SLC
Soil & Land Consultants

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

Attention: Philippa Lambourne

Our Ref: SLC-12-AN-0617-SA

21 January 2018

Dear Philippa

Topsoil Analysis Report : Potters Bar – January 2018

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 *sandy loam* with a moderately developed, medium to coarse granular structure. The soil contained a low fraction of small stones and no deleterious materials (eg. building waste materials, glass, etc) 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);
- banded aromatic and aliphatic petroleum hydrocarbons (C_5-C_{35}).

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 8.8) with a pH value that would be considered suitable for general landscaping purposes.

The electrical conductivity value using the soil:water extract was moderate (877µS/cm) indicating that soluble salts are not present at levels that would be harmful to plants.

Organic Matter & Nutrient Status

The sample contained adequate levels of 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 *sandy loam* texture class. This particle size distribution is considered suitable for a broad range of landscape applications, including tree and shrub planting, turfing and seeding.

The sample was free from stones of 50 mm and upwards in diameter and only contained a slight fraction of smaller stones (14.4). 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, sandy loam. 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 provided the physical condition of the soil is maintained.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if you have any queries or comments.

Client	Freeland Horticulture Ltd
Job Name	Topsoil Analysis
Site	Potters Bar, Hertfordshire
Month/Year	January 18
Our Ref	SLC-18-AN-0617-SA
Date	19 January 2018

		Composite sample
pH Value & Salinity		
pH value (1:2.5 soil/water ext)	units	8.8
Electrical Conductivity (1:2.5 soil/water ext)	µS/cm	877
Organic Matter & Nutrient Status		
Organic Matter (LOI)	%	6.6
Organic Carbon (Derived)	%	3.8
Total Nitrogen	%	0.280
Carbon:Nitrogen Ratio	:1	14
Available Phosphorus	mg/l	63.8
Available Potassium	mg/l	1362
Available Magnesium	mg/l	142
Particle Size Analysis & Stones		
Clay (<0.002mm)	%	7
Silt (0.063-0.002mm)	%	8
Sand (2.0-0.063mm)	%	85
Texture Class	UK Class	Sand
Stones 2-20mm	% by DW	11.2
Stones 20-50mm	% by DW	3.2
Stones >50mm	% by DW	0.0
Potential Contaminants		
Total Arsenic (As)	mg/kg	12.9
Total Cadmium (Cd)	mg/kg	0.27
Total Chromium (Cr)	mg/kg	17.2
Hexavalent Chromium (CR^{VI})	mg/kg	<0.1
Total Copper (Cu)	mg/kg	14.3
Total Lead (Pb)	mg/kg	19.3
Total Mercury (Hg)	mg/kg	<0.2
Total Nickel (Ni)	mg/kg	15.9
Total Selenium (Se)	mg/kg	0.34
Total Zinc (Zn)	mg/kg	66.9
Total Beryllium (Be)	mg/kg	<1
Total Barium (Ba)	mg/kg	33.7
Total Vanadium (V)	mg/kg	29.1
Hot Water Soluble Boron (B)	mg/kg	1.8
Total Cyanide (CN)	mg/kg	<1
Elemental Sulphur (S)	mg/kg	<5
Easily Liberated Sulphide (S^{2-})	mg/kg	<1
Water Soluble Sulphate (SO_4^{2-})	mg/l	57.2
Total Phenols Index	mg/kg	<1
Asbestos Screen	-	N.D.

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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	0.1
Benzo[a]anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo[b]fluoranthene	mg/kg	<0.1
Benzo[k]fluoranthene	mg/kg	<0.1
Benzo[a]pyrene	mg/kg	<0.1
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	<0.1
Total PAHs sum US EPA 16	mg/kg	<1

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	34.8
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	14.7
Aromatic TPH >C_{35}-C_{44}	mg/kg	<0.2

Total Petroleum Hydrocarbons (C_5-C_{44})	mg/kg	49.5

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