

Freeland Horticulture Ltd
Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Attention: Philippa Lambourne

Our Ref: 0832-SA

20 March 2020

Dear Philippa

Topsoil Analysis Report : Gilfach Topsoil – March 2020

We have completed the analysis of the topsoil sample recently taken from the above site and have the pleasure of reporting our findings. The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes.

SOIL SAMPLING & EXAMINATION

At the time of our sampling visit the topsoil was stored in a stockpile. A series of 10 hand augered trial holes were constructed across the stockpile for the purpose of soil examination and sample collection. As the soil examination confirmed a consistent topsoil composition, the ten samples were combined together to form one composite sample for analysis purposes. The soil was described as a dark brown, friable *loamy sand* with a moderately developed, medium to coarse granular structure. The soil contained a moderate fraction of small stones and no deleterious materials (eg. building waste materials, glass, roots or rhizomes of pernicious weeds) or unusual odours (eg. hydrocarbons) were recorded.

LABORATORY ANALYSIS

The topsoil sample was submitted to a UKAS accredited laboratory for routine physical and chemical parameters to confirm the composition and fertility of the soil. The following parameters were determined:

- ⊕ pH & electrical conductivity values;
- ⊕ major plant nutrients (N, P, K, Mg) & organic matter content;
- ⊕ particle size distribution and stone content;
- ⊕ heavy metals & potentially toxic elements (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, B);
- ⊕ sulphate, sulphur, sulphide;
- ⊕ total cyanide and total (mono) phenols;
- ⊕ speciated PAHs (US EPA16)
- ⊕ total petroleum hydrocarbons (C₁₀-C₄₀).
- ⊕ Asbestos.

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

COMMENTS

pH & Electrical Conductivity (salinity) Values

The sample was alkaline in nature (pH 8.5) with a pH value that would be suitable for general landscaping purposes, and in particular for species classified as either *wide pH tolerant* or *lime tolerant*.

The electrical conductivity value using the soil:water extract was moderate (1211S/cm) indicating that soluble salts are not present at levels that would be harmful to plants.

Organic Matter & Nutrient Status

The sample was rich in organic matter and all major plant nutrients. No further additions of compost or fertiliser are required, or indeed recommended, for at least the first growing season.

Particle Size Distribution & Stone Content

The sample contained 85% sand and fell into the *loamy sand* texture class. Topsoils with this particle size distribution are considered suitable for a broad range of landscape applications, including tree and shrub planting, turfing and seeding.

The sample was free from stones of 20 mm and upwards in diameter and contained a slight fraction of smaller stones (15.2%). As such, stones will not restrict the use of the soil for landscaping purposes.

Potential Contaminants

We are not aware of any specified contaminant levels set for the proposed end-use of this topsoil so the following comments are based on the Soil Guideline Values (SGVs) for residential end-use presented in the Contaminated Land Exposure Assessment (CLEA) Model (EA/DEFRA:2002). The SGVs currently only consider a limited range of parameters so where a potential contaminant is not covered by the CLEA Model other relevant schedules for contamination assessment, such as the Dutch Guidelines, and professional judgement have been used.

Of the potential contaminants determined, none was found at levels that would indicate significant contamination.

CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes. From the soil examination and laboratory analysis, the soil is described as an alkaline, non-saline, loamy sand. The organic matter and nutrient levels are acceptable, and no significant contamination was found with respect to the parameters determined. This soil would adhere to all aspects of the current BS3882 specification for 'multipurpose grade'.

To conclude, based on our findings, the topsoil would be considered well-suited to general landscaping purposes.

George Longmuir MSc Soil Sci. M.I Soil Sci.

Client	Freeland Horticulture Ltd
Job Name	Topsoil Analysis
Site	Gilfach, Neath
Month/Year	March 20
Our Ref	0832-SA
Date	20 March 2020

Composite sample

pH Value & Salinity

pH value (1:2.5 soil/water ext)	units	8.5
Electrical Conductivity (1:2.5 soil/water ext)	$\mu\text{S/cm}$	1211
Neutralising Value (CaCO_3 equivalent)	%	4.1
Neutralising Value (CaO equivalent)	%	2.3

Organic Matter & Nutrient Status

Organic Matter (LOI)	%	8.7
Organic Carbon (Derived)	%	5.1
Total Nitrogen	%	0.368
Carbon:Nitrogen Ratio	:1	14
Available Phosphorus	mg/l	56.6
Available Potassium	mg/l	1490
Available Magnesium	mg/l	216

