

Date: **Jan. 12, 2022**

Attn: **Strata LMS 712
c/o Beverly Andrews
888 Beach Ave
Vancouver, BC**

Project: **Tree Transplant Feasibility Study
888 Beach Ave, Vancouver**

Re: **Roof Membrane Replacement Project**

ACL File: 21249




To the Attention of Beverly Andrews,

With reference to pending roof membrane replacement works, we have been requested to determine the feasibility of transplanting all the trees growing in the rooftop garden allée of little leaf linden (*Tilia cordata*) at this site. For our study, we have undertaken root mapping, soil property analysis, and visual tree assessment to determine the feasibility of a successful transplant for the rooftop trees.

Details of my observations are provided:

- The subject trees include 33 mature little leaf linden (*Tilia cordata*) ranging in size between 20 – 24cm DBH (diameter at breast height) and maintained at 5m height via a combination of pollarding and shearing to maintain the desired form for the allée. Shearing has resulted in stub cuts to the finer twigs and the tree crown form is asymmetric from the pruning for the desired effect as well as from suppression that has resulted from the close proximity of each tree to its neighbor. The trees appeared in fair condition.
- The growing site consists of a roof top garden (trees growing over a concrete slab) where the trees have been planted into a soil-less medium (sand) and the site impacts the trees in a similar way as if they were growing in a planter.
- Tree root growth and establishment, like a planter condition, have also grown with severe limitations in response to root restrictions from existing hardscape (concrete garden edging, adjacent planter box footings, unit pavers and subbase) and the concrete roof below the trees.
- The trees are watered via an in-ground automatic irrigation system via pop-up spray nozzles.

Root mapping and soil property analysis has resulted in the following findings:

Site Visit Date: Nov 26, 2021 Root Mapping and Soil Property Investigation		
Photo A. West side of the rooftop looking north.	Photo B. Root mapping excavation with rock edge and adjacent soil and grass.	Photo C. Root mapping within adjacent softscape with tree in background
		



ARBORTECH

Comments:

- The trees are growing in a sand base with thick landscape fabric between the sand and compacted gravel that covers the surface area of the tree planter.
- The sand is approximately 75cm deep over the concrete slab.
- The tree planter is constrained by adjacent concrete and wood retaining walls and their footings as well as rock edging set 30cm deep between the trees and the adjacent turfgrass and soil.
- Multiple test pits for root mapping were hand excavated within the sand area beside and between the lindens, as well as into the adjacent turfgrass and soil area beyond the rock edge. Three test pits were hand-dug directly beside the trees to determine the size of the old rootballs (from the nursery) for root mapping as well.

Findings:

1. Only fine roots, 1cm \varnothing or smaller grew from the old rootballs into the sand growing medium. Rooting was fine and sparse, indicating the sand impacted tree root growth with restricting qualities because it is relatively infertile. With trees grown in soil without restrictions at this age class, roots would have been expected to be large, woody, densely populated, and radiating from the tree in all directions. Since growing conditions are less than ideal, the root growth is deemed to be minimal and very sparse.
2. Root mapping at the extent of the old rootballs resulted in findings that the old burlap sacs that wrapped the rootballs (from the balled and burlapped nursery preparation) was still intact and the burlap had not disintegrated/biodegraded over time. Roots grew around the old burlap, but not through it. In typical landscape soils, untreated burlap sacs are apt to disintegrate within 1-3 years from the soil biology and chemistry breaking down the fibres. The burlap did not appear to be treated nor did it appear to be synthetic, both conditions that would result in the burlap not being degraded over time by soil chemistry and biology, and weather. The infertility of the sand in the surrounds of the original rootballs was the likely primary contributing factor that the burlap remained intact and substantiates the infertility as it relates to the lack of observed root growth outside of the original rootballs.
3. The largest woody roots found outside of the original rootballs were 1 to 2 cm \varnothing and were found to be growing from the nearest trees specifically below the rock edge and into the soils where the turfgrass grows. This is an opportunistic root growth strategy whereby the nutrition, water, and oxygen has enabled initial resource collection for the trees, but those roots are not well established at this stage.
4. Conclusively, the rooting of the trees into the site is weak and sparse and the architecture of the rootplate, rather the lack of a rootplate, is not suitable to consider transplanting the trees.

Additionally, if the trees were to be re-excavated to form a root ball for transplant then they could only physically be dug to approximately the same diameter as the original rootball size as when they were originally planted. The sand would not hold together and there is insufficient opportunistic roots to harvest with the tree. There would simply be insufficient roots to sustain the trees to meet their health needs now that they have grown larger.

Conclusions:

In conclusion, the little leaf linden trees growing on the rooftop have not produced sufficient root structures to enable rootballs to be dug for transplanting them. Based on the results of root mapping and soil property analysis, relocating the trees is not feasible. I recommend that to enable the roof membrane to be exposed for replacement, the tree should be removed (cut and disposed of) and replaced with new. I also recommend that the planting site for new trees include appropriate volumes of growing medium (i.e. not sand) as a backfill, and that drainage and watering consider the trees physiological needs. Species choices and spacing should also consider the landscape objectives relative to the maintenance burdens. This office can be requested to extend our consulting services to provide additional support for those aspects upon request.

With Regards,

Aelicia Otto
Senior Consulting Arborist

Enclosures;
none