	mg/kg	MCERTS
Total Zinc (Zn)	mg/kg	MCERTS
Water Soluble Boron (B)	mg/kg	MCERTS
Total Cyanide (CN)	mg/kg	MCERTS
Total (mono) Phenols	mg/kg	MCERTS

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

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

Benzene	mg/kg	MCERTS
Toluene	mg/kg	MCERTS
Ethylbenzene	mg/kg	MCERTS
p & m-xylene	mg/kg	MCERTS
o-xylene	mg/kg	MCERTS

Asbestos	ND/D	ISO17025
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SL = SANDY LOAM

#### Visual Examination

The sample was described as a very dark brown (Munsell Colour 10YR 2/2), slightly moist, friable, very slightly calcareous SANDY LOAM with weakly developed, fine to medium granular structure. The sample was very slightly stony and contained moderate proportions of organic fines and occasional woody fragments. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

Results of analysis should be read in conjunction with the report they were issued with.

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#### GP10 Plus Topsoil (S)

13
4
3
4
34
36
6
83
SL
1
1
0

6
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8.1
1273
3242
5.7

4.4
0.20
13
64
1498
128

2.1
10
26
0.26
< 0.2
12.0
< 1.8
22
18
< 0.3
7
< 1.0
19
44
1.6
< 1.0
< 1.0

0.15
< 0.05
0.15
0.09
0.11
< 0.05
0.16
0.15
0.06
0.07
0.11
< 0.05
0.08
< 0.05
< 0.05
< 0.05
1.13

< 0.10
< 0.10
< 0.10
< 1.0
< 2.0
< 8.0
< 8.0
< 10
< 0.10
< 0.10
< 0.10
< 1.0
< 2.0
< 10
< 10
< 10

< 0.005
< 0.005
< 0.005
< 0.005
< 0.005

Not-detected
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H. MacRae

Harriet MacRae  
BSc MSc  
Graduate Soil Scientist