Particle Size Analysis & Stones

Clay (<0.002mm)	%	
Silt (0.063-0.002mm)	%	8
Sand (2.0-0.063mm)	%	85
Texture Class	UK Class	Sand

Stones 2-20mm	% by DW	15.2
Stones 20-50mm	% by DW	0.0
Stones >50mm	% by DW	0.0

Potential Contaminants

Total Arsenic (As)	mg/kg	9.5
Total Cadmium (Cd)	mg/kg	0.29
Total Chromium (Cr)	mg/kg	12.6
Hexavalent Chromium (Cr^{VI})	mg/kg	<0.1
Total Copper (Cu)	mg/kg	18.1
Total Lead (Pb)	mg/kg	24.2
Total Mercury (Hg)	mg/kg	<0.2
Total Nickel (Ni)	mg/kg	27.9
Total Selenium (Se)	mg/kg	0.17
Total Zinc (Zn)	mg/kg	92.1
Total Beryllium (Be)	mg/kg	<1
Total Barium (Ba)	mg/kg	69.5
Total Vanadium (V)	mg/kg	<10
Hot Water Soluble Barium (B)	mg/kg	1.7
Total Cyanide (CN)	mg/kg	<1
Elemental Sulphur (S)	mg/kg	6.2
Easily Liberated Sulphide (S^{2-})	mg/kg	<1
Water Soluble Sulphate (SO_4^{2-})	mg/l	<40
Total Phenols Index	mg/kg	<1
Asbestos Screen	-	N.D.

Client	Freeland Horticulture Ltd
Job Name	Topsoil Analysis
Site	Gilfach, Neath
Month/Year	March 20
Our Ref	0832-SA
Date	20 March 2020

Polyaromatic Hydrocarbons

Naphthalene	mg/kg	<0.05
Acenaphthylene	mg/kg	<0.05
Acenaphthene	mg/kg	<0.05
Fluorene	mg/kg	<0.05
Phenanthrene	mg/kg	0.1
Anthracene	mg/kg	<0.05
Fluoranthene	mg/kg	0.2
Pyrene	mg/kg	0.2
Benzo[a]anthracene	mg/kg	0.2
Chrysene	mg/kg	0.2
Benzo[b]fluoranthene	mg/kg	0.2
Benzo[k]fluoranthene	mg/kg	0.1
Benzo[a]pyrene	mg/kg	0.2
Indeno[1,2,3-cd]pyrene	mg/kg	0.1
Dibenzo[a,h]anthracene	mg/kg	<0.1
Benzo[g,h,i]perylene	mg/kg	0.2
Total PAHs sum US EPA 16	mg/kg	1.6

Banded Petroleum Hydrocarbons

Aliphatic TPH >C ₅ -C ₆	mg/kg	<0.2
Aliphatic TPH >C ₆ -C ₈	mg/kg	<0.4
Aliphatic TPH >C ₈ -C ₁₀	mg/kg	<4
Aliphatic TPH >C ₁₀ -C ₁₂	mg/kg	<4
Aliphatic TPH >C ₁₂ -C ₁₆	mg/kg	<4
Aliphatic TPH >C ₁₆ -C ₂₁	mg/kg	<4
Aliphatic TPH >C ₂₁ -C ₃₅	mg/kg	15.3
Aliphatic TPH >C ₃₅ -C ₄₄	mg/kg	<12

Aromatic TPH >C ₅ -C ₇	mg/kg	<0.02
Aromatic TPH >C ₇ -C ₈	mg/kg	<0.02
Aromatic TPH >C ₈ -C ₁₀	mg/kg	<0.02
Aromatic TPH >C ₁₀ -C ₁₂	mg/kg	<4
Aromatic TPH >C ₁₂ -C ₁₆	mg/kg	<4
Aromatic TPH >C ₁₆ -C ₂₁	mg/kg	<4
Aromatic TPH >C ₂₁ -C ₃₅	mg/kg	21.5
Aromatic TPH >C ₃₅ -C ₄₄	mg/kg	<0.2

Total Petroleum Hydrocarbons (C ₅ -C ₄₄)	mg/kg	36.8
---	-------	------

BTEX

Benzene	mg/kg	<0.02
Toluene	mg/kg	<0.2
Ethyl Benzene	mg/kg	<0.04
m- & p-Xylene	mg/kg	<0.2
o-Xylene	mg/kg	<0.1