Nepal Reserve

Native forest restoration plan

June 2026

Christchurch City Council

Approvals Panel			
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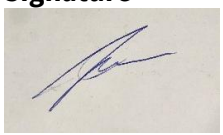
Reviewed by	**Toby Chapman** Manager, Urban Forest Parks Unit.	**Date** 10/06/2026	**Signature** 
Reviewed by	**Al Hardy** Manager Community Parks Parks Unit	**Date** 10/06/2026	

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Christchurch City Council

Introduction

Vision

Nepal Reserve will be a treasured community asset where people of all ages and backgrounds are actively involved in restoring, shaping, and caring for a thriving native landscape. The reserve will be a place people visit regularly to experience nature, recreation, learning, nature play, and social connection.

The reserve will support representative woodland and shrubland ecosystems once widespread across the local area, alongside lowland podocarp forest that together provide important feeding and breeding habitat for native birds and other forest fauna within Ōtautahi-Christchurch's wider urban native forest network. Nepal Reserve will demonstrate how ecologically authentic native ecosystems can be successfully integrated into the city's stormwater reserves, while also serving as an exemplar of fire-smart planting design that strengthens landscape resilience without compromising ecological integrity or natural character.

Objectives

The objectives of establishing a native forest patch within Nepal Reserve are:

- ✓ Increase the presence of accessible native trees and forests in the urban landscape
- ✓ Provide opportunities for people to be involved with restoring and managing the natural environment
- ✓ Help achieve multiple objectives of Ōtautahi-Christchurch's Urban Forest Plan
- ✓ Increase tree canopy cover in the Harewood area to help combat climate change
- ✓ Contribute to a target of 10% indigenous vegetation cover across the district[1]
- ✓ Provide important resources for native wildlife as part of a city-wide forest patch network
- ✓ Provide an exemplar site for fire-safe native planting in public spaces
- ✓ Provide manawhenua with opportunities to exercise Matauranga Māori and support mahinga kai
- ✓ Reduce ongoing operational costs and carbon emissions associated with managing mown turf
- ✓ Establish a significant and iconic landscape feature that contributes to community identity
- ✓ Promote supporting and increasing indigenous biodiversity beyond Nepal Reserve

[1] The National Policy Statement on Indigenous Biodiversity (2023) requires that all territorial local authorities (E.g., Christchurch City Council) achieve 10% indigenous cover across their urban and rural areas.

Context

In 2023, we adopted the **Urban Forest Plan for Ōtautahi Christchurch[2],** focused on growing and managing public and private trees to increase urban tree canopy cover to 20% over the next 50 years. This plan supports climate action, neighbourhood livability, improved wellbeing, and better protection and maintenance of our precious indigenous flora and fauna. Native forests within our urban environments play a significant role in helping us achieve these goals.

Ōtautahi-Christchurch, a biodiversity hotspot within the Plains Ecological Region[3], contains many important biodiversity sites, some of national or international importance. However, over the past 700 years Canterbury has suffered enormous loss in both the extent and quality of its indigenous biodiversity, particularly forests, with Māori and European settlement. Pre-European fires meant that only a very small amount of native forest remained on the Canterbury Plains by the 1840s, and subsequent colonisation by European settlers in the 1850s brought further rapid habitat destruction to the Canterbury Plains and Port Hills.

The historic 'Black Maps' of Ōtautahi-Christchurch dating from the 19th Century show extensive areas of wetland with only limited areas of forest at Pūtaringamotu-Riccarton Bush (22 hectares – Figure 1) and Papanui Bush (30 hectares). Both patches of bush could be seen easily from the Bridle Path in a sea of tussock and toetoe. Unfortunately, Papanui Bush was completely felled by settlers within approximately five years, and Pūtagringamotu-Riccarton bush was reduced to around seven hectares.

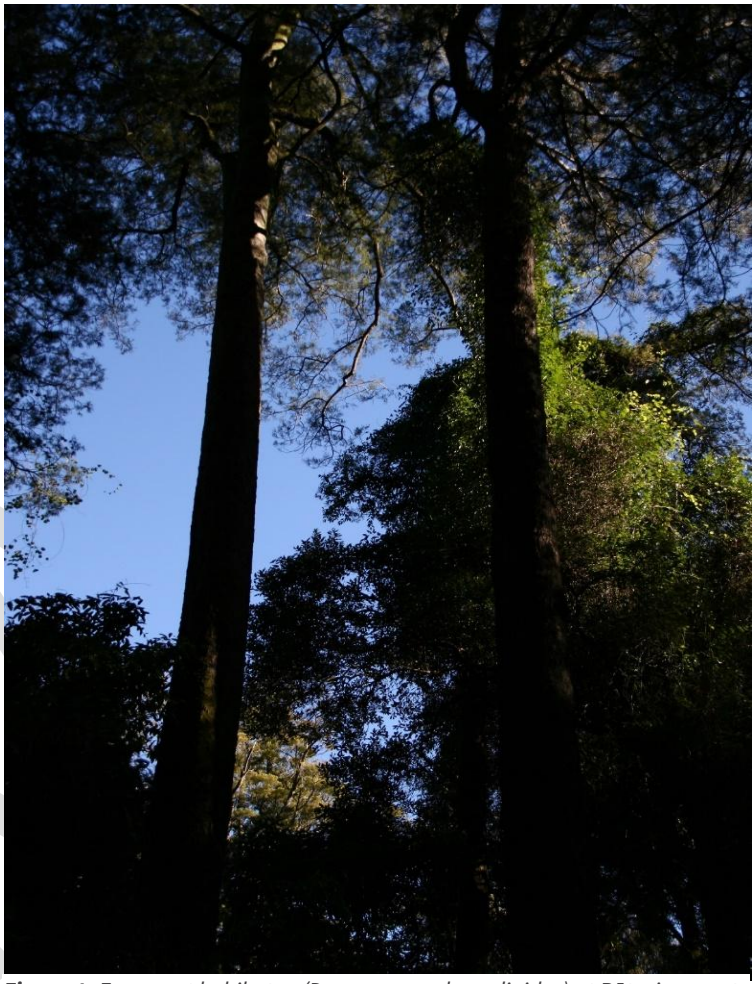

Figure 1: *Emergent kahikatea (Dacrycarpus dacrydioides) at Pūtaringamotu – Riccarton Bush (Photograph: A. Shadbolt, 2019)*

Only around 20% of our urban forest tree asset database[4] is made up of native trees!

While the other 80% of our urban forest trees are exotic - numbering some 700 species - native forests have begun to have a renaissance in recent years, as have our native bush birds. Planted native forests in Ōtautahi-

[2] www. ccc.govt.nz/assets/Documents/Consultation/2023/02-February/CUS5882-Urban-Forest-Plan-A4-WEB.pdf
[3] www.doc.govt.nz/documents/science-and-technical/ecoregions4.pdf
[4] The Councils database is a record of trees on Council land. The primary purpose of the database is to record those trees that are on a regular maintenance cycle and therefore does not typically include grouping of trees or forest patches.

Christchurch now well-exceed the c.1840 extent but further restoration is essential for sustaining wildlife and providing high quality nature experiences for all.

Nepal Reserve in a network of forest patches

As well as the Urban Forest Plan, we are also developing the Ōtautahi-Christchurch Native Forest Patch Network Plan[5] (Figure 2) to create a strategic network of native forests[6] across the city.

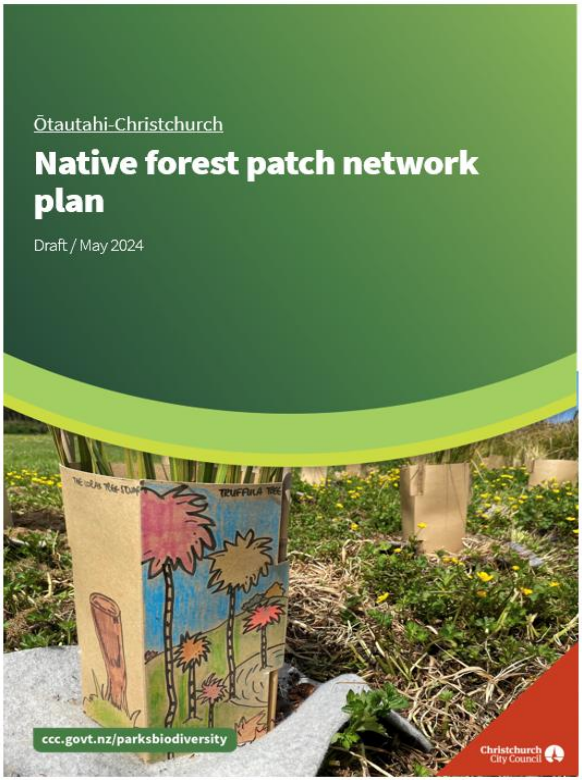

Figure 2: *Ōtautahi-Christchurch Native Forest Patch Network Plan (In preparation)*

This network aims to support viable populations of native bush birds and other wildlife, enhance ecosystem connectivity, and provide accessible natural areas aligning with the city's Biodiversity Strategy[7]. We hope it will also encourage community engagement in biodiversity conservation – like we see at Nepal Reserve - and foster a deeper understanding of ecological needs.

If we want to see viable populations of native bush birds back in our urban environments, large areas of forest (e.g. 500 – 10,000 ha) would be ideal. However, we know that such large areas are of course not realistic, and instead series of smaller patches that allow freedom for birds and other wildlife to travel between them may be equally important.

A series of smaller core forest patches about the same size as Pūtaringamotu-Riccarton Bush and located at five-kilometre distances from each other across the landscape, could provide core wildlife sanctuaries. A series of smaller 'stepping-stone patches' of around 1.5 hectares in size - like the one we are now establishing at Nepal Reserve - at one-kilometre distances could then provide habitat for most plants, invertebrates, lizards and insectivorous birds, while small groves of native trees at 200 m spacings would provide rich food sources within our neighbourhoods.

Together, this arrangement of native forests and trees should be able to support our precious wildlife populations at a landscape level.

Our Native Forest Patch Network Plan envisions 135 native forest patches averaging around six hectares each. 42 of these will be larger patches (>6.25 ha) that will provide core wildlife breeding habitat, and 93 - like Nepal Reserve - will be smaller patches (1.50 ha – 6.25 ha) that act as food sources and stepping stones for wildlife.

Like Nepal Reserve, around two-thirds of these patches, simply build on existing native forest plantings in parks and stormwater sites. This approach serves to maintain the general character of our public spaces, whilst allowing the plantings to be extended and enriched to provide more optimum habitat and wilderness experiences.

[5] CCC (2024a & 2024b)
[6] Meurk and Hall (2006)
[7] CCC (2008)

Ultimately, we would like to extend our support for biodiversity and urban tree canopy beyond Nepal Reserve and into surrounding areas so that the Nepal Reserve forest is truly connected to the wider landscape.

