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Kingsland Forest Park Development Plan

July 2020

Tasman District Council
Kingsland Park Forest Development Plan
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Acknowledgements

This policy draft document has been prepared for the Tasman District Council by independent consultant Paul McArthur with oversight by Tasman District Council Senior Policy Advisor, Alan Bywater.

The Steering Group was chaired by then Deputy Mayor King supported by Councillors Tuffnell, Ogilvie and staff, Sharon Flood, Mark Johannsen, Richard Hollier and Jenna Neame.

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A review of the area for Māori cultural sites was completed by Te Atiawa Trust

Disclaimer

This document provides planning policy only and does not constitute geotechnical, slip, or hazard management advice and should not be treated as such.

Contents

1 Introduction

Kingsland Forest, located on the flanks of the Barnicoat Range immediately behind Richmond, is one of several forests owned by Council to raise revenue to reduce the demand on rates. It is also a key destination for recreation[1]. Many of us enjoy that morning, evening, or weekend stroll or mountain bike through the Forest, which is so close and accessible to the Richmond urban area.

The Forest covers an area of approximately 150 hectares, of which two-thirds is planted with Pinus radiata. A significant proportion of these trees are due to be harvested in the next few years. There are also gullies of remnant and regenerating native forest that is progressively being restored through additional planting and pest control undertaken by keen and active volunteers. The Forest contains the Barrington Gum, a Eucalyptus regnans or mountain ash, which is reputed to be one of the tallest of this species in NZ.

Kingsland Forest also forms part of the catchment for Richmond with stormwater from the Forest flowing through the urban area before reaching the sea.

In 2018, when Council reviewed its internal Recreational Use of Council Plantation Forestry Policy, the need to undertake more detailed planning for Kingsland Forest was identified given a number of factors.

- The importance of ensuring that the valued recreational use of this area continues to be possible in the future.
- The importance of protecting and enhancing important areas of conservation value within the Forest that are being actively managed and restored by volunteers.
- The potential stormwater runoff implications for the Richmond urban stormwater infrastructure from the upcoming scheduled forest harvest and future replanting decisions.
- The implications on landscape values from forestry operations given the visual profile of the Forest as a backdrop to Richmond.

This plan considers all these issues to provide a framework to achieve multiple use outcomes into the future while taking into account revenue and cost implications to Council from this commercial forest asset. It will provide policy direction to guide the future management of the Forest and identify actions to guide future budgets and work programmes, to ensure policy objectives are able to be achieved.

[1] Over 45,000 recorded passes of track counters at Easby Park, 28,000 at Jimmy Lee Creek and 15,000 at Hill St South entrances between February and September 2019 (Appendix 8)

2 Key Outcomes Sought

Protection
Land use activities are managed on a catchment-wide basis to protect the natural and heritage values of the site and avoid any downstream negative effects.

Multiple Use
The Forest provides for a range of outcomes for the community minimising conflict through careful design and management.

Maximising Benefits
The overall net benefit of the Forest to the community is maximised by considering all potential benefits, including commercial, natural, cultural and recreational outcomes.

Recreation
Activities in the Forest cater to a range of activities, ages, and abilities, with barriers to participation minimised.

Connections
The surrounding land use is taken into account by providing for biodiversity and recreational connections below the Forest to the urban area and sea and the wider Barnicoat Range and beyond.

Partnerships
Council works together with manawhenua iwi, and the local community to provide for natural, cultural and recreational outcomes for the Kingsland Forest.

3 Project Plan Actions

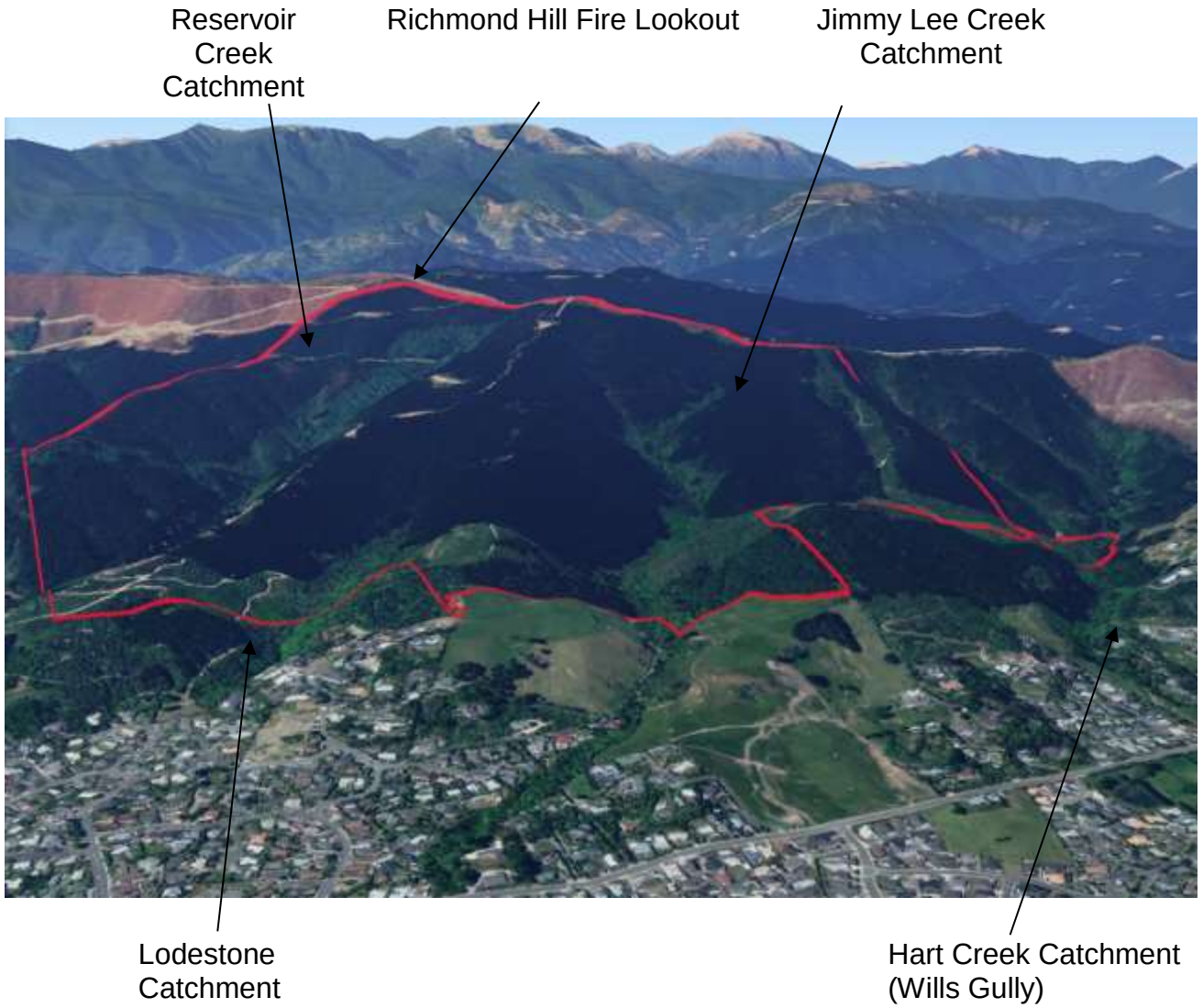
Important background information to assist in the development of this plan has included:

