

Design Squared Landscape Architects Ltd.
207 Durham Street South
Central Christchurch

e. office@design2.co.nz
m. 0274 511 486
w. www.design2.co.nz



24th June 2020

Attn: Christchurch City Council

Ryman Healthcare Park Terrace - Raised Tree Planter Design Assessment

Following the recent meeting with Christchurch City Council and request for more information regarding the proposed tree planters, we have undertaken an assessment on the raised planter volumes for trees as a part of the landscape scheme across both Ryman Park Terrace sites.

We have assessed what makes a contained tree root system successful in ensuring tree life longevity. This assessment and response strategy combined with 25 years of experience in the nursery industry growing large scale containerised plants and trees of varied grades and sizes gives us the confidence that what we are proposing can achieve successful results.

We have identified the following challenges in promoting successful plant and tree growth within contained or restricted tree pits.

1. *Drought Management and Control*
2. *Soil Aeration*
3. *Drainage*
4. *Soil Nutrients*
5. *Lateral Root Spread*
6. *Root & Trunk Damage*
7. *Quality Growing Medium*
8. *Suitable Tree Selection*
9. *Maintenance*

Our design, implementation and maintenance response strategy has been outlined below to successfully overcome each of these respective challenges.

1. *Drought Management & Control*

When trees are subjected to drought their root systems naturally disperse in search of water, leading to invasive root systems.

Ryman Healthcare install full, professionally designed automated irrigation systems throughout their villages. Each raised planter will be ducted and equipped with appropriate irrigation to ensure each specimen never suffers the stresses associated with drought. In turn, promoting more contained root systems. It is also important to note that the trees grown in these locations will suffer less wind

exposure than trees that are planted in open spaces, therefore requiring smaller root systems to survive.

2. Soil Aeration

Adequate soil aeration is what allows nutrients and water to pass through the growing medium to support and promote root growth and health. Quite commonly this can be affected by above ground compaction and consolidation of soil by pedestrians, vehicle movement and surrounding activities.

The proposed scheme places all specimen trees within raised areas where subjection to regular soil compaction is minimal except for the regular maintenance by gardeners. This provides specimens with perfect conditions for quality soil aeration and the promotion of healthier roots.

3. Drainage

Inadequate drainage within a planter can lead to serious root damage, rot, and subsequent death.

All raised planters within the scheme will be equipped with a Versicell drainage grid and filter cloth. This will be connected to the stormwater system to ensure the removal of any surplus water. In addition, quality soil aeration as described above will contribute to the successful passing of water through the growing medium and into the drainage cell at the base of the planter.

4. Soil Nutrients

Trees require additional soil nutrients to grow, establish and mature, especially in a contained environment.

Ryman Healthcare always provide a team of multiple skilled gardeners to manage and maintain their gardens. Weed mat and bark will not be used for the finishing of beds, rather programmed mulching by the gardening team will be undertaken in accordance with a management plan to ensure that planters receive their required additional nutrients. Furthermore, fallen leaf matter from trees will be left to compost and filter natural nutrients back into the planters.

5. Lateral Root Spread

Inadequate space for root spread restricts tree growth and maturity.

Most of the planters designed throughout both sites accommodate a deep depth of soil for trees to be planted into which then opens out at the bottom into a larger volume of soil allowing for roots to have continual lateral spread throughout the entire planter. This allows the trees to spread further for additional stability and obtain nutrients and moisture from other surrounding gardens. It is also accepted that trees grown within such a shared/continual space are generally better and healthier for this type of planting.

6. Root & Trunk Damage

There are number of external factors that can cause damage to the trunks and roots of trees. Vehicle and pedestrian movement can cause the surrounding compaction of root systems, constricting soil aeration and subsequent root growth. Public vandalism, and vehicle damage of trunks and laterals also create additional challenges for survival.

As described above, the tree planters are raised and will not be subject to any surrounding soil compaction or consolidation. Furthermore, most trees are sufficiently distanced from any pedestrian or vehicle disturbance so have limited exposure to risk of physical damage.

7. Quality Growing Medium

The composition of the growing medium is critical to the initial establishment of a successful tree.

Although specified on the typical tree planter details as screened topsoil, the soil will be mixed to form a suitable medium including conditioner. This mix will be developed in conjunction with the arborist and soil suppliers. Ryman Healthcare take a great level of pride in their gardens, and we will make every effort to ensure the most suitable and quality growing mix is provided to all planters.

8. Suitable Tree Selection

Rather than the landscape contractor, we, as the Landscape Architects will procure all the plants and trees for the Ryman Park Terrace sites. We will personally select and ensure that all specimens are fit for purpose and in the best shape and health as possible.

9. Maintenance

Ryman Healthcare will employ a team of gardeners tasked with the maintenance of both sites. Trees will be carefully maintained, working to a provided management and maintenance plan that specifies when they are to be trimmed, how often, and when to fertilize and water. As the Landscape Architects, we have ongoing involvement in the villages to ensure that all planting and trees thrive to achieve what has been planned and we advise and update the gardening team accordingly as time progresses. Qualified arborists will be engaged to undertake tree trimming to ensure healthy and well-shaped trees.

In addition to the above response strategies, we have outlined below the design intent and rationale for the raised planter designs and sizes.

There has been concern raised with regards to the size of the raised planters. All main tree planters have a minimum growing medium volume of 3m³. This allows a generous amount of soil substrate for these trees to grow in. For the majority but where appropriate, tree planters have been combined with garden planters to provide a continual volume of soil. However, it is important to note and as described above, that the trees on site will be subjected to ideal growing conditions, with quality growing mediums, aeration, trimming and drainage. All trees will be professionally maintained on an annual basis to ensure they retain their shape whilst achieving the desired screening that is proposed in the Resource Consent documentation. With such ideal growing conditions, it would be expected that root growth will be notably less than that of a tree in an open ground situation where there is competition for water and nutrients whilst having a higher exposure to wind and other environmental factors. Their sheltered environment means there will be minimal loading to encourage caliper expansion and therefore root growth will be restricted. Regular maintenance will further reduce the need for the trees to develop larger root systems due to reduced pressure on growth.

There are eight Magnolia 'Teddy Bear' specimens proposed for around the pool at Bishops Park. In 'plan view' these appear to be sited within inadequately sized planters. However, the architectural plans make an allowance for a slab set down throughout this area to provide a sufficient volume of growing medium and therefore ample space for lateral root spread. The ten Acer 'Jeffers Red' specimens within the central courtyard of the Peterborough Apartments are proposed within smaller

raised planters. Through our experience within the nursery industry we have always found these trees to have proportionally small root systems in relation to their large canopies. Hence, we have specifically selected this tree for this more confined application.

We are comfortable that the species we have selected will thrive in the situation that has been proposed but acknowledge that it is important to start with excellent species that have strong leaders and good branching patterns. The trees selected can be controlled to ensure that we succeed in achieving the desired anchoring of the development within the surrounding landscape.

As discussed with Jennifer Dray, we have added extra variety of specimens to locations where space permits for a larger canopy spread, contributing to the park like scene of Park Terrace. To inform our tree selection we have taken inspiration from some of the heritage specimens that were originally planted within Hagley park and used these within our scheme.

A handwritten signature in black ink, appearing to read 'Sean Dixon', written in a cursive style.

Sean Dixon
Landscape Architect. NZILA member