Nepal Reserve

Location

Nepal Reserve is an approximately 4.48 ha Local Community Park located at 30 Nepal Place in the northern Christchurch suburb of Harewood. It has one major road frontage (Westpark Drive) on the northeast side of the park, and three secondary access points: 1) via the end of Thornaby Close off Teesdale Street, and 2) from the end of Nepal Place, and 3) from the industrial estate at the north end of Nepal Reserve vis the end of Abros Place (Figure 3).

Figure 3: Location map of Nepal Reserve

Brief history

The present-day site and surrounds of Nepal Reserve have had a long history of modification, dating from the early 1940s with large-scale shingle quarrying near the corner of Wairakei Road and Roydvale Avenue following by use of the quarry lakes as landfill. A series of aerial photographs dating from the 1940s onwards are provided in **Appendix 2** that show the extent of quarrying and subsequent filling in and around the Nepal Reserve area).

The quarry consisted of three main gravel pits, and the main gravel pit lake was known as Lake Bryndwr. Water was fed by an underground spring, and water was up to 6 m deep in places.

The 1964 – 1969 aerial in **Appendix 2** shows a 2.4 km midget car motor racing circuit around the lakes that operated from the 1950s (See also Figure 4). The lakes were also used for recreational fishing, water skiing, and swimming/bathing, and several people were reported to have drowned in the lake.

Aerial photographs in **Appendix 2** show that most of the quarrying and subsequent fill activity occurred in the northern extremity of the present-day reserve in the 1940s and towards the eastern end in the 1960s. There are no aerial photographs showing the extent of quarrying in the 1950s, however we can assume that this occurred through the central parts of the reserve as well.

Nepal Reserve was developed on the site in 2007 **(Refer Appendix 3)** and included a 1.2 hectare excavated and re-contoured stormwater detention facility at the north end of the reserve **(Refer Appendix 4)**.

During investigations for the reserve in 2006, seven test pits were dug - the deepest being to 3.2 metres. The composition of fill in the test pits was found to be limited to unconsolidated soil, wood, bricks, timber, wire, concrete, shingle, and some iron. This was considered inert fill, and there was no evidence of contaminated material in the pits.

Today, Nepal Reserve is a well-developed and well-used Community Park that is valued by the local community for recreation, play, dog walking, informal sports, and enjoyment of nature and open space.

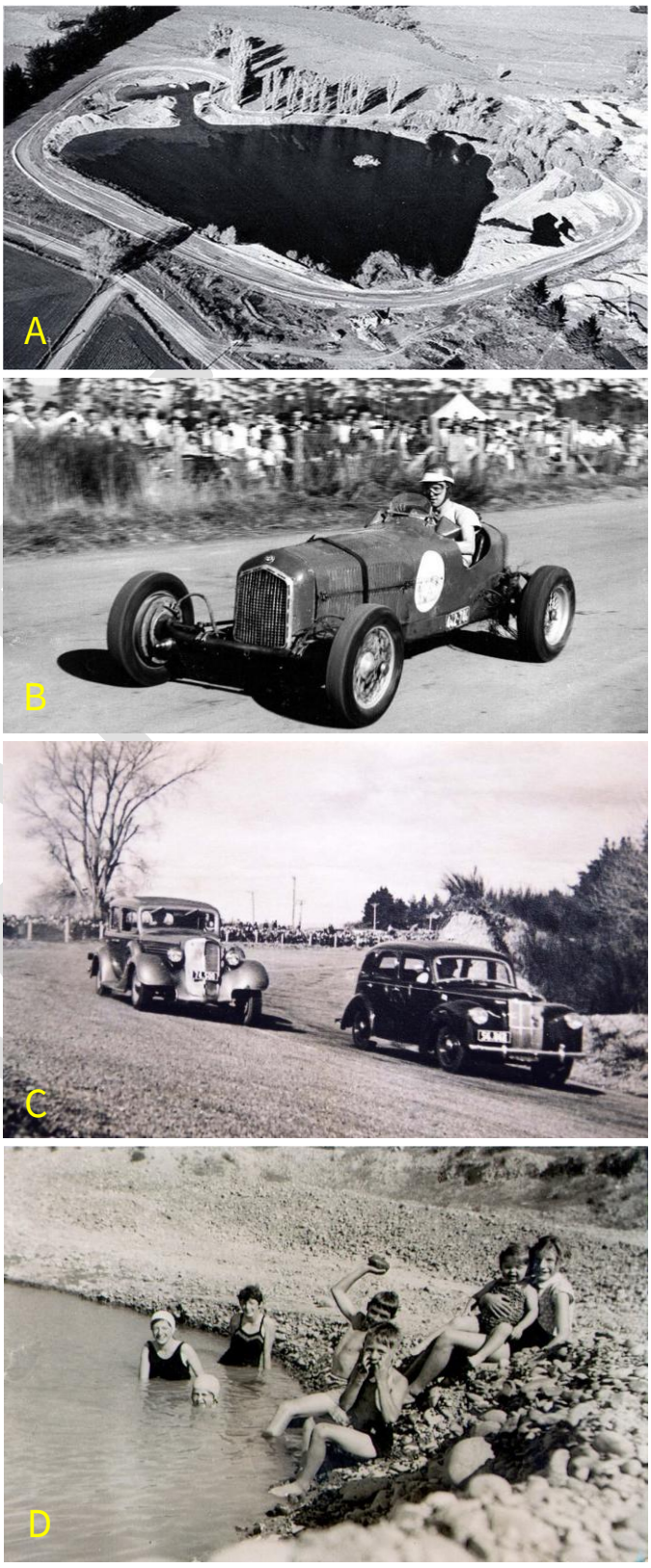

Figure 4: *Historic images of Lake Bryndwr in the 1950s showing the motor racing track (A), car racing (B & C), and recreational swimming/bathing (D).*

Urban forest planting

The first of the recent native forest plantings was done by Council's Parks Team in August 2024, followed shortly after by a community planting day with a local school on 29th August that year.

In early 2025, a community BBQ was hosted at Nepal Reserve with Fire and Emergency NZ (FENZ), to talk about a local resident's long-term proposals for the park, to educate the public about fire resistant planting, and to share the tree planting plan which was being consulted on.

Overall, the feedback from the BBQ suggested a desire for improved amenities at Nepal Reserve, such as toilets and lighting, along with a focus on safety and tree/footpath maintenance. There were also requests for more trees and green spaces, with considerations for native species and water management.

In mid-2025, the Waimaero Waimairi-Fendalton-Harewood Community Boad approved the tree planting plan for the reserve (Figure 5). The approved plan included specimen tree planting - including for shade around the playground at the in the southern half of the reserve, and significant native forest planting across the northwest half. Combined with the existing native trees and shrubs planted in the north half of the reserve, the new native forest patch will be larger than 1.5 hectares and play an important role in Ōtautahi-Christchurch's native forest patch network.

A second round of planting took place in September 2025 in partnership with the Burnside Bryndwr Community Network, FENZ, the community board governance team, Scouts and Council's Urban Forest and Community Parks teams (Figures 6 & 7).

The **'Friends of Nepal Reserve'** group was formed in early 2026, and thanks to their commitment - together with Council's Community Park Ranger Team - the plantings have had a very high success rate and are growing vigorously.

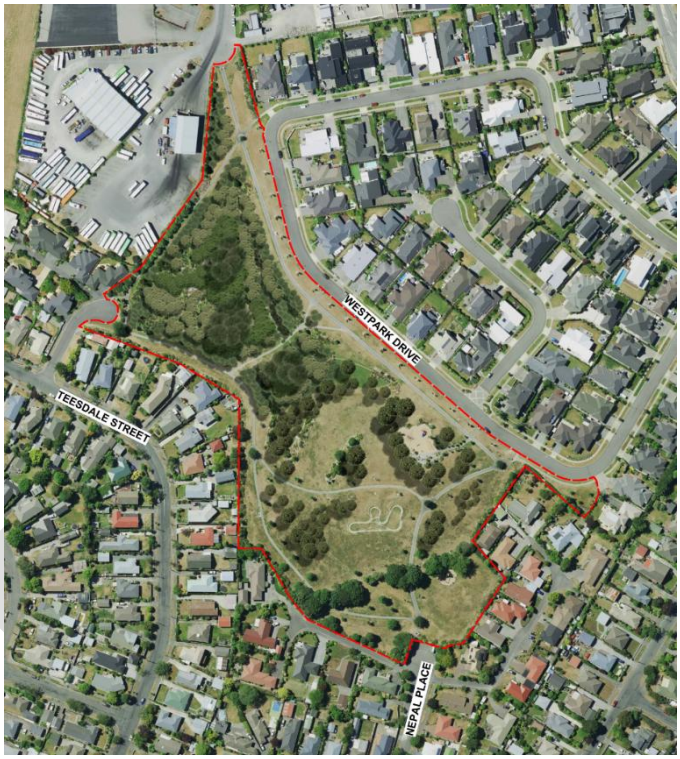

Figure 5: *Tree and forest planting plan approved by Council's Waimaero Waimairi-Fendalton-Harewood Community Boad in 2026 showing >1.5 ha of native forest in the north half of Nepal Reserve.*

Figure 6: *The first native forest plantings at Nepal Reserve supported by the Friends of Nepal Reserve group and Councils Community Park Rangers, the Urban Forest Team and the Waimaero Waimairi-Fendalton-Harewood Community Boad (Photograph September 2025).*

The Friends of Nepal Reserve group meets at Nepal reserve on the first Sunday of every month to continue to develop and manage the native forest and shubland areas.

Figure 7: *September 2025 planting day in partnership with the Burnside Bryndwr Community Network, Fire and Emergency New Zealand (FENZ)Z, the Waimaero Waimairi-Fendalton-Harewood Community Boad Governance Team, Scouts and Council's Urban Forest and Community Parks teams. (Photographs: Burnside Bryndwr Community Network, 2025).*

Management issues

The three main management issues at Nepal Reserve are:

- ✓ the presence of a small number of biodiversity pest plants,
- ✓ issues associated with establishing a native forest in and around a highly modified/engineered stormwater detention facility, and
- ✓ ongoing/long-term management of amenity turf, which is costly, and also has high carbon emissions.

Pest plants

Although the planting areas in the reserve are generally thriving under a low-level maintenance regime, exotic woody pest plants will threaten our restoration efforts and success if left unchecked.

If not controlled while their numbers are still relatively small, biodiversity pest plants will spread into our planted restoration areas where they will displace indigenous plant communities (both planted and naturally establishing) and the indigenous fauna those communities' support. Luckily, many of these pest plant species are both relatively sparse and young and able to be controlled cost effectively compared to if they are left to establish further.