- stormwater modelling of Kingsland Forest under different harvest scenarios
- review of property files to identify any legal constraints on the future use of land comprising the forest
- survey of current recreational users to gain an understanding of the existing recreational use and views of users and residents
- review of the current information on the Forest, surrounding land use (current and future planning) and approaches taken in other similar areas, as well as
- opportunity for input from iwi and key stakeholders.

4 Critical Issues Identified

- Stormwater and run off implications are paramount.
- Native areas need protection and enhancement/expansion.
- Land use selected needs to ‘beat the weeds’ and be practically and financially achievable.
- Land use needs to take into account the risks of more intense storm events resulting from climate change.
- Both walking and cycling needs to be catered for and not adversely affect each other or the environment.
- Need to maximise land use synergies with neighbouring areas.
- The Forest currently provides a revenue stream that helps fund forest management, which would not be available under other options.

5 Site Location



6 Current Land Use

Kingsland Forest is one of seven forests held by Tasman District Council for the purpose of generating revenue to reduce the demand on rates income. Some of the forests are also used for other purposes including recreation (Moturoa/Rabbit Island, Kingsland, and Tunnicliff) and biosolid disposal (Moturoa/Rabbit Island).

Tasman District Council's current objective for its forestry portfolio as a whole is to obtain an economic return on investment while also providing for other environmental benefits.[2]

There is also an existing policy to spread the risk of its forest resource through various means including planting a mix of species, with up to 15% by area of species other than Radiata pine. Kingsland Forest currently comprises approximately 92% of its 103 ha in production forest in Pinus radiata (92%) with smaller areas of Macrocarpa and *Cypress* comprising 8% of this area. Across the whole commercial forestry portfolio, 9.5% of the current area is in species other than Radiata.

The recreational use of plantation forests has been formalised through the Recreational Use of Council Plantation Forests Policy which was finalised in April 2018. This policy provides for the recreational use of Council's commercial forests within the operational needs and safety constraints of running a commercial forest and the overriding requirement to protect all other forest values.

[2] Forest Management Plan, Tasman District Council 2014-2019

7 Neighbouring Land Use

Nelson City Council

Nelson City Council also provides reserves on the Barnicoat Range further to the north in the Marsden Valley area, which connects to wider Council owned reserves in the Brook, Maitai and Roding valleys. This wider area includes the Brook Waimarama Sanctuary. Active biodiversity restoration work is underway through the Nelson Nature and Nelson Halo projects.
There is currently also a recreational connection from Kingsland Forest to Marsden Valley via the Barnicoat Range Walkway and significant opportunities exist to improve the biodiversity connections along the Barnicoat Range between these areas.

Silvan Forest

Silvan Forest is in the process of completing a significant Radiata harvesting operation, and the owners are now looking at a complete change of land use for this highly accessible and visible forest. Since 2013 the Forest has become a volunteer developed, non-profit and free access mountain bike park, which has been extremely popular with the local community as a recreational asset. Due to the steep land, high visibility and proximity to a significant residential population - as well as the ongoing risk from forestry operations, a large-scale arboretum comprising both natives and exotics is currently being planned for this area. The Forest also has some native forest remnants in the gullies.
There are clear future synergies between Silvan Forest and Kingsland Forest, both in terms of potential replanting plans and in the development of links between the two recreation areas.

Other Landowners

Most of the other landowners with land on the Barnicoat Range utilise their landholdings for plantation forestry. Many of these sites have gullies also containing remnant or regenerating native forest, with scope to act as biodiversity corridors or ‘stepping stones’ for native wildlife.

