



By Appointment to
Her Majesty The Queen
Tree Surgeons
The F.A. Bartlett Tree Expert Co. Ltd

Bartlett Consulting

16th August 2019
JH/190181/R2

Mr. Donncha O'Shea
Gustafson Porter & Bowman
1 Cobham Mews
Agar Grove
London
NW1 9SB

Dear Mr. O'Shea

Interpretation and Further Recommendations Following Soil Sampling and Analysis

During the geo-technical site investigations undertaken at Victoria Tower Gardens, Bartlett Consulting was able to collect six (06) soil samples from within the rooting environment and notional root protection area of the London Plane trees flanking both sides of the gardens.

Below is a description of where soil samples were collected; the laboratory analysis of the soil samples; our interpretation working with the R.A. Bartlett Research Laboratory; and remediation recommendations.

Victoria Tower Garden Soil Nutrient Analysis

Three soil samples (SS) were collected along the Thames Riverbank, referenced SS1 – SS3.

SS1) Collected from the excavated soils from Trial Pit 5 at 1.5 metre depth, 16.5 metres away from T70014.

SS2) Collected from 500 millimetres depth, 15.0 metres away from T70010.

SS3) Collected from 500 millimetres depth, 10.0 metres away from T70006.

SS1 was found to be deficient in potassium, magnesium and manganese, and both SS2 and SS3 were deficient in magnesium and manganese. All three test results showed low levels of nitrogen (13 g/m²) whilst other macro- and micro-nutrients were at adequate quantities and availability. Heavy metals such as copper and zinc are at above optimal levels, while boron is verging on above optimal.

Continued...

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Victoria Tower Garden Soil Nutrient Analysis (continued...)

Bartlett Consulting collected three soil samples (SS) along Millbank, referenced SS4 – SS6.

SS4) Collected from the excavated soils from Trial Pit 4 at 1.5 metre depth, 12.5 metres away from T71013

SS5) Collected from 500 millimetres depth, 11.0 metres away from T71019

SS6) Collected from 500 millimetres depth, 11.0 metres away from T71022

SS4 was found to be deficient in potassium, magnesium and manganese, and both SS5 and SS6 were deficient in magnesium and manganese. All three test results showed low levels of nitrogen (13 g/m²) whilst other macro- and micro-nutrients were at adequate quantities and availability. Heavy metals such as copper and zinc are at above optimal levels, while boron was within optimal levels for these soil samples.

Discussions

The laboratory soil nutrient analysis informs us that the soil pH within Victoria Tower Gardens is good for London Plane tree species and there are good but high levels of organic material in the soil.

Nitrogen and potassium are essential macronutrients directly involved in the metabolism of a tree which cannot be replaced by any other nutrients, and are necessary for a tree to complete its life cycle. These elements are required in large quantities by trees which is why they have the title 'macro' nutrient. Nutrients can influence plant vigour, leaf size and colour, susceptibility to pest and disease and tolerance to other environmental stresses. Nitrogen for example is an important part of proteins and chlorophyll production. Potassium is necessary for leaf stomata aperture control, water and nutrient transportation and stress resistance whilst phosphorous forms an important part of starch and sugars within the tree.

Secondary micronutrients, such as manganese and magnesium are also essential for tree growth but are required in smaller quantities than the macronutrients.

The two deeper soil samples returned deficiencies of potassium, manganese and magnesium, whilst the four shallower soil samples showed a deficiency of manganese and magnesium. All six soil samples showed low levels of nitrogen.

All soil samples were outside optimal ranges of heavy metals.

Heavy metals in soils can become toxic to trees, and can have negative impacts on root growth and formation, slowing root elongation and fibrous root formation. Whilst it is clear that the London Plane trees have tolerated this growing environment, the effects of heavy metals on the trees can be detrimental especially when considering the need for root pruning.

Any nutrient deficiencies in soils can reduce tree vitality and increase physiological stress. When considering root pruning for mature trees, it then becomes even more important to correct these deficiencies prior to the root pruning so that the London Plane trees are better able to respond.



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Recommendations

Following the treatment recommendations in our arboriculture impact assessment is now highly recommended as we know that essential macro- and micro-nutrients are at low levels and must be corrected. When considering the need for root pruning, it is even more important to correct these soil deficiencies.

Bartlett Tree Experts are able to provide a soil and species specific programme of health care for the soils of Victoria Tower Gardens and the existing London plane, which must be completed before any approved development and enabling works.

It is also possible, through landscape planting, to remove some of the heavy metals in the soil. This does not form part of the recommendations of this letter, but can be discussed and included in future landscaping plans for the proposed development.

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We trust that you will find the discussions and recommendations in this letter well-presented, clear and concisely delivered. Should you have any further questions or concerns, or require further information and supervision during any site investigations, please don't hesitate to contact me again.

Sincerely,



Jason C. Hasaka
Principal Arboricultural Consultant

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