Table 1 (below) lists biodiversity pest plants that threaten ecological values and restoration success at Nepal Reserve.

Table 1: *Biodiversity pest plants occurring at Murchison Park and prioritised recommended control actions.*

Common name	Scientific name	Recommendation
Ivy	*Hedera helix*	Achieve complete eradication of all ivy within Nepal Reserve as this is a significant pest plant species that will eventually smother the forest understorey preventing natural regeneration and also climb into the forest canopy and fruit/seed prolifically. **HIGH PRIORITY**
Old man's beard	*Clematis vitalba*	At least one plant established in border at north end of reserve. Achieve complete eradication within Nepal Reserve as this is a significant pest plant species that will eventually smother plantings and climb into the forest canopy and spread prolifically. **HIGH PRIORITY**
North Island lacebark	*Hoheria sextylosa*	At least one tree (but likely others) growing amongst established harakeke in basin plantings at north end of reserve. **HIGH PRIORITY**.
Chilean mayten	*Maytenus boaria*	At least one tree growing in a planting bed on the western boundary of the reserve needs to be removed. **HIGH PRIORITY**
Cherry	*Prunus spp.*	Ongoing surveillance and control of cherry throughout restoration plantings and amenity borders. **HIGH PRIORITY**
Elderberry	*Sambucus nigra*	A small number of established elderberry trees rowing amongst established harakeke in basin plantings at north end of reserve. **HIGH PRIORITY**

Restoring forest in a stormwater facility

Growing conditions

The planting areas in Nepal Reserve are harsh environments that will likely provide difficult growing conditions for native forest vegetation. Soils in and around these types of stormwater basins are often thin, prone to drought, and compacted. In similar situations we would normally be able to do deep soil cultivation/deep ripping to break up compacted soils to better support plant and tree growth, but because the basins have been constructed above an old landfill, this will not be possible.

There may also be areas within the basin bottoms that have needed to be clay-lined so that stormwater is not able to percolate down through the landfill and into unconfined freshwater aquifers below. Figure 8 shows the extent of the clay lining that was proposed in 2005 as part of the engineering design.

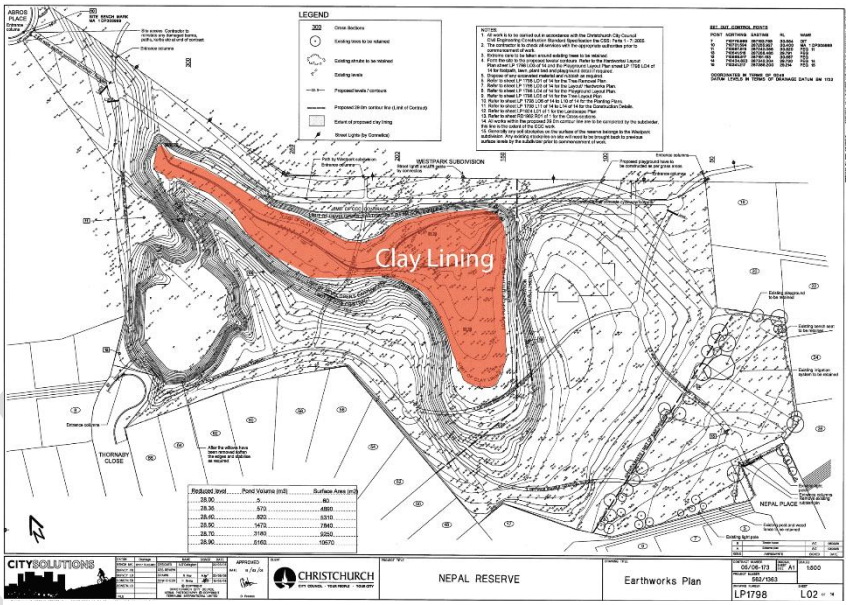

Figure 8: *Engineering plan for the Nepal Reserve stormwater ponds earthworks construction showing the extent of the clay liner that was proposed at the time (red).*

Clay lining will be a significant impediment to tree growth, however planting done within this area in September 2025 did not detect clay - and instead found relatively deep soil. These plantings established well over the summer with a very high survival rate, indicating that the clay liner may not have been installed throughout the full extent shown in Figure 8 – if at all.

To overcome these growing condition constraints, it will be important to carefully consider species choice. Luckily many species appropriate to the soil types in the local area are well-adapted to droughty thin soils (Refer **Restoration Methods** section).

Prior to planting further sections of the basin bottoms within potential clay liner area shown in Figure 8, we will dig some investigative test pits. Where a clay liner is found, we will re-assess our species selection and adapt to the depths of topsoil we find.

Operation and function of the stormwater facility

The Nepal Reserve stormwater basins are important engineered solutions for managing the local area's stormwater quality and quantity. They are also important for protecting our natural downstream waterways and wetlands from urban pollution - including sediment - contained in road and other hard surface run-off. Forests can play an important role in managing urban stormwater but need to be planned in a way that they do not compromise the function and operation of a stormwater treatment facility like the one at Nepal Reserve if they are planted within them.

Consideration for planting forest in and around the Nepal Reserve stormwater ponds include:

Loss of storage capacity: The basins at Nepal Reserve have been designed to store/detain a specified volume of stormwater for a specified duration (normally 48 hours) before it is released back into the Council's drainage network – including its natural waterway network. Vegetation has the potential to displace and reduce storage volume; however native forests generally result in negligible storage loss. For example, stems of 14-year-old kahikatea dominated plantings at Te Waoku Kahikatea Reserve in Marshland take up less than 0.7% of the forest area, and even trees at the 600-year-old Pūtaringamotu-Riccarton Bush occupy less than 0.59% of the area.

However dense plantings of harakeke, toetoe and pukio sedge in the bottom of the basins may compromise storage capacity, and these types of dense clumping plants should be restricted to beyond the basin areas. Similarly, cabbage trees, that develop very thick trunks from a young age, were found to increase the percentage of area taken up by tree trunks and stems at Te Waoku Kahikatea Reserve and should be avoided within the basins also.

Over time, if storage capacity does become reduced beyond levels at which the facility is required to operate at, we can easily thin trees out to reinstate capacity. This may provide an opportunity for a novel source of timber (or other resource) that could be used for a range of cultural purposes – including carving.

Leaf size: Councils stormwater facility managers prefer that plants established in and around stormwater basins are limited to species with small leaf sizes that can be easily washed through the stormwater network – including pipes. They also discourage species with long strappy leaves (e.g., cabbage trees), as these - along with other large leaves - can cause sumps and drains within the basins to become blocked.

Luckily most native tree species have comparatively small leaves – particularly those that would naturally occur locally on the range of soil types in and around Nepal Reserve (e.g., kanuka, kowhai, manuka, mikimiki) – and even kahikatea and totara.

Bark mulch: Bark mulch or aged chipped wood mulch is often used around restoration plantings for two key reasons: 1) supressing weeds, and 2) retaining soil moisture. However, when used in stormwater basins, when the basins become inundated during rain events, the mulch can float, become mobile, and be transported to outlet sumps and drains where they can cause blockages. Bark or wood mulch can also be conveyed along pipes and into natural waterways where it has an adverse impact on water quality and the freshwater ecosystems.

Bark or wood mulch must be restricted to use only in areas that are above the operating water level when the basins are full. Instead, we encourage the use of (e.g.) wool mulch or other non-plastic weed matting to supress weeds and retain soil moisture.

Maintenance access: From time-to-time Council contractors need to access various part of the stormwater system within Nepal Reserve to carry out routine maintenance. This may require access to sumps and outlets. To achieve this, margin and slope planting should incorporate regular gaps where the maintenance team can bring out cut debris.

Sumps, manholes, headwalls, and the concrete low-flow channel within the basins may occasionally require cleaning using a vacuum truck and hoses. To support this, safe parking areas within 10–30 m of these structures are necessary. At Nepal Reserve, such access is accommodated within the lawn areas along the entire Westpark Drive frontage.

Mowing

Mown grass covers approximately 3.8 hectares of Nepal Reserve. This includes the expansive grass areas at the south end of the reserve, the currently grassed areas within the stormwater basins to the north (Figure 9), and the grass verge along Westpark Drive.

Depending on the mowing frequency of existing grass areas at Murchison Park, at $0.06/m2, annual costs for mowing could be anywhere between $57,000 for 25 visits and $72,960 for 32 visits.

Proposed restoration plantings within the stormwater basins will remove approximately 1.10 hectares of mowing from Nepal Reserve, resulting in mowing related savings of between $16,500 and $21,000 per annum.

Ecological values

Nepal Reserve has few existing biodiversity values other than the small patches of planted native forest and shrublands associated with the constructed stormwater facility. The site's ecological significance sits more with its potential as part of the wider native forest patch network than the forest on its own. In the future, it can be expected to support small populations of common native bush birds such as fantail/pīwakawaka, grey warbler/rironiro, and silvereye/tauhou, and attract regular visits by larger bush birds like NZ wood pigeon/kererū, bellbirds/korimako, shining cuckoo/pīpīwharauroa and potentially tui.

Along with native bush birds, we also expect to see native invertebrate populations establish and increase. These populations may establish via natural recolonisations or through intentional reintroductions. Similarly, we can expect native lizard populations to establish around the forest margins.

April 2026 BioBlitz

On 26th April 2026, the Friends of Nepal Reserve group organised for a BioBlitz to occur at the reserve. A BioBlitz is a 24-hour survey that aims to record as many different species as possible within a large urban area where the focus is on counting the total number of species rather than identifying every individual organism.

The Nepal Reserve BioBlitz provided a unique opportunity for scientists, students, and members of the public to work together (e.g. Figure 9) and explore the range of biodiversity found in the reserve. The findings from this event are listed in **Appendix 5** and provide good baseline on which to measure and monitor ongoing restoration success.

Figure 9: *Local residents - including children – working with biodiversity experts to identify flora and fauna at the 2026 Nepal Reserve Bioblitz (Photograph XXX 2026)*

On the day, 32 indigenous native tree, shrub and grass species that naturally occur in the Low Plans Ecological District were recorded, along with eight non-local native species and 20 exotic trees and large shrub species.

Proposal

Native forest restoration

In 2024, The Fendalton-Waimairi-Harewood Community Board of the Christchurch City Council approved a native forest and specimen tree planting plan for Nepal Reserve.

We will continue to implement the approved native forest areas of this plan by replacing large areas (approximately 11,000 m2) of mown grass with native forest which will expand and connect existing harakeke dominated areas within the stormwater basins to create one large core forest habitat patch covering approximately 1.6 hectares (Figure 10). This will include low flammability native trees and shrubs around the periphery of the plantings and paths that are typical of natural forest edges. These edge plantings will grade back into kānuka-kōwhai dominated woodland on high/dry areas and kahikatea/mixed podocarp forest in damper and regularly flooded hollows.