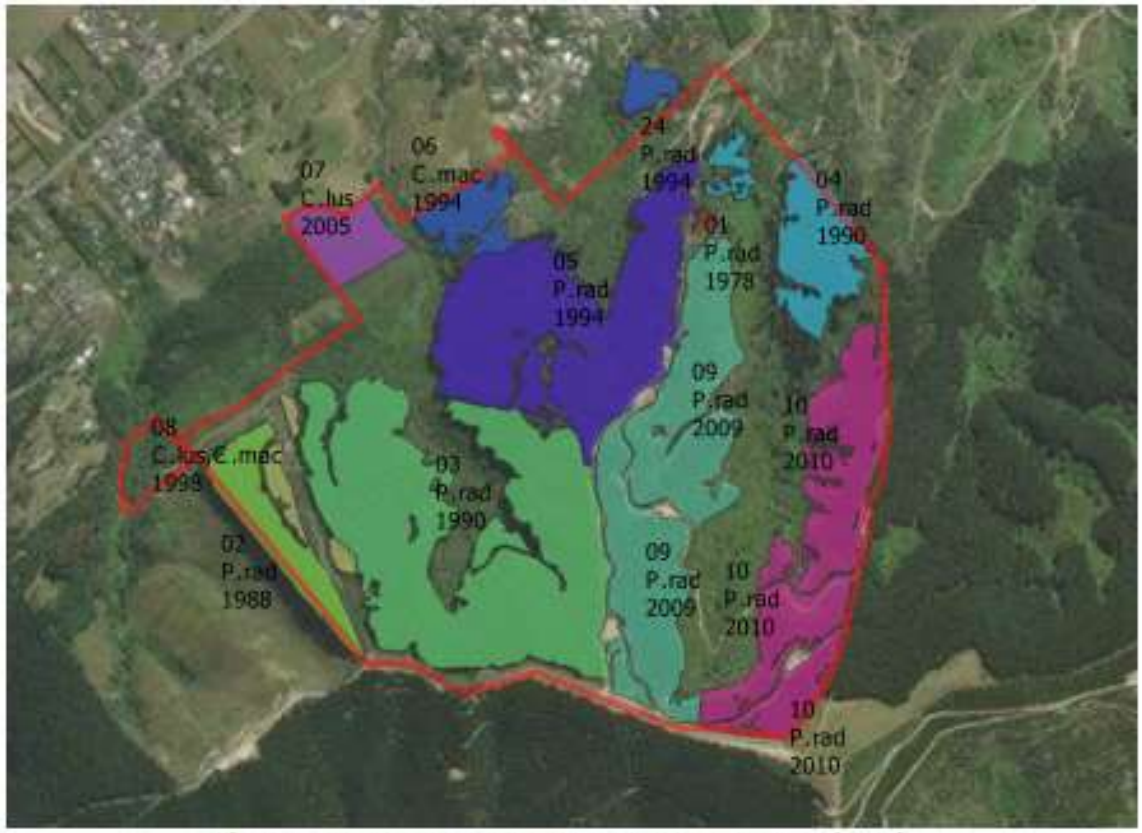
There is scope to work together with all these landowners on areas of common interest in forest management and operations.

8 Land Use

Forest Cover

Objectives

- Maintain forest cover over the site to reduce runoff, erosion and sedimentation.
- Prevent Emissions Trading Scheme liabilities and enhance carbon sequestration from any decisions taken.
- Provide forest that supports a variety of recreational uses of the area.
- Select species that do not create a wilding or weed issue.



Plantation Forest Cover - Compartment, Species, Year Planted

Current State

Kingsland Forest comprises 103ha of plantation forest land which is 4% of the total forest portfolio owned by Council. It is also the poorest performing forest with an Internal Rate of Return (IRR)[3] of 5.8%. (Highest being Moturoa Rabbit Island at 8.1% and an average of 7.1%).

The reasons for this relatively poor performance despite proximity to log markets is the highly visual location and proximity to a residential area nearby and extensive recreational use of the Forest. These factors all add cost and complexity to operations.

[3] IRR is the rate of return at the net present value over the lifecycle of a project or investment

Tree removal has commenced in the Forest and significant areas are scheduled for harvest in the next few years, including compartment three in the head of the Jimmy Lee catchment, compartment four on the eastern side of Reservoir Creek and compartment five behind the Lodestone Gully several years later. Given the relatively poor performance of this production forest and the range of other values the site is managed for, a review of planting options following harvest is required.

Issues

Land Use Capability

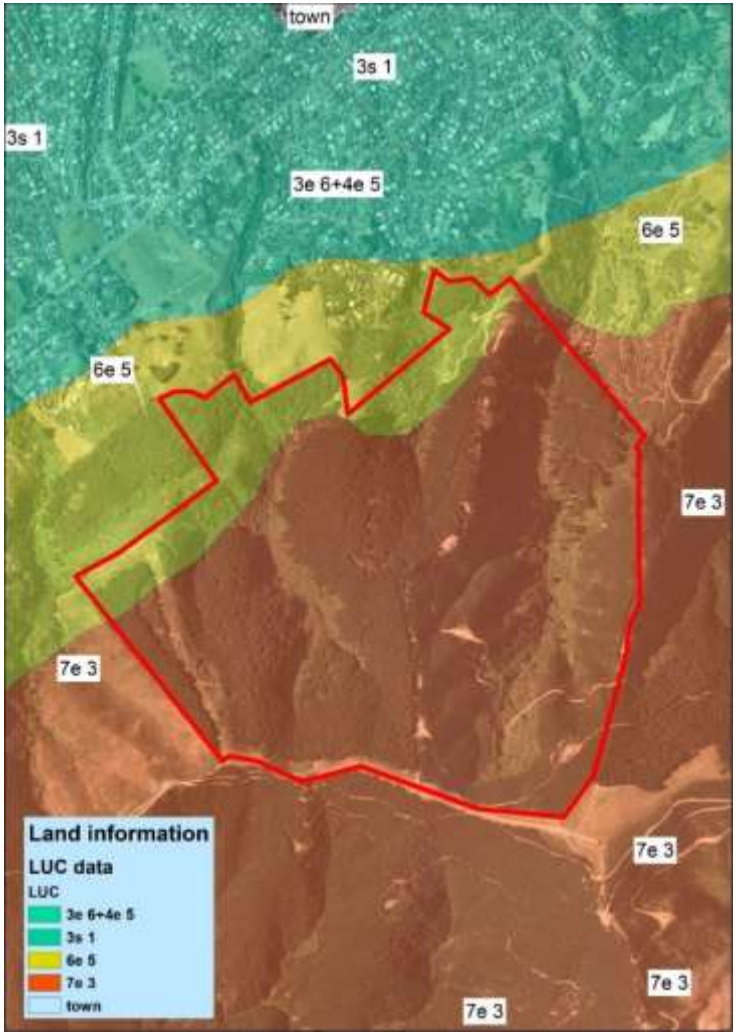
The Land Use Capability Handbook and Inventory, first published in 1969, was prepared to provide national standards for the long-term capability to sustain one or more productive uses. Land is categorised into eight classes relating to the land's capability for use, while taking into account its physical limitations and its versatility for sustained production.

