



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

# Bartlett Consulting

16<sup>th</sup> August 2019  
JH\_JPL/190181/R1

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

Dear Mr. O'Shea

## Formal Arboricultural Comments & Further Recommendations Following Ground Investigations

This letter follows our review of the two draft MOLA documents: *Report on an Archaeological Watching Brief*, dated May 2019 and *Report on Geoarchaeological Monitoring of Geotechnical Work*, dated 02<sup>nd</sup> June 2019. Also accompanying these reports was a series of 30 plans showing trial pit and site investigation details and sketches with Project Reference No. C14757, as well as Survey Solutions *Topographical Survey* plan, drawing number 2425se-01 dated 20.05.2019.

### Thames Side Trial Pit & Root Data

Three trial pits were excavated along the Thames River side of VTG, referenced Trial Pits 1, 2 and 5. All three trial pits measure 2.0 x 1.0 metre and varied in depth between 1.6 – 2.2 metres.

The main archaeological feature identified in these trial pits is the presence of a historic river wall, running in a north – south direction within the gardens. The depth of this wall varies slightly but is approximately 1.6 metres below ground level with a width of 1.3 metres. The full depth of this structure is unknown but it was excavated to a further 600 millimetres within Trial Pit 5.

Using the detailed Topographical Survey, drawing number 2425se-01 dated 20.05.2019, and AutoCAD architectural software, the distance from the historical river wall to the modern wall measures:

TP1 – 13.5 metres  
TP2 – 16.0 metres  
TP5 – 22.5 metres

Continued...

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### Thames Side Trial Pit & Root Data (continued...)

The location of this structure in relation to the proposed development is currently unknown and should be plotted on a proposed layout drawing for further reference and information.

With regards to the nearest London Plane trees, the historical river wall measures:

TP1) Approximately 10.5 metres from T70004

TP2) Approximately 12.0 metres from T70007

TP5) Approximately 16.5 metres from T 70014

Additional to the historic river wall, two east – west walls were identified within Trial Pit 1 and Trial Pit 5. The full length of these two walls is unknown, but both appear to span beyond the trial pits.

Along this same eastern aspect of the park, Canopy Consultancy excavated a number of investigation, identifying eighteen (18) tree roots between ground level and 1.0 metre.

Trial Pits TP1 and TP5 identified a further four (04) trees roots below 1.0 metre depth, ranging from 40 – 80 millimetres diameter, taking the total of roots identified between ground level and 2.0 metres depth to twenty-two (22).

Trial Pit TP2 did not identify any roots deeper than the original 1.0 metre investigation depth.

### Millbank Side Trial Pit & Root Data

Two trial pits were excavated along the Millbank aspect of VTG, referenced Trial Pit 3 and Trial Pit 4. Both trial pits measured 2.0 x 1.0 metre and varied between 2.1 – 2.6 metres in depth.

With regards to the nearest London Plane trees, these trial pits measure:

TP3) Approximately 8.5 metres from T71018

TP4) Approximately 13.0 metres from T71013

Only one archaeological feature was identified in these trial pits, an east – west brick wall found in Trial Pit 4. The wall footings extended below the final pit depth of 2.6 metres, however the full depth of foundations was not determined. It is presumed that this wall extends beyond the length of the trial pit, however the full length is unknown.

Along this western aspect of the park, Canopy Consultancy excavated six (06) investigation trenches, identifying twenty-five (25) tree roots between ground level and 1.0 metre depth.

The two trial pits identified a further three (03) trees roots below 1.0 metre depth, ranging between 30 – 40 millimetres diameter. The addition of these three tree roots takes the total of roots identified between ground level and 2.6 metres depth to twenty-eight (28).

What is noteworthy with these investigations is that within Trial Pit 4, the two roots actually descended deeper within the soil profile from 1.0 metre depth to 2.6 metres depth where the trial pit was terminated.



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## Victoria Tower Garden Geo-technical Soil Data

Five bore holes were sampled through the central region of VTG, the results of which will be applied 'evenly' across the site. The results of the bore hole logs did vary slightly, however conclusions can be reached which include Made Ground being the principal soil component averaging 4.5 metres depth. This is followed by Alluvium Clay averaging 7.2 metres depth, and Pleistocene Gravel averaging 11.0 metres depth.

Although not specified within the draft reports, through discussions with operatives on-site during the investigations we were informed that the water table is at approximately 7.0 metres depth. This would correspond with the bore hole logs which state that the Alluvium is either "slightly" or "very" wet when at the bottom of the soil profile.

## Discussions & Conclusions

Starting with the geo-technical soil profile results, the bore hole samples inform us that the Made Ground and Alluvium Clay have a texture and density which can be considered suitable for root growth to approximately 7.0 metres below ground level at which point the soils become waterlogged, anaerobic and compacted.

Through the trial pits, an additional seven (07) trees roots were identified below 1.0 metre depth with two of these descending deeper into the soil profile. This information informs us that roots are present deeper within the soil profile.

The principal below ground feature is the historical subterranean river wall, which following the historical research of Victoria Tower Gardens, we can be certain was in existence before the London Plane trees were planted. From the trail pits it is clear that secondary horizontal roots have been deflected or are above the wall as twenty-two lateral roots have been identified through the various site investigations.

At between 10.0 – 16.0 metres from the eastern line of London Plane trees the old river wall will be outside of the critical rootzone of the trees (discussed in Arboricultural Impact Assessment) as well as on the outer radius of the notional root protection area.

However, if there is deeper rooting, this feature will act as a root barrier causing roots to deflect and grow above the wall as seen through the trial pits, or along the length of the wall. As the full depth of the old river wall is unknown the influence of this wall on root growth cannot be fully understood.

The east – west walls are not considered to be 'restricting' root growth and formation, however they could possibly 'guide' root growth into the open areas of Victoria Tower Gardens.

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## Discussions & Conclusions (continued...)

Following the above discussions our conclusions are thus:

- The soil profile itself allows for rooting at greater depths – most likely down to approximately 7.0 metres where heavily compacted soils have been recorded and the water table was identified.
- A total of seven more roots were encountered between the original 1.0 metre investigation trench and more recent 2.0 metre depth trial pits. As two of these seven roots actually descended deeper into the soils this information further informs us that the soil profile allows for deeper rooting within VTG.
- Should there be deeper rooting, the old river wall along the Embankment and eastern side of VTG can potentially be acting as a root barrier, creating a greater accumulation of roots growing along the wall in a north/south orientation at this aspect of the site, or forcing root growth up and over the wall.

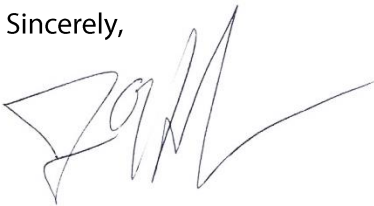
The east – west walls will not be acting as barriers to root growth, however they can be directing roots into the wider open space of VTG.

- Following conclusion of these investigations, when considering the site of Victoria Tower Gardens, the site constraints and the London Plane trees, we can be even more confident that any uniform shape and plotting of a calculated root protection area on to a 2D plan, and weighting of a notional RPA as a true reflection of a tree root system, is wholly unrealistic and impractical.

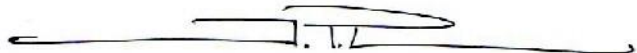
Whilst the notional RPA can and should be used for constraint mapping and planning, this particular site and proposed development must be guided and informed by real-life information including the data and results of all site investigations.

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

Sincerely,



Jason C. Hasaka  
**Principal Arboricultural Consultant**



James Percy-Lancaster  
**Senior Arboricultural Consultant**

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