Figure 10: *Approved forest plans showing approximately 1.6 hectares of native woodland and forest across the northern half of Nepal Reserve (Source (Christchurch City Council 2025)*

Species selection will be informed by the soil types, landforms, and the types of plant communities that would have once grown in the area prior to the arrival of humans. As well as the wider forest planting, this will include enrichment planting within the planted borders around the periphery of the reserve and within the established harakeke dominated plantings within the basins. These enrichment plantings will include native climbers and scramblers (such as clematis, native jasmines, and bush lawyers), ferns, and other more sensitive species that require sheltered planting conditions **(Refer Appendix 6)**.

Access

We will retain all existing pathways in the park and create a series of informal nature loop trails through the native forest areas. These secondary loops will follow established desire lines or logical routes through natural clearings in existing plantings, creating the impression that the trails were organically integrated within the forest rather than the forest being shaped around them. This approach aims to enhance the sense of wilderness and natural character within the park.

Abros Place wildlife corridor

We will also work with Council's City Streets department and owners of private commercial properties on Abros Place to investigate opportunities to plant native woodland habitat along wide grass verges that link to Wairakei Road. This planting will create a green linkage that will support bush bird movement between Nepal Reserve and proposed native forest plantings in Wairakei Reserve – potentially a similar sized native forest patch as Nepal Reserve.

Planting along Abros place will also provide a quality walking connection between Nepal Reserve and Wairakei Reserve and beyond to Nunweek Park and the start of the >25 km Pūharakekenui-Styx River Source to Sea Reserve Network and walkway (Refer Figure 11). Wairakei Reserve is also a key link in the Christchurch 360 Trail.

Figure 11: *Aerial photograph showing green linkage (green dashed line) along Abros place that could provide a quality walking connection and wildlife corridor between Nepal Reserve, Wairakei Reserve and beyond to the Pūharakekenui-Styx River Source to Sea Reserve Network.*

Increasing biodiversity on surrounding residential properties

Once restoration is well underway within Nepal Reserve, we will work with the 61 private households immediately surrounding the reserve (Refer Figure 12) to support increasing indigenous biodiversity beyond our restoration site. This may involve community education or providing free native plants and planting advice to households. Future native tree giveaways and outreach could extend to the remainder of the properties in the Westpark Subdivision (65 additional properties) or even wider.

A similar "free trees" programme—funded through the Council's Sustainability Fund—has been delivered over four consecutive years in the Pūharakekenui–Styx River catchment by the Styx Living Laboratory Trust[8], in partnership with Trees for Canterbury[9]. The initiative has proven highly successful, not only enhancing biodiversity across four residential areas but also boosting tree canopy cover, helping to counter the ongoing decline in Ōtautahi Christchurch's urban tree cover.

Figure 12: *Aerial photograph of Nepal Reserve and surrounding residential, areas showing neighbouring properties where we intend to support increasing biodiversity values urban tree canopy coverage through education and providing free trees.*

Visitor experience features

As we continue to plant and develop the site, we will investigate and consider locations for seating and spaces to accommodate small groups of students in informal outdoor classroom settings. We will also explore incorporating other park features such as interpretive elements (e.g. Figure 13) that support restoration efforts. This may include novel interpretation that explains fire-smart planting design for parks, information on key plant species – including cultural uses, and how to get involved with restoring and managing the site.

The specific placement of these features will be decided later, based on the unique character and layout of various areas within the area.

Figure 13: Example of interpretation installed as part of a stormwater facility at Te Oranga Waikura in Linwood *(Photograph, A. Shadbolt)*

[8] www.thestyx.org.nz
[9] www.treesforcanterbury.org.nz

Restoration method

Plant species selection

Successful restoration starts with creating a native ecosystem that closely reflects the natural character of the site and wider Ōtautahi-Christchurch natural environment. This means restoring not only the native plant communities themselves, but also the ecological processes that allow them to function naturally over time — including relationships between plants, animals, soils, water, and habitat.

A key part of this approach is establishing a diverse range of appropriate native species, in proportions that resemble the composition of naturally occurring forest ecosystems in the region. While not all species may be planted at the outset, the long-term goal is to support the gradual development of a resilient and self-sustaining native forest.

The Black Maps of 1856 (Figure 14) show the areas around Nepal Reserve as a mosaic of tutu and fern, swamps and areas of shingle. This 1856 vegetation cover had already been heavily modified by the first wave of human occupation in the Ōtautahi-Christchurch area. Prior to this time, we believe that the underlying soils and hydrology would also have supported forest and woodland ecosystems, and as suggested in Lucas and Associates Indigenous Ecosystems of Ōtautahi Christchurch maps (Figure 10).

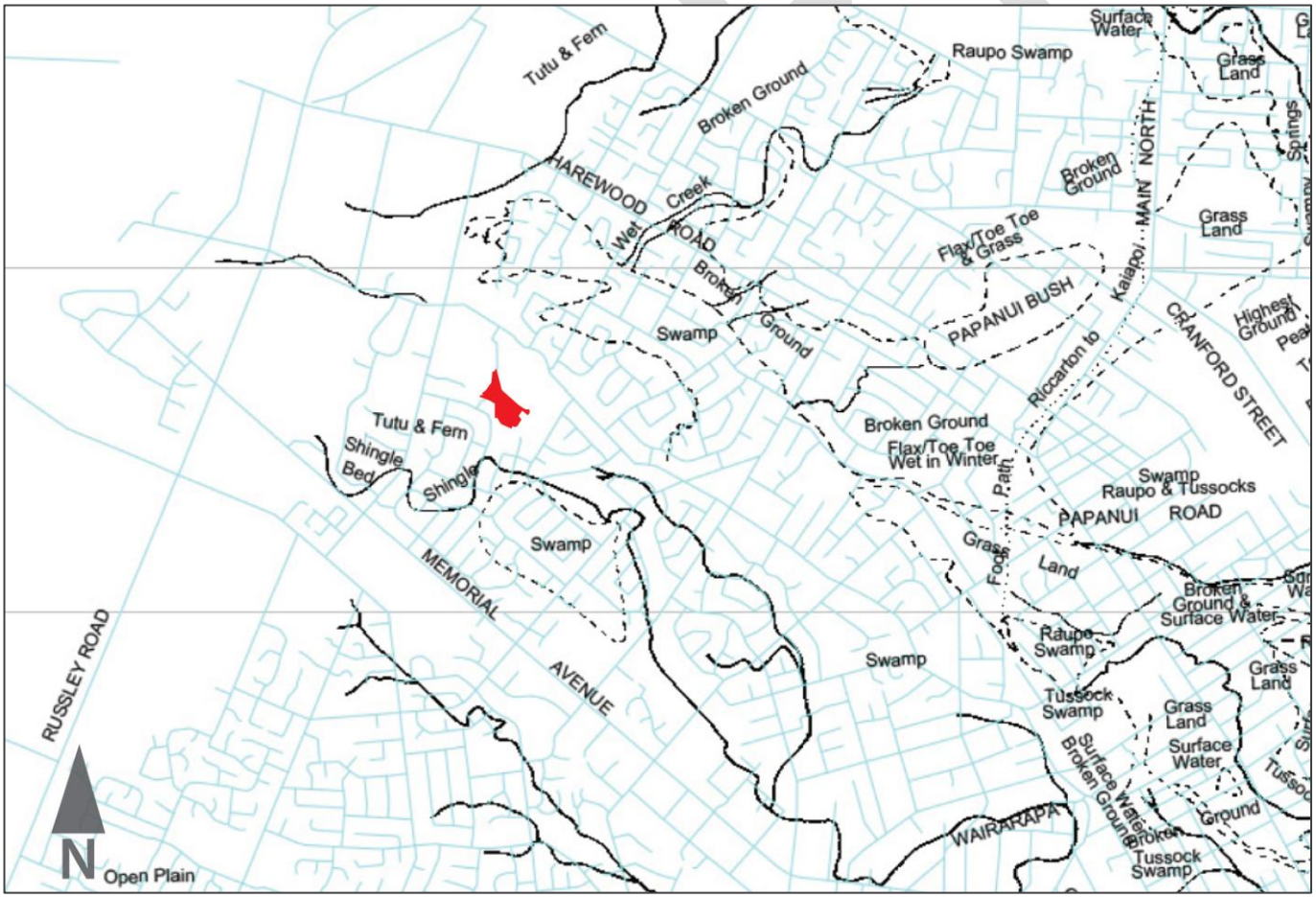

Figure 5: Black Maps from 1856 showing waterways, swamps and vegetation with location of Nepal Reserve shown in red.

The Lucas and Associates maps indicate that Nepal Reserve (see Figure 16) lies on moderately aged, shallow, and drought-prone Waimakariri soils, which would naturally have supported kānuka–kōwhai-dominated woodland. These soils are bordered by areas of drought-prone Selwyn soils, typically associated with tussock-dominated shrubland, as well as deeper, moister young Selwyn soils that transition into deep Kaiapoi soils capable of supporting tōtara and mataī-dominated forest.

However, extensive earthworks and soil modification since the early 1940s have significantly altered site conditions. Observed plant growth suggests that Nepal Reserve is likely capable of supporting a broad range of species, consistent with those identified by Lucas and Associates for the variety of soil types shown in Figure 15. Topsoil depth and quality will play a critical role in plant establishment and may vary considerably over short distances. As a result, species selection from the Lucas and Associates lists should be guided by detailed, fine-scale site investigations.