Increasing limitations to use ↓

LUC Class	Arable cropping suitability†	Pastoral grazing suitability	Production forestry suitability	General suitability
1	High	High	High	Multiple use land
2	↓	↓	↓	
3				
4	Low			
5	Unsuitable	Low	Low	Pastoral or forestry land
6				
7				
8		Unsuitable	Unsuitable	Conservation land

Decreasing versatility of use ↓

The majority of the Kingsland Forest is categorised Class 7, with the lower slopes classified Class 6. As shown in the above table, this land is towards the low end of suitability for production forestry. Both classifications have an 'e,' which indicates that erosion is the primary limiting factor.



Commercial Considerations

As described, Kingsland is the poorest performing forest in the Council portfolio with an Internal Rate of Return (IRR) of 5.8%. However, this IRR calculation only considers the direct costs associated with the plantation areas and does not include additional costs associated with managing the non-plantation areas within the Forest. These costs have been funded by the commercial forest account and have included significant weed control costs for the native gullies over the last few years. When these additional costs are considered, the IRR for Kingsland drops to approximately 2%.

Kingsland has generated approximately $2m in net harvesting income every 28 years (at current values), split across several harvesting cycles. At the return levels highlighted above, Kingsland is not operating as a commercial forest. The only benefit of having the current plantation areas, over another permanent forest cover, is that the revenue effectively funds forest reestablishment after harvest and approximately $100-120,000 per year in forestry management costs.[4] In the absence of production forestry continuing on this site, additional funding would be required to resource these activities.

Risk

While the stormwater modelling did not indicate significant additional runoff risk resulting from forest harvesting, risks from managing slash and silt remain every time harvest and other forest management activities occur. Also, Pinus radiata is more susceptible than other species to wind and fire damage. A combination of the steepness of the land, residential areas below, high visibility and climate change generating more extreme and frequent storm and drought conditions are also factors.

Weeds

As experienced following previous harvests and when damage to the areas of native forest has occurred, vigorous weed regrowth can be expected once a high light environment is created. Desiccation spraying following initial germination of weeds, with a second follow up application if possible, can assist before planting. It is critical that some form of canopy cover is established as soon as possible to recreate a low light environment to suppress weed growth after planting. For this reason, evergreens are a preference in weedy locations. Also, some tree species can become weeds in their own right, as shown in the following table:

[4] Forestry Management Costs comprise a base of approximately $50,000 per year plus between $50,000 and $70,000 per year over the last few years for weed control

Wilding Tree Risk Calculator[5]

Species	Risk (0 low, 5 high)
Redwoods, Leyland cypresses, cedars and spruces	0
Radiata (P. radiata) and ponderosa (P. ponderosa) pine, Lawsons cypress (C. lawsoniana)	1
Muricata (P. muricata) and maritime (P. pinaster) pine and larches (Larix spp)	2
Corsican (P. nigra) and mountain/dwarf mountain (P. uncinata/mugo) pine	3
Douglas-fir g (Ps. menziesii), Scots pine (P. sylvestris)	4
Lodgepole/contorta pine (P. contorta)	5

Emissions Trading Scheme (ETS)

To avoid a carbon liability under the ETS, a site must be replanted in a forest and meet reestablishment targets. If native restoration of a site is selected, it must pass the 'four years after harvesting test' which is that each hectare has regenerating forest species that are likely to survive, grow and continue to germinate, so that the hectare will meet the forest land test 10 years after clearing. The forest land test is having forest species established that are likely to have a crown cover of 30% or more at maturity.

Forest species include any species that grow to > 5m on the site to achieve a 30% crown cover. In some areas such as those with enough rainfall and seed source, natural regeneration may be enough providing weeds are controlled - however, in other areas, supplementary planting of primary cover is likely to be required to meet this target.

Other Factors

Carbon sequestration rates vary between species with exotic hardwoods and softwoods sequestering carbon faster than regenerating native forest in its early years, however after a several hundred-year process to fully establish, mature native forest stores more carbon than exotic forests. See Appendix 9 for more details.

Pinus radiata is generally harvested on a 28-year cycle which is significantly shorter than some slower-growing alternative species. It does, however, have a significantly higher Internal Rate of Return (IRR) than alternative species, hence the prevalence of this species in the NZ forestry environment.

[5] Calculating Wilding Spread Risk from New Plantings, TS Paul, Scion 2015

Given the high levels of public use of the Forest and the associated built infrastructure, including tracks and signs etc. there is potential for significant disruption and damage during these infrequent periods of harvest.

Some of the compartments on the lower slopes of the Forest, when ready for harvest, may present challenges for access and safety given their proximity to nearby residential areas. Access and safety are important considerations for replanting decisions, particularly for compartments on the lower slopes.

Key Options Consideration

Council considered four main options for the reestablishment of forest cover following the progressive harvest of the existing tree crop. These were:

1. **Status Quo - Pinus radiata**

   Replanting the majority of compartments with Pinus radiata and establishing permanent exotic woodland in isolated compartments on the lower slopes with difficult access or safety concerns.

2. **Permanent exotic forest**

   Replanting compartments with permanent evergreen species such as Redwood (Sequoia sempervirens) and other species matched to the site.

3. **Combination permanent native forest/exotic woodland**

   Re-establishing native forest on lower compartments and extending native forest in gullies to the ridge using a combination of active replanting of natives and natural regeneration (while controlling weeds) and replanting remaining mid and upper compartments with permanent evergreen exotic woodland.

4. **Native forest**

   Re-establishing native forest in all compartments using a combination of active replanting of natives and natural regeneration (while controlling weeds).

Attachment 1 contains an assessment of these options.

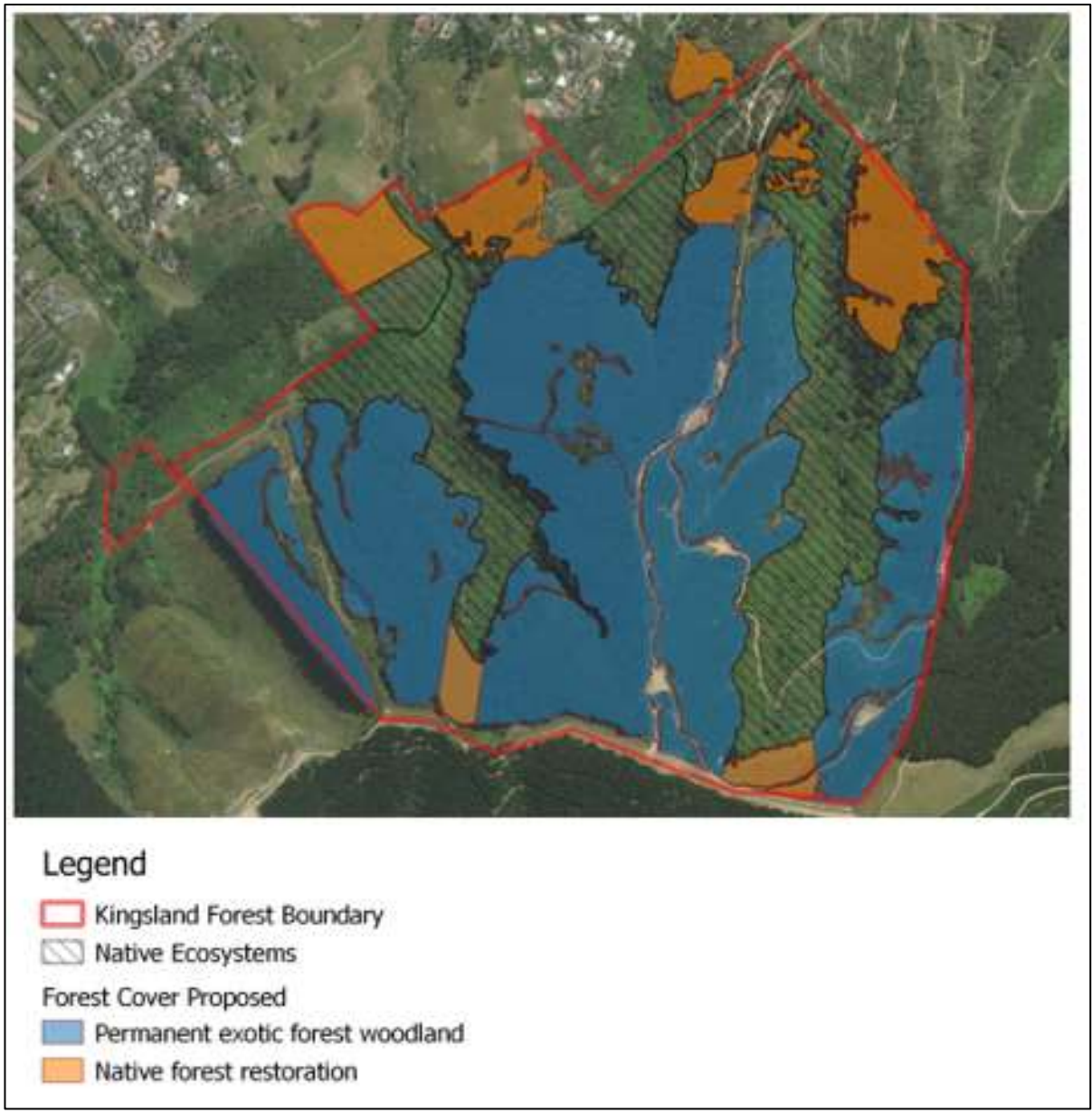
Note: under options 2, 3 and 4 existing Pinus radiata compartments will be harvested and replanted in non-commercial trees (exotic species or natives). As this progressively takes place the funding for replanting costs and ongoing maintenance will no longer be funded by future forestry revenue. Rather these costs will be funded by a combination of Reserve Financial Contributions and rates. We estimate annual maintenance costs to be in the order of $170,000 per annum.

Conclusion

Given the range of outcomes that the forest is managed for, an ongoing cycle of harvest through clear-felling every 25-30 years is disruptive on many of these values. It also presents a risk to the Richmond community, and the increased frequency of more severe storm events resulting from climate change. It is considered that the multiple non-financial benefits of a permanent forest immediately behind Richmond to the community outweigh the financial contribution that this production forest makes to the Council's commercial forestry portfolio.

While options 2, 3 and 4 achieve a permanent forest cover, option 3 is considered most practical, cost-effective and provides the most benefits for the effort and costs involved.

Careful consideration is required about the species to be planted in different areas of the Forest in both the areas for native restoration and the areas for permanent exotic woodland. A number of submissions to the Draft Kingsland Forest Development Plan suggested specific species to be planted in the Forest and some suggested methods to achieve native regeneration in a cost effective manner. Suitable qualified expertise will be employed to



develop a detailed planting plan. The planting plan will appraise the environmental conditions in the different parts of the Forest and will consider the suggestions made in submissions to determine which species to plant.

Actions

- Develop a planting plan that provides for:
  - reestablishment of native forest on lower compartments
  - the extension of native forest in gullies to the ridge, and
  - replanting the remaining mid and upper compartments with permanent evergreen exotic woodland species best suited to the site.

Catchment Management

Three primary catchments within Kingsland Forest flow into the residential area of Richmond. These are Jimmy Lee, Lodestone and Reservoir Creeks. A small area of the forest is also within the Hart Creek catchment.

In its 2018 Activity Management Plan for stormwater, the Council signalled an increased focus on integrated catchment management planning which takes into account the wider effects on the environment, climate change effects as well as growth and network capacity. It seeks to manage the environmental effects of stormwater discharges by addressing these as close to the source as possible and to build capacity for increased frequency and severity of rainfall events.

Council has developed a catchment management plan for Richmond, which identifies the importance of careful forest harvesting schedules, practices and management within Kingsland Forest as an important means of managing downstream stormwater effects.