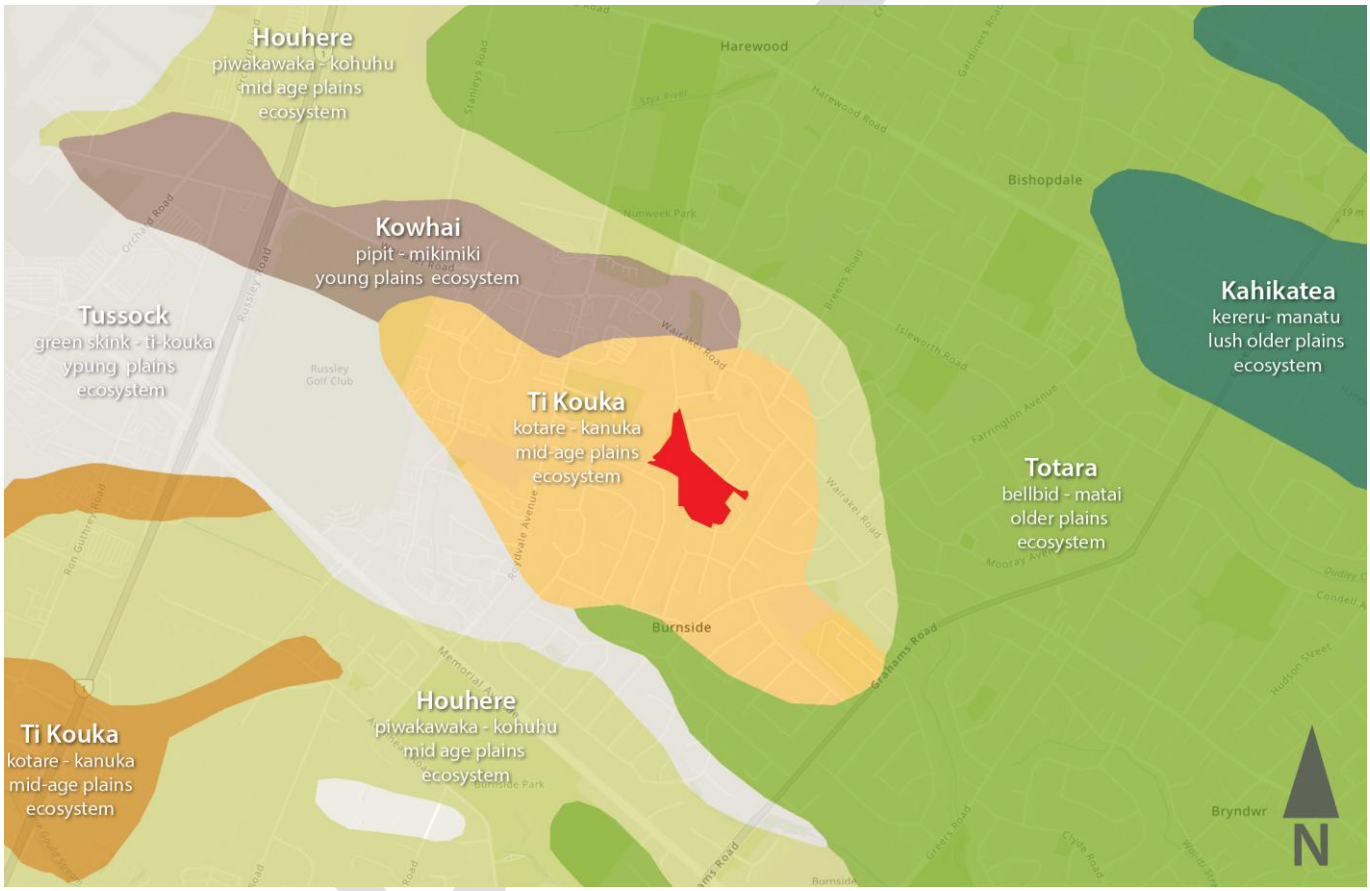

Figure 6: Location of Nepal Reserve (red)) in relation to various ecosystem types based on underlying soils (Source: Lucas & Associates Indigenous Ecosystems of Ōtautahi Christchurch).

Ecological restoration also depends on maintaining healthy genetic diversity within plant species. To achieve this, the project will follow eco-sourcing principles by using seed and plant material collected from naturally occurring/remnant plant communities in local and/or environmentally similar areas. This is important because many New Zealand native species vary genetically across different climates, altitudes, rainfall patterns, and soil conditions. Using locally adapted plant material helps ensure better survival, resilience, and ecological integrity over the long term.

All species used for forest restoration planting at Nepal Reserve shall be eco-sourced from naturally occurring vegetation remnants occurring in the Low Plains Ecological District or nearest appropriate location as approved by Council's parks ecologist and/or Community Parks Rangers.

Restoration zoning

To aid planning the forest, the proposed planted area has been separated into six distinct zones (Figure 17 on following page). These zones are based on how they will support different plant communities, park use, public safety, and how they integrate with neighboring properties (Refer also **Appendix 4**). These zones include:

1) **Mixed podocarp forest (P1 – P4):** In the base of the stormwater storage basins, we will establish dense stands of mixed podocarp forest.

2) **Kānuka woodland (K1 – K5):** On the higher/drier areas of the reserve, including the upper slopes of the stormwater basins we will establish kānuka, tī kōuka and kowhai dominated woodland and shubland. This area will include buffers of low flammability species along pathways and areas where people are encouraged to congregate.

3) **Forest edge (E):** We will generally select lower flammability species for plantings around forest edges, especially where they follow pedestrian pathways. Forest edges will mostly consist of dense shrubs that buffer forest interiors and limit direct people's access to designated pathways

4) **Harakeke enrichment (H):** We will eradicate woody weeds, and other pest plants from these areas and establish enrichment planting in from these sheltered sites, including native climbers and scramblers.

5) **Park borders (B):** We will remove pest plants from the planted borders along the residential interface of Nepal Reserve, and over time replace non-local and cultivar native species (e.g., ornamental hebes) as they begin to fail and replace these with low eco-sourced native shrubs.

6) **Abros Place (A):** We will work with Council's Streets department and owners of light industrial/commercial properties along Abros Place (Figure 16) to plant grass berms with native shrubland/woodland species to create a green corridor to Wairakei Reserve and beyond to the Pūharakekenui-Styx Source to Sea Walkway and Christchurch 360 Trail.

Figure16: *Potential planting areas I grass verges along Abros Place connect restoration plantings at Nepal Reserve with existing and proposed plantings in Wairakei Reserve.*

Tables provided in **Appendix 3** provide indicative species lists and numbers for the six planting zones.

Figure 7: *Planting zone map for native woodland and forest planting at Nepal Reserve (Refer* ***Appendix 3*** *for species lists).*

A note on path edge planting for fire-smart design

Limited information is available regarding fire behaviour in New Zealand's native forests, but they are generally considered less flammable than (e.g.) exotic plantations. In native forests, moisture levels are assumed to be higher due to accumulation of decomposing leaves and logs which hold moisture. Higher moisture levels often lead to fuel being unavailable to fire consumption until drought conditions occur. However, with climate change, Canterbury is expected to experience more frequent and more severe droughts, increasing the risk and impacts of wildfire on restoration sites like Nepal Reserve.

Wildfire ignition susceptibility is often more a result of lower levels of management of the long exotic grass growing along path edges (e.g. Figure 18) rather than fuel loads produced by the restoration plantings themselves. We intend to plant path edges with lower flammability species, and where higher flammability species are used, we will ensure they are used in smaller numbers amongst less flammable species mixes. We will also bolster unplanted areas next to paths where grass is likely to become long and dry in the summer months or ensure that long grass is managed. This will supress the exotic grass, remove an ongoing source of exotic weed, and increase indigenous vegetation and habitat throughout the reserve. Planting these unmanaged margins will also result in lower maintenance requirements for these areas.

Species suited to path-edge planting at Nepal Reserve include those listed in **Appendix 6**: Zone 3 (E) 'Low Flammability Edge' which are based on Lucas Associates Indigenous Ecosystems of Ōtautahi-Christchurch species listed as having a low fire risk rating. Note that only around 1/3 of the species in the Lucas Associates lists had fire risk ratings, and therefore there are likely to be other species from those lists that could be used also but will need assessed on a species-by-species and specific location/setting basis.

Figure 8: *Typical path edge native forest restoration planting dominated by low flammability native tree and shrub species but with exotic grasses that become long and dry over summer, increasing ignition susceptibility. Te Waoku Kahikatea Reserve, Christchurch (Photograph A. Shadbolt 2005).*

Enrichment planting (future)

Although we will be establishing approximately 60 species of indigenous plant at Nepal Reserve, many will still be represented by only a small number of individuals. While some species may have been naturally rare in local native forests, we can establish larger, more viable populations of under-represented species through enrichment planting. We will also establish populations of locally appropriate species that do not yet occur at the site. These will include species that require sheltered microclimates to establish, and/or would be unlikely to establish on their own due to the absence of nearby seed sources. Enrichment species may include:

- ✓ Forest floor species,
- ✓ Understorey species,
- ✓ Sub-canopy species (e.g., Figure 19),
- ✓ Canopy and emergent tall species,
- ✓ Climbers (e.g. Figure 20),
- ✓ Epiphytes.

Enrichment planting will be undertaken in clusters of 3 – 7 individuals, comprising either single species or complementary species combinations, to establish a series of micro-refugia.

Clusters will be spaced at intervals of 4 – 6 metres, replicating natural regeneration patterns and enhancing local microclimates, while also supporting understorey connectivity and allowing for ongoing canopy regeneration.

Within each cluster, plants will be spaced 0.5 – 2 m apart depending on the types of plants, for example:

- ✓ Ground/low ferns & small seedlings: 0.5 – 1.0 m.
- ✓ Small shrubs and juvenile understorey trees: 1.0 – 2.5 m.
- ✓ Climbers: within 1.0 m of a support tree/shrub.

Enrichment planting will eventually be done throughout all zones as the forest and shrublands mature and provide suitable growing conditions.

Figure 19: *Seven-finger (Schefflera digitata) planted as part of enrichment planting at Te Waoku Kahikatea Reserve (Photograph: A. Shadbolt 2025).*

Figure 20: *Early enrichment plantings of native clematis (Clematis paniculata) are now well established at Te Waoku Kahikatea Reserve (Photograph: A. Shadbolt 2025).*

Figure 21: *Styx Living Laboratory Trust field team worker planting enrichment species in the forest understorey at Te Waoku Kahikatea Reserve (Photograph: A. Shadbolt 2025).*

Addition of woody debris

Because natural forests and woodlands have a high proportion of standing deadwood and downed woody debris in their understories, it is desirable to arrange for the importation of logs and stumps. Supply of this type of material can normally be easily arranged with local arboricultural contractors who are working in the area, as dropping it at convenient pre-arranged locations often helps. **Note: Care must be taken not to place logs in stormwater basins where they may float, become mobile, and block basin outlets.**

Figure 22: *Woody debris incorporated into planting areas at Te Waoku Kahikatea Reserve (Photograph: A. Shadbolt 2024).*

Figure 23: *Community working bee at Nepal Reserve hosted by the Friends of Nepal Reserve group and Council's Community Parks Teams in 2026.*

Site preparation

Herbicide application

- ✓ Spray all areas with a broad-spectrum herbicide to achieve total kill of all grass and broadleaved weeds.
- ✓ Contractor to follow all best-practice agrichemical application procedures and council guidelines for working in parks.
- ✓ Where possible, use a *'stale seedbed'* methodology whereby two applications of herbicide are done, consisting of 1) an initial application to achieve total kill of existing weeds, and 2) a second follow-up application (e.g. 6 – 8 weeks later) to kill any new weed-cover that has established resulting from seeds that have germinated following the first herbicide application.

Supply and spread mulch

- ✓ Where funding allows, arrange for the supply, delivery, and spreading of 100 mm compacted/settled depth of arbor mulch across planting areas (but refer note below). Mulch will help suppress further weed growth and help retain soil moisture.
- ✓ Where available budget will not allow for the entire site to be mulched, recommend limiting mulch to a 5 – 10 m wide band around the edges of the planted areas, and particularly along pathways. Mulching these areas will help the site look tidy and cared-for, making the restoration plantings more acceptable to the public.
- ✓ **IMPORTANT:** Ensure that bark mulch is not used within stormwater basins where it can become mobile and block stormwater basin outlets and pipes, and or be transported into downstream natural waterways.

Addition of woody debris

- ✓ Because natural forests have a high proportion of standing deadwood and downed woody debris in their understories, it is desirable to arrange for the importation of logs and stumps. Supply of this type of material can normally be easily arranged with local arboricultural contractors who are working in the area, as dropping it at convenient pre-arranged locations often helps them avoid transportation and disposal costs.
- ✓ Do not use (e.g.) fresh/live willow or poplar logs that may take-root, sprout and need to be controlled/eradicated in future.
- ✓ **IMPORTANT:** Ensure that logs or other woody debris are not placed within stormwater basins where it can become mobile and block stormwater basin outlets. If large woody debris is used within the basins, ensure it is firmly secured in a way that does not interfere with the operation the facility nor penetrate any landfill capping.

Planting

Plant collection and delivery

- ✓ Contractors, staff, and/or volunteers collecting plants from nurseries must contact the nursery ten working days prior to plant pick-up to allow for their planting stock to be sorted and weeded before dispatch.
- ✓ Where contractors, staff, or volunteers are concerned about the size of nursery plants being too small to establish well, they should contact Council's parks ecologist for advice prior to plants leaving the nursery.
- ✓ Ensure that only the number of plants that can be planted on the day are collected unless the contractor, staff, or volunteers have facilities to ensure plants are watered and remain in good health prior to planting.
- ✓ When transporting plants to the planting site, foliage should be covered with (e.g.) hessian or wind break material to reduce wind damage and transpiration/water loss.

Plant setout

- ✓ Contractor, staff and/or volunteers should contact Council's parks ecologist to discuss or arrange meet on site at time of planting to assist with set-out and/or provide plant set-out advice.
- ✓ All plants to be laid out in natural patterns, avoiding straight lines.
- ✓ Totara *(Podocarpus totara)* and matai *(Prumnopitys taxifolia)* shall be planted at (average) 5.0 m centres throughout their respective areas, noting that some may be much closer, and some much further apart.
- ✓ Similarly, kahikatea *(Dacrycarpus dacrydioides)* shall be planted at (average) 3.0 m centres throughout their respective areas, noting that some may be much closer, and some much further apart.
- ✓ Other tree species to be distributed randomly (either singularly or in same-species groups of 3 – 7 plants) throughout planting areas, noting the plant spacings designated for the six zones.
- ✓ Shrubs such as harakeke/NZ flax *(Phormium tenax)*, small-leafed coprosmas *(Coprosma propinqua & C. rubra)*, toetoe *(Austroderia richardii),* koromiko *(Hebe salicifolia)* and manuka *(Leptospermum scoparium)* shall be planted towards the edges of new plantings to achieve a natural forest edge ecosystem.
- ✓ Ensure that harakeke/NZ flax is planted no closer than 3 m from the edge of any path to maintain sightlines and avoid tripping hazards from their long strappy leaves.
- ✓ Climbers and scramblers, including NZ jasmine *(Parsonsia spp.)*, bush lawyer/tataramoa *(Rubus spp.),* and clematis *(Clematis paniculata)* will require mature plants to support them and will therefore need to be planted at the bases of existing trees and large shrubs that can offer them structural support to eventually climb.

Planting

- ✓ Planting must follow industry best-practice for restoration plantings whereby holes are sufficiently wider than the plant container size, straight sided, deep enough and having broken through any sub-surface pans or compacted soils beneath the level of the pot.
- ✓ Where local schools with younger children under the age of 10 are involved with planting, recommend that holes are pre-dug by others prior to the planting event, and that follow-up planting checks are carried out and any issues rectified immediately.

- ✓ Ideally, all plants (with the exception of grasses) should have cardboard plant protectors installed, including bamboo stakes and wool mulch mats to assist their establishment and enable easier location, line-trimming, and/or follow-up herbicide application.
- ✓ Where plant guards are not used, each plant shall have a one-metre length bamboo cane installed to help contractors, staff, and/or volunteers find plants amongst weeds. Suggest that all stakes are installed on the same side (e.g. north side or street side) of each plant to further aid in plant location amongst weeds.
- ✓ Because soil quality and fertility across the site are likely to variable, adding fertilizer tabs as-per manufacturers/suppliers recommendations may assist with planting survival and vigour.

24-month establishment period

Weed control

- ✓ Contractors, staff, and/or volunteers shall ensure that weed growth at the site does not compromise native plant health and vigor, and that the site is maintained in a tidy state that is accepted by the community.
- ✓ Recommend site receives a minimum of four maintenance passes per year during the 24-month establishment period. This will involve locating and hand releasing plants where they have become overrun with weeds, and then - if required - careful application of an approved systemic herbicide to control weeds throughout the site. (Note: hand releasing and herbicide application shall occur as two separate activities to avoid contact and risk to volunteers).

Watering

- ✓ Some parts of Nepal Reserve are likely to be prone to drought. Consideration should be given to how these drier areas can be watered if needed during the summer months.

Pruning

- ✓ Pruning shall not be carried out on any plantings during the 24-month maintenance period.
- ✓ Ongoing pruning shall be limited to proactive removal of branches that threaten to overhang pathways. If these branches can be pruned at an early stage - before they start to become a problem - it will help avoid needing to hedge trim vegetation along pathways which results in an artificially maintained aesthetic and impacts on natural character.

Pest animals

- ✓ Often restoration plantings are impacted by pest animals such as rabbits, hares, possums, and pūkeko. However given the urban nature of Nepal Reserve, which is surrounded on all sides by residential neighbourhoods, we do not expect significant issues with these species, however hedgehogs, rats, mice and potentially mustelids may impact on wildlife populations as habitat develops.

Rubbish removal

- ✓ In some situations, restoration plantings can trap rubbish (plastic bags, paper, plant guards etc.) that is discarded or blows through sites. Although we expect this to be minimal at Nepal Reserve, any rubbish or other debris encountered during routine maintenance shall be collected and disposed of off-site appropriately.

Ongoing management

Ongoing management of the site following the initial 24-month maintenance period shall largely be limited to the following activities.

- ✓ Removal and disposal off-site or re-use of plant guards.
- ✓ Control of grass and herbaceous weeds around the periphery of the forest areas, and particularly along pathways for aesthetic reasons.
- ✓ Control of woody weeds and vines throughout planted areas, e.g., grey willow, sycamore, Chilean mayten, cherry, North Island lacebark, old man's beard, ivy.
- ✓ Periodic removal and disposal off-site of rubbish and debris.
- ✓ Stripping of dead cabbage tree leaves from trees alongside paths to reduce risk of arson or wildfire. Cabbage tree leaves to be disposed of within plantings away from paths and high-use areas.
- ✓ Limbing or form pruning of trees planted within 4 m path buffer to maintain sightlines for CPTED purposes.
- ✓ Infilling of areas where plantings have failed.
- ✓ Introduction of species requiring more sheltered micro-climbers once a suitable forest structure has established (Refer **enrichment planting** section. To be advised by Council's Parks ecologists).
- ✓ Once habitat is well established and supporting native wildlife populations, consideration will be given to community-led predator control. However, it is likely to be some decades before Council could justify providing additional resources and would need to be prioritised against other high value sites.

Indicative implementation plan

We intend to establish and manage the native forest plantings at Nepal Reserve via both the Council's rolling programme of urban forest plantings and as a partnership between Friends of Nepal Reserve group and Councils Community Park Rangers.

Partnership options will need to be confirmed, but could involve variations of:

- ✓ Council's Urban Forest Team leading the large-scale planting,
- ✓ Friends of Nepal Reserve leading enrichment planting and finer-scale planting areas,
- ✓ Councils Urban Forest Team partnering with Friends of Nepal Reserve on the large-scale planting,
- ✓ Council's Community Parks Team partnering with Friends of Nepal Reserve in specific areas, or
- ✓ Combinations of any of the above.

Programme

Table 2 outlines an indicative implementation programme for planting, and Figure 24 shows indicative areas for the main forest plantings led by Council's Urban Forest Team and supported by Friends of Nepal Reserve and Community Park Ranger Team.

Table 2: *Indicative implementation programme - including lead team (bold) for forest restoration at Nepal Reserve where* ***CPT*** *= Council's Community Parks Team;* ***FNR*** *= Friends of Nepal Reserve;* ***BIO*** *= Council's Parks Biodiversity Team;* ***UFT*** *= Council's Urban Forest Team ;* ***CSU*** *= Councils City Streets Unit; and* ***FWH*** *= Fendalton-Waimairi-Harewood Community Board.* ***Note that the timing of this indicative programme will be dependent on funding, resources and prioritisation.***

Action	Timing	Area	# Plants	Lead
Formalise partnership with Friends of Nepal Reserve	June 2026	-	-	**CPT** / FNR
Approve Nepal Reserve Forest Restoration Plan	June 2026	-	-	**BIO** / FNR / CPT
Confirm programming of Council funding	June 2026	-	-	**BIO** / UFT / CPT
Initiate discussions on Abros Place planting	June 2026	-	-	**BIO** / UFT / CSU
Install fine-scale habitat features (ongoing)	June 2026	-	-	**FNR** / CPT
Stage-2 planting (K1, K4, P2, P4, E)	Aug 2026	7000 m2	4800	**UFT** / FNR
Enrichment planting into 2025 planting (P3, K5)	Aug 2026	-	150	**FNR** / CPT
Harakeke enrichment 1 (H)	July 2026	-	200	**FNR** / CPT
Stage-3a planting (K2, K3, P1, E)	May 2027	2244 m2	2745	**UFT** /FNR
Harakeke enrichment 2	May 2027	-	200	**FNR** / CPT
Enrich reserve borders (plants at 3 m centres)	May 2028	3000 m2	350	**CPT** / FNR
Support biodiversity of neighbouring properties	May 2028	-	380	**FNR** / FWH
Install interpretation signage	2028	-	-	**FNR** / CPT /FWH
Planting Abros Place (pending approvals)	May 2029			**UFT** / FNR
Infill planting/enrichment planting	May 2030	-	200	**FNR** / CPT
Infill planting/enrichment planting	May 2031	-	200	**FNR** / CPT
Infill planting/enrichment planting	May 2032	-	200	FNR / CPT

Figure 24: *Proposed staging plan for the Council's main Urban Forest Team led plantings at Nepal Reserve. Note: Plan does not include Community Park Ranger or Friends of Nepal Reserve led plantings, although both will be involved in the main plantings.*

References

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CCC (2023) *Our urban forest plan for Ōtautahi Christchurch.* Christchurch City Council, Christchurch, New Zealand.

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Poulson, B., Hassan, H., Larsen, F., Sykes, A., and Maynard, I. (2023) *Pūharakekenui-Styx Living Laboratory Trust community tree planting scheme.* GEOG309: research for Resilient Environments and Communities. University of Canterbury, Christchurch, New Zealand.

Appendix 1: City wide forest patch network

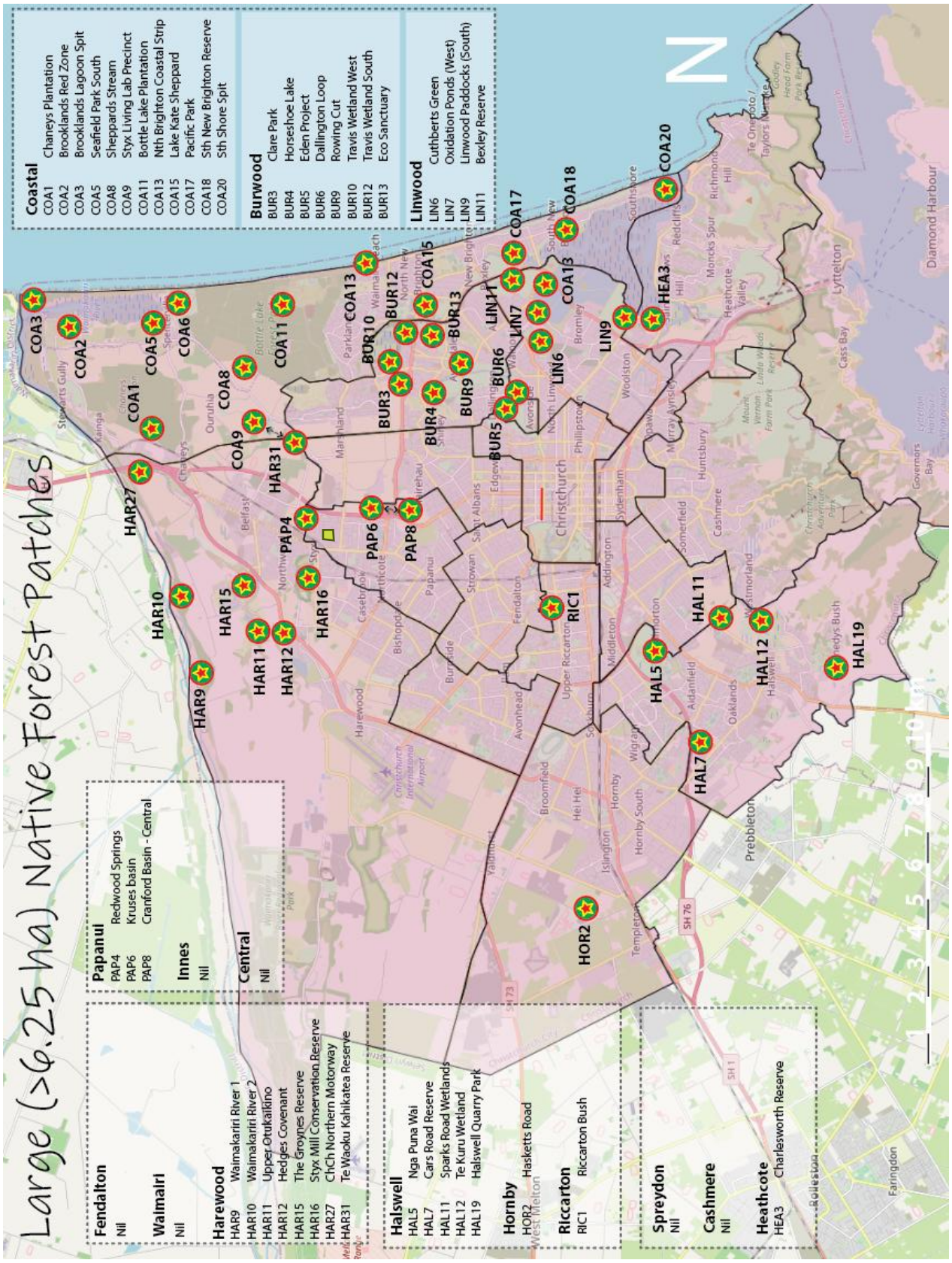
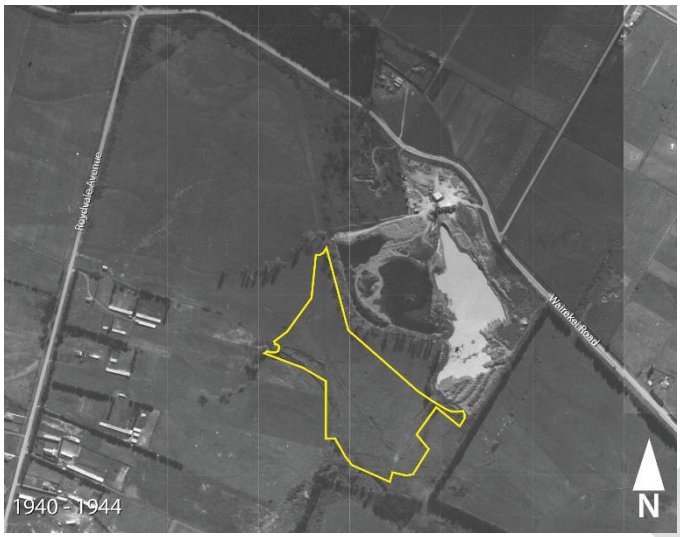


Figure 17: *Potential city-wide native forest patch network showing large (<6.25 ha) forest patches. Murchison Park is shown as small pale green square immediately southwest of PAP4 – Redwood Springs (Source: CCC 2024a & 2024b).*

Appendix 2: Historic aerial photographs




Roydvale Avenue
Wainoni Road
2000 - 2004
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Roydvale Avenue
Wainoni Road
2004 - 2010
N


Roydvale Avenue
Wainoni Road
2010 - 2015
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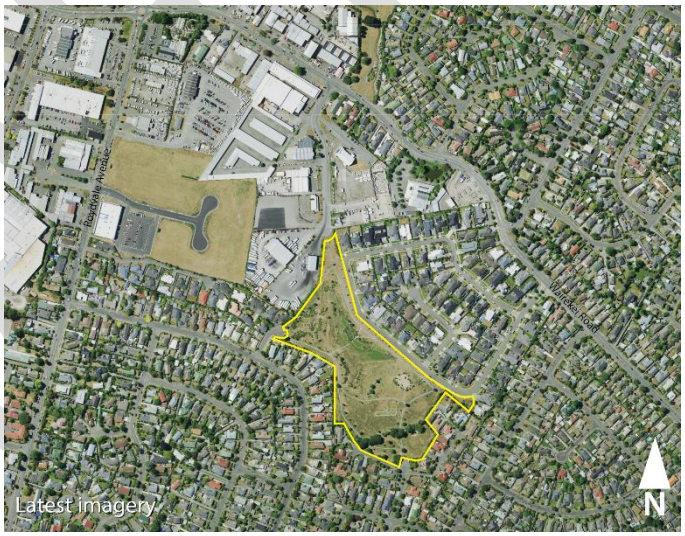
Roydvale Avenue
Wainoni Road
Latest imagery
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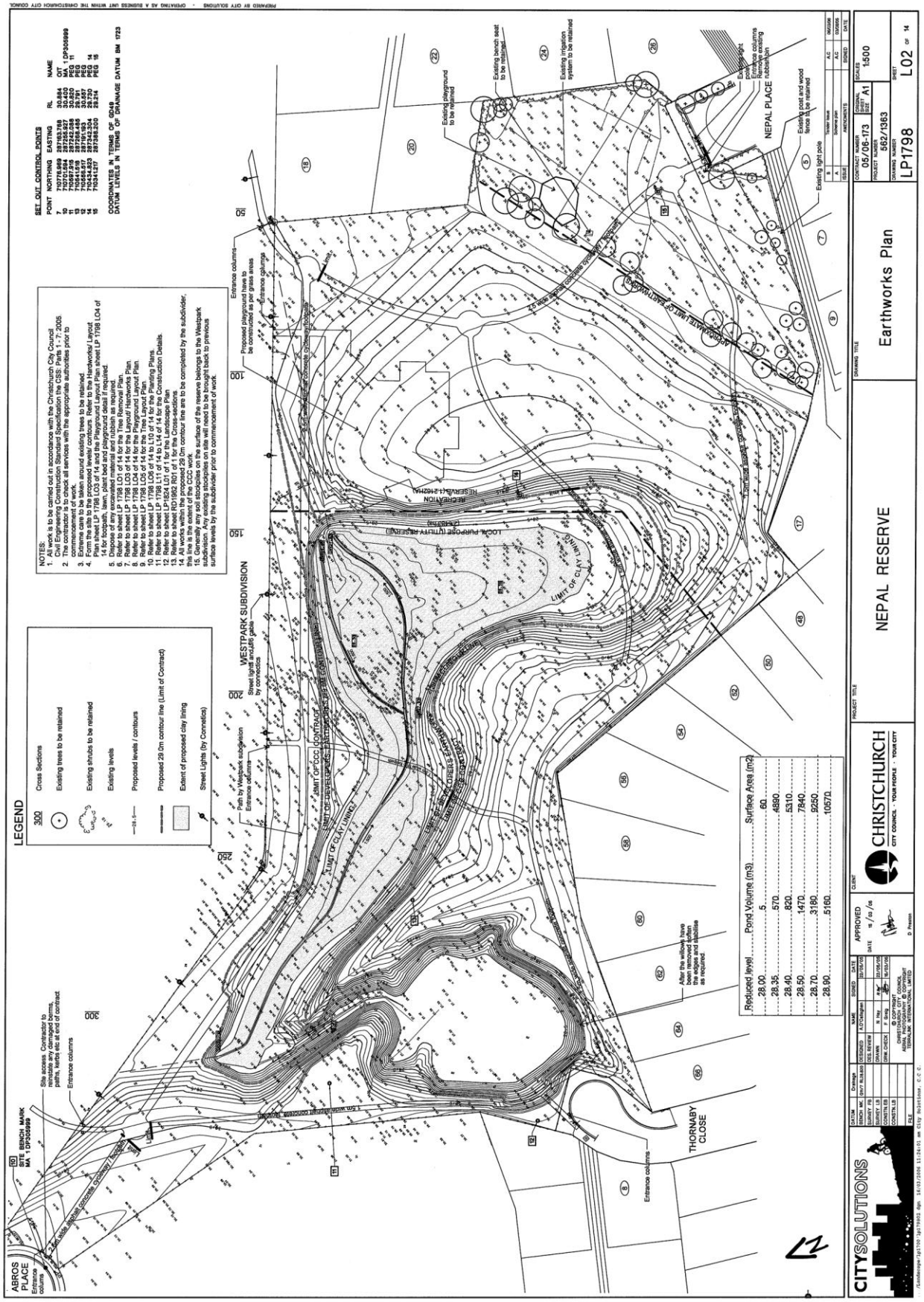
Appendix 3: Nepal Reserve planting plan (2007)

Appendix 4: Nepal Reserve earthworks plan



Christchurch City Council

Appendix 5: 2026 Nepal Reserve BioBlitz

Indigenous species (Low Canterbury Plains Ecological District)

Species	Common name	Comments
Anemanthele lessoniana	wind grass	
Aristotelia serrata	makomako/wineberry	
Astelia fragrans	bush flax	
Austroderia richardii	toetoe	
Carex secta	pukio sedge	
Carmichaelia australis	New Zealand broom	
Coprosma crassifolia	thick-leaved coprosma	
Coprosma propinqua	mikimiki	
Coprosma rhamnoides	mikimiki/twiggy coprosma	
Coprosma robusta	karamu	
Coprosma virescens	mikimiki	
Cordyline australis	ti kouka/Cabbage tree	
Corokia cotoneaster	korokio	
Dacrycarpus dacrydioides	kahikatea	
Dodonaea viscosa	akeake	
Griselinea littoralis	kapuka/broadleaf	
Hoheria angustifolia	houhere/South Island lacebark	
Juncus edgariae	wiwi	
Libertia peregrinans	Mikoikoi/New Zealand iris	
Melicytus ramiflorus	mahoe/whiteywood	
Muehlenbeckia astonii	Shrubby tororaro	
Muehlenbeckia complexa	pohuehue	
Olearia paniculata	golden akeake	
Phormium tenax	harakeke/New Zealand flax	
Pittosporum eugenioides	tarata/lemonwood	
Pittosporum tenuifolium	kohuhu/black matipo	
Plagianthus regius	manatu/lowland ribbonwood	
Poa cita	silver tussock	
Podocarpus totara	totara	
Pseudopanax crassifolius	horoeka/lancewood	
Prumnopitys taxifolia	matai	
Sophora microphylla	South Island kowhai	

Indigenous species (non-local species and cultivars)

Species	Common name	Comments
Chionochloa flavicans	miniature toetoe	
Hoheria sextylosa	North Island lacebark	Invasive species - remove ASAP
Nothofagus fusca	red beech	Retain as specimen tree
Phormium cookianum	mountain flax	Shade out as forest matures - do not replace
Pittosporum crassifolium	karo	Invasive species - remove ASAP
Sophora tetraptera	North Island kowhai	Single tree - seek to phase out over time
Veronica odora	boxwood hebe	Seek to phase out over time
Veronica speciosa	New Zealand hebe	Seek to phase out over time

Exotic tree species (mostly specimen trees)

Species	Common name	Comment
Acer campestre	field maple	
Betula pendula	silver birch	Invasive - Seek to phase out over time
Camelia japonica	camelia	
Carpinus betulus	hornbeam	
Cedrus atlantica	Atlantic cedar	
Cedrus atlantica 'Glauca'	blue Atlantic cedar	
Corylus colurna	witch hazel	
Fagus sylvatica	European beech	
Fraxinus ornus	manor ash	
Ginkgo biloba	ginkgo	
Liriodendron tulipifera	tulip tree	
Maytenus boaria	Chilean mayten	Invasive species - remove ASAP
Platanus orientalis	London plane	
Prunus avium	wild cherry	Invasive species – remove ASAP
Prunus cerasifera 'Nigra'	purple plum	
Quercus cerris	Turkey oak	
Quercus coccinea	scarlet oak	
Quercus robur	English oak	
Sambucus nigra	elderberry	Weed species – remove ASAP
Ulmus parvifolia	Chinese elm	

Appendix 6: Planting species lists

Zone 1 (P1 – P4): Mixed podocarp forest in basin bottoms

Species	Common name	P1	P2	P3	P4
Alectryon excelsus	titoki	20			
Aristotelia serrata	makomako/wineberry	30			
Astelia fragrans	kakaha/bush flax	40			
Austroderia richardii	toetoe	40			
Coprosma crassifolia	thick-leaved coprosma		20		10
Coprosma linariifolia	linear-leafed coprosma	40	20		10
Coprosma propinqua	mikimiki	50	100	20	50
Coprosma robusta	karamu		100		40
Coprosma rotundifolia	round-leafed coprosma	20			
Carpodetus serratus	putaputaweta/marbleleaf	20	20		10
Dacrycarpus dacrydioides	kahikatea	100	150		75
Dicksonia squarrosa	rough tree fern	20			
Elaeocarpus dentatus	hinau	40	25		10
Elaeocarpus hookerianum	pokaka	40	25		10
Fuchsia excorticata	kotukutuku/tree fuchsia	20			
Griselinea littoralis	kapuka/broadleaf	20			
Kunzea serotina	kanuka		50		25
Leptospermum scoparium	manuka	40	50	20	25
Lophomyrtus obcordata	rōhutu	20			
Melicytus ramiflorus	mahoe/whiteywood	20			
Microsorum pustulatus	maratata/hounds' tongue fern	20	100		50
Myrsine australis	red mapau	20			
Myrsine divaricata	weeping maupo	40		10	
Pennantia corymbosa	kaikomako	40			
Pittosporum eugenioides	tarata/lemonwood		20		10
Pittosporum tenuifolium	kohuhu		20		5
Plagianthus regius	manatu/lowland ribbonwood		100		40
Podocarpus totara	totara	40	50		25
Prumnopitys ferruginea	miro	20			
Prumnopitys taxifolia	matai	40	50		25
Sophora microphylla	South Island kowhai	40	100		40
Veronica salicifolia	koromiko	20	100		40
TOTAL		**820**	**1100**	**50**	**500**

Zone 2 (K1 – K5): Kanuka – kowhai dominated woodland

Species	Common name	K1	K2	K3	K4	K5
Carmichaelia australis	New Zealand broom	5	10		20	10
Coprosma crassifolia	thick-leaved mikimiki	5	10	15	50	10
Coprosma propinqua	mikimiki	15	25	60	100	10
Cordyline australis	ti kouka/cabbage tree		10	20	50	
Corokia cotoneaster	korokio	5	10	20	40	
Discaria toumatu	matagouri	20	5	15	55	10
Griselinea littoralis	kapuka/broadleaf		5	25	55	10
Hoheria angustifolia	houhere	5	10	25	40	
Kunzea serotina	kanuka	70	100	170	500	20
Melicytus alpinus	porcupine shrub				10	
Muehlenbeckia complexa	scrambling pohuehue	5	5		10	
Myrsine divaricata	weeping maupo	5	10	25	10	
Pteridium esculentum	rahurahu/bracken fern	5	20	25	30	10
Pittosporum tenuifolium	kohuhu/black matipo		5	5	10	
Podocarpus totara	totara	5	5	10	40	
Pseudopanax crassifolius	horoeka/lancewood	5	10	10	20	
Sophora microphylla	South Island kowhai	10	10	25	200	10
TOTAL		**180**	**250**	**450**	**1240**	**100**

Zone 3 (E): Low flammability edge planting

Species	Common name	No'	Notes
Aristotelia serrata	makomako/wineberry	25	Plant in well-sheltered low lying/damper areas
Carpodetus serratus	putaputaweta/marbleleaf	25	Plant in well-sheltered low lying/damper areas
Coprosma crassifolia	thick-leaved coprosma	200	Plant in large groups throughout where won't become shaded
Coprosma propinqua	mikimiki	1000	Plant in large groups throughout where won't become shaded
Coprosma robusta	karamu	250	Plant in lower lying/damper areas throughout
Griselinea littoralis	kapuka/broadleaf	500	Plant as individuals or in small-to-large groups throughout
Melicytus ramiflorus	mahoe/whiteywood	25	Plant in well-sheltered low lying/damp areas
Myrsine australis	red mapou	50	Plant in well-sheltered low lying/damper areas
Pennantia corymbosa	kaikomako	25	Plant in well-sheltered low lying/damper areas
Phormium tenax	harakeke/New Zealand flax	100	Do not plant harakeke within stormwater basins
Plagianthus regius	manatu/lowland ribbonwood	200	Plant in lower lying/damper areas throughout
Pseudopanax arboreus	whauwhaupaku/five-finger	100	Plant in low lying/damp areas throughout
Pseudopanax crassifolius	horoeka/lancewood	25	Plant as individuals or in small groups throughout
Sophora microphylla	South Island kowhai	250	Plant as individuals or in small groups throughout
Veronica salicifolia	korimiko	250	Plant as individuals or in small groups throughout
TOTAL		**3025**	

Zone 4 (H): Established harakeke beds

Species	Common name	No'	Notes
Alectryon excelsus	titoki	10	Plant in well-sheltered gaps in low lying/damp areas
Aristotelia serrata	makomako/wineberry	10	Plant in well-sheltered gaps in low lying/damp areas
Clematis afoliata	leafless clematis	10	Plant on edges with large plants to scramble over
Clematis marata	clematis	10	Plant on edges with large plants to scramble over
Clematis paniculata	puawananga/bush clematis	20	Plant on edges with large plants to scramble over
Clematis quadribracteolata	clematis	10	Plant on edges with large plants to scramble over
Coprosma propinqua	mikimiki	20	Plant in small groups on edge where they won't get shaded
Griselinea littoralis	kapuka/broadleaf	20	Plant individuals in medium to large gaps
Hoheria angustifolia	houhere/South Island lacebark	40	Plant individuals or groups in large gaps
Kunzea serotina	kanuka	40	Plant in groups in large gaps in drier sites
Leptospermum scoparium	manuka	10	Plant in groups in large gaps in low damp areas
Muehlenbeckia complexa	scrambling pohuehue	20	Plant on edges with large plants to scramble over
Myrsine divaricata	weeping maupo	20	Plant individuals or groups in sheltered gaps
Parsonsia heterophylla	kaiwhiria/New Zealand jasmine	10	Plant on edges with large plants to scramble over
Podocarpus totara	totara	50	Plant individuals or groups in large gaps throughout
Prumnopitys taxifolia	matai	20	Plant individuals in large gaps in well-sheltered sites
Rubus schmidelioides	taramoa/narrow leafed lawyer	20	Plant on edges with large plants to scramble over
Rubus squarrosa	leafless lawyer	20	Plant on edges with large plants to scramble over
Sophora microphylla	South Island kowhai	20	Plant individuals or groups in large gaps
Veronica salicifolia	koromiko	20	Plant individuals or groups in large gaps
TOTAL		**400**	

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