Objectives

- Harvesting activities and other land management activities do not create any significant increase in flows or sediment load that will adversely affect the Richmond streams, urban stormwater and Waimea Inlet.
- Water quality and habitats are progressively improved.

Current State

Approximately two-thirds of the land within Kingsland Forest is in plantation forest and one third contains remnant and regenerating native forest. Several stormwater detention areas exist downstream[6], which assist in managing downstream flows.

Issues

In response to concern regarding the upcoming harvest of significant parts of the Forest, and the possibility of alternative land uses for parts of the Forest being considered for the future, Council commissioned a modelling assessment to determine the possible effects of different harvesting scenarios in the forest on the catchment below.[7]

Options

A range of harvesting options was considered in the model, ranging from the baseline of 0% harvest as at present, to 100% harvest all at one time as well as in years 2020, 2023, 2035 and 2038 following the current forest harvest and replanting schedule. In the years between harvesting years, it was assumed 'business as usual' replanting of exotic forest with the commensurate amount of regrowth for that period. No alternative planting strategies were considered, although this further analysis was possible if required.

The modelling found that urban areas of the catchment were observed to be contributing significant runoff to flooding in Richmond without the influence of the Kingsland Forest and as such, land-use change in the Forest was unlikely to impact flood conditions in urban areas of Richmond significantly. The mobilisation of sediment was, however, determined to be a much more significant issue that requires effective management. The outcome of modelling also concluded that short duration storm events proved more

[6] Reservoir Creek (Reservoir and Templemore Ponds). Jimmy Lee Creek (Bill Wilkes Reserve, Washbourn Gardens), Lodestone Gully
[7] Tonkin and Taylor 2019: Kingsland Forest Stormwater Management, Assessment of Flood effects from Land Uses

sensitive to any land-use change in the Forest than long-duration storm events.

Of the four catchments draining from Kingsland Forest, Reservoir Creek was considered the most susceptible catchment to increases in flood hazard to urban areas downstream. This is due to the large size of the catchment, and the absence of substantial stormwater storage downstream. It was recommended that further modelling of alternative planting and harvesting regimes in the Reservoir Creek catchment could be investigated.

A high-level finding from the study was that "the introduction of stormwater quantity management measures (e.g. attenuation devices) in the upper catchment is unlikely to relieve flooding in the urban environment significantly, but that conversely, the poor or mismanagement of stormwater in the Kingsland Forest can exacerbate downstream flooding issues." In particular, the way the forest operations are managed, including the amount of bare ground created and routing of flows via forestry roads, may affect the range of flood flows resulting from harvesting.

While the stormwater modelling did not indicate significant additional runoff risk resulting from forest harvesting, risks from managing slash and silt remain every time harvest and other forest management activities occur, given the limitations of stormwater intakes below. Also, *Pinus radiata* is more susceptible than other species to wind and fire damage. A combination of the steepness of the land, residential areas below, high visibility and climate change generating more extreme and frequent storm and drought conditions are also factors in the risk profile for this site.

Actions

Forestry Practices

- Ensure best practice harvest techniques to manage runoff and mobilisation of sediment, including limiting the construction of new roads and consider debris barriers and further detention areas if required. These actions should be developed and recorded in the harvest plan following consultation with Council stormwater and parks staff.
- Ensure active revegetation of harvested slopes occurs as soon as practicable after harvest using species with good erosion controlling properties.

Other Activities

- Replant additional streamside areas where further shade is required.
- Identify any further fish passage obstacles downstream and pursue resolving these.

Landscape Protection and Enhancement

Objectives

- Maintain green forested vista to Richmond Hill from Richmond, south Nelson and the Waimea Plains.
- Look for opportunities for a common theme along the Barnicoat Range.
- Provide opportunities within the Forest for views across the Waimea Plains and Tasman Bay.

Current State

The Kingsland Forest is located on the Barnicoat Range, which forms the primary backdrop to the Richmond and South Nelson area. The whole range is relatively steep with a cover dominated by plantation forestry with areas of scrub, grassland and pockets of remnant native vegetation.

These mixed vegetation types contribute to a 'green' backdrop to the Nelson Richmond area. The lower slopes of Kingsland Forest also have network utility assets, including power transmission lines and telecommunication repeaters and water reservoirs. It is expected that some further expansion and infilling of the residential area on the lower slopes will also occur over time.

Issues

The Barnicoat Range comprises several different landowners, resulting in the mix of land uses that we see today. Plantation forestry is likely to remain the dominant land use along the range although some landowners are currently considering alternative species partly to reduce the raw impact on the landscape that occurs on the harvest of *Pinus radiata* at 25-30-year intervals

Further potential threats to landscape values include scarring from earthworks for tracks for forestry or other land uses, development of further buildings, or utility structures in prominent locations.

Options

Providing some form of forest reestablishment regime is selected, there are several options that will ensure that the green backdrop to Richmond is maintained. From a pure landscape perspective, a forest that does not require clear-felling as part of harvesting is preferable, however this also means a loss of revenue. There is value in considering land uses adjacent both in terms of seeking synergies in planting design and practical operational matters such as access and forest management activities.

As there is already a strong presence of network utility assets, on the lower slopes of the Forest, any further development should preferably be located within the existing areas of modification rather than in new locations.

Users of the Forest also value viewpoints and view shafts being maintained to be able to appreciate the spectacular views across the Waimea basin and Tasman Bay. Not every user is able to reach the summit of Richmond Hill itself, therefore maintaining several other key view shafts from the Forest in key locations is desirable.

Actions

- Ensure forest is re-established on the site to ensure a green backdrop to Richmond is maintained.
- Where there is alignment in aspirations for landscape development with neighbouring properties, consider a common approach to achieve a wider positive landscape effect.
- Seek to limit new network utility assets to existing areas.
- Create and maintain a selection of viewpoints within the walking and biking track network.

Cultural, Historical and Archaeological Values

Objectives

- Manawhenua iwi are suitably acknowledged for their customary use of these catchments and waterways being ara (trails) inland to areas of harvest and opportunities to work in partnership with the Council on the development of the Forest are available.
- Rongoā/medicinal species and species used for other Māori customary purposes (such as for rāranga/weaving) form part of the landscaping of parks and reserves and are available for sustainable harvest.
- Historical, cultural and archaeological sites are protected and interpreted where appropriate.

Current State

Council is building its partnership relationship with manawhenua iwi in Te Tau Ihu through its planning and day to day operational activities. The objective is to ensure te ao Māori (the Māori world view) is represented in the way Council undertakes its statutory and wider role for the community. While the area of land comprising the Forest was not considered to have been sites of occupation, Māori would have travelled through this area inland to areas of harvest.[8]

Actions

- Ensure the manawhenua iwi association with the land and partnership with Council is reflected on any new signboards for the reserve.
- Rongoā/medicinal species and species used for rāranga/weaving form part of the planting plans for native restoration areas and are available for sustainable harvest for use.
- As a registered historic site, Reservoir Creek dam is protected and interpreted.

[8] Māori cultural site review, Te Atiawa Trust, 2019.

Biodiversity Restoration

Objectives

- Maintain and enhance existing conservation values and actively manage identified threats.
- Ensure weed and pest management activities are adequately resourced to support restoration objectives.

Current State

Kingsland Forest contains three gullies containing remnant and regenerating native forest. These are within the Jimmy Lee (14.8ha), Lodestone (4ha) and Reservoir Creek (26.5ha) catchments.

These forest remnants contain a range of native vegetation communities such as gully forest rich in titoki, mahoe, pigeonwood and tawa, which is considered a rare community in Bryant Ecological District.[9] Regenerating pole matai also occur in the upper catchments.

Scattered large podocarps within the reservoir creek catchment, including kahikatea and totara, are notable trees within the Bryant ED. The Native Habitats Tasman programme considers the site is the best remaining example of gully forest on the northern faces of the Barnicoat Range.

[9] Native Habitats Tasman Ecological Assessment Report, Michael North 2012

The main gully bottom of mixed broadleaved forest associations is in good condition primarily as a result of extensive efforts by volunteers undertaking weed control, pest control and supplementary planting however extensive areas of climbing weeds exist around the margins of the Forest where light levels are higher.
In recent years anecdotal evidence also suggests an increase in birdlife including tui, korimako (bellbird), riroriro (grey warbler), piwakawaka (fantail), pihipihi (waxeye) and pīpīwharauroa (shining cuckoo) over the summer months. Ruru (morepork), kotare (kingfisher), kereru (NZ pigeon), pipipi (brown creeper) and occasional karearea (NZ falcon) are also present. As with other areas in the Nelson Tasman area, weka has also returned in large numbers to the Forest.

Issues

While these forest remnants have been retained through the care and ongoing efforts by past and present landowners, they are still under significant threat from weeds, pests and adjacent forestry activities.

Old man's beard and banana passionfruit are well established within all of the catchments, with the Reservoir Creek bush margins in particular also heavily infested with climbing alstromeria (Bomarea multiflora). Weed infestations are generally low or scattered within the lower light valley floors however at the margins they are extensive in places. Other weeds within the Forest include barberry, gorse, hawthorn, Himalayan honeysuckle, woolly nightshade and climbing spindleberry. Mature macrocarpa and radiata pine are also scattered along the margins in the lower section of the site.

Extensive predator and possum trapping by dedicated volunteers occur within these areas, which keeps numbers at acceptable levels. Pigs and goats are occasionally seen but given the large amount of human activity in the Forest, these only cause localised problems from time to time.

Forest operations immediately adjacent to these native remnants have in the past resulted in damage, particularly at harvest where trees have damaged the bush margins - creating conditions that favour old man's beard and banana passionfruit establishment. Earthworks and runoff from logging roads and skid sites have also caused significant damage. Improved harvest techniques are now able to avoid damage to adjacent areas, although an exposed forest edge and sedimentation risk remains following harvest and requires active management.

Options

Council has a role in encouraging the protection and enhancement of areas of significant natural value within the District[10]. For areas of land directly owned and managed by Council, this is particularly important. Many of the threats to the protection of the Forest relate to edge effects either through forestry activities or by weed invasion around high light areas of the margins. Withdrawing production forestry from these edges and replacing it with suitable fast-growing native or exotic species to provide primary canopy cover as fast as possible is likely to be the best option both to suppress potentially vigorous weed regrowth and provide a nursery cover for other species.

Given the proximity of the Forest to other Native Habitats Tasman sites[11] and wider forested habitats (including the Brook Sanctuary and Nelson Halo project), there is an advantage in connecting these existing habitats to the ridge as well as to the residential areas of Richmond to provide a corridor for wildlife movement.

Actions

- Harvest practices are undertaken using techniques that minimise damage to areas of native forest in the gullies and adjacent flanks.
- Biodiversity corridors are developed to link existing native gullies from the top of the Barnicoat Range to the backyards of urban Richmond.
- Continue to develop a band of native vegetation on lower slopes by not replanting exotics in lower compartments.
- In conjunction with recreational track development objectives, provide access tracks around the edge of native forest areas to provide for good access for weed (and pest) control activities.
- Maintain an active weed and pest control programme to prevent damage to forest values and forest reestablishment.
- Work with volunteer groups to better define biodiversity objectives for the important work that they do and establish robust monitoring to measure results and advocate for the work being undertaken.
- Work with adjoining landowners to encourage control of invasive weeds such as woolly nightshade.

[10] Resource Management Act 1991, Sections 5,6 and 7
[11] Refer Appendix 6

Fire Prevention, Control and Safety

Objectives

- Recreational users are not placed in an unsafe situation when within the Forest.
- Council actively manages its landowner fire and safety management obligations.

Current State

As with other recreation areas in the Nelson Tasman region, Kingsland Forest presents a risk for users during periods of dry weather. This risk is due to a large area of available flammable vegetation in the same location where walking and cycling are occurring with potential ignition sources below on the fringe of the Richmond residential area. The existing reservoir in the Forest has too much silt in it to provide a useable source of firefighting water.

Issues

Some of this risk is unable to be easily resolved due to the location of the Forest immediately behind and uphill from Richmond. However, there are several land management practices that will assist in managing these risks.

Options

Fire and Emergency NZ (FENZ) is the primary organisation responsible for managing fire risk throughout the District. For Kingsland Forest, a Recreational Area Fire Management Plan has been developed by FENZ that will guide both landowner and user actions to reduce the risk of fire, provide safe areas and clear actions to take in the event of a fire. Providing water storage in the Forest for firefighting purposes was suggested by a few submitters. However on balance Council decided there were sufficient water sources in the wider area for this purpose. The Council staff will continue to work with FENZ to develop risk and mitigation approaches for reserves and

significant recreation areas (one of which is Kingsland Forest) including site specific criteria for closure as a result of fire risk.

As recommended in the FENZ Recreational Area Fire Management Plan.

- Placement of signs at entry points to the Forest with steps to take in case of a fire and the installation of markers at designated safe areas.
- Consider using broadleaf natives and species with low flammability alongside tracks.
- Regular maintenance of designated safe areas to remove vegetation to make these sites suitable as an evacuation point.
- Work with FENZ on closing public access to the Forest during periods of high fire risk.

Utilities Infrastructure

Objectives

- To ensure land-use decisions within Kingsland Forest do not adversely affect critical utilities infrastructure.

Current State

Safe corridors are currently in place around all network utilities infrastructure. In some areas, inappropriate species close to the power line corridor have been replaced by lower growing natives to achieve this.

Issues

The presence of network utilities infrastructure places limitations on the range of uses possible in this part of the Forest - however, it is important that this infrastructure is protected as a priority.

Options

The most effective way of managing risk is to create safe setbacks at the time of planting or development within the Forest. In addition, following relevant codes of practice and considering the ongoing operation and maintenance (including access) requirements of the National Grid is important in any future development plan. Transpower is available to assist this planning with setback mapping and on the ground guidance.

Actions

- Follow relevant codes of practice and consult with Transpower in the development of planting plans, earthworks and construction in proximity to the National Grid assets and associated access.

9 Recreational Use

Overall Objectives

- Provide well signposted and easy to use entrances to the Forest and ensure information about recreational opportunities in the Forest is readily available.
- Actively provide for both walking and biking and a range of different grade tracks for a variety of abilities.
- Use activity zones, shared use, designated trails and a range of other methods to reduce the potential for conflict between walkers and bikes.
- Ensure hubs and intersections are clearly signposted.
- Provide for wider connections to other public recreation areas.
- Ensure that new track building activity only occurs where current and projected use levels warrant it and that it is within the carrying capacity of the catchment in order to reduce the risk of erosion, land stability, or sedimentation issues.

Existing Policy Provisions

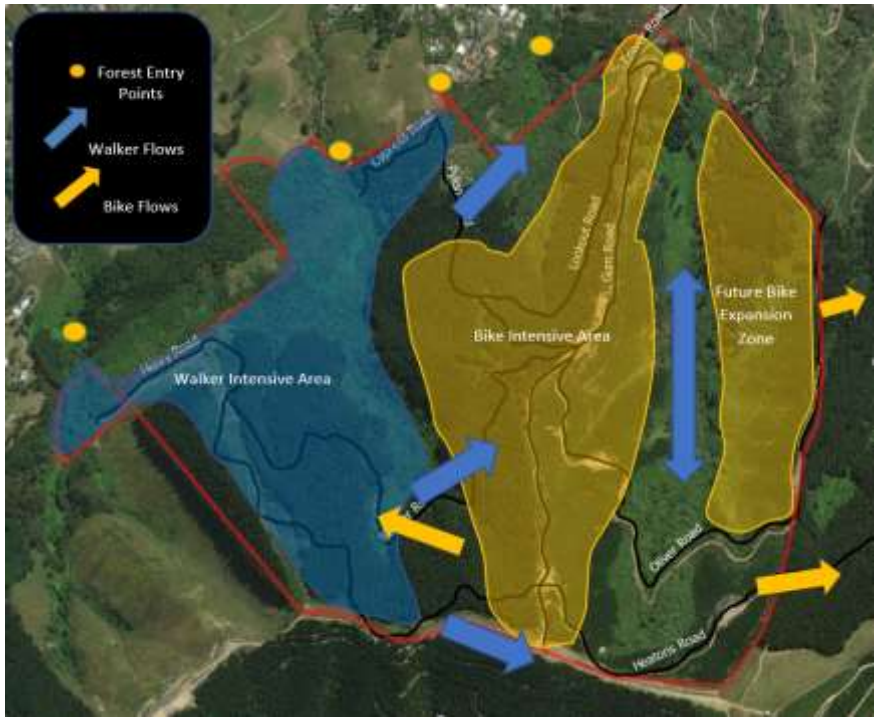
The Forest access policy[12] provides for free access for walkers, runners and cyclists to the forests over formed and signposted tracks or roads with a passive and informal outdoor recreation emphasis. It also provides for use of pedal-assisted ebikes with a maximum power not exceeding 300W. Organised events are provided for within Council forests, subject to an application and approval process. The Policy specifically reinforces that the building of new tracks, alteration of existing tracks or other recreational infrastructure by any other party is not permitted in the forests without the prior approval of the designated Council officer.

Overall Recommended Actions

- Seek opportunities to increase the number and quality of entrance points into the Forest.
- Review track naming, signage and wayfinding hierarchy to ensure necessary information is available at each intersection and align between GIS records.
- Take into account activity zones when planning for new track development.

[12] Recreational Use of Council Plantation Forests, April 2018

- Seek geotechnical advice before construction of new tracks that require earthworks in sensitive areas.
- Follow best practice guidelines when constructing, modifying and maintaining tracks.[13]
- Assess intersections between downhill mountain bike tracks and walking tracks to provide as much safety as possible for users.
- Retain forest roads as shared-use tracks.
- Improve base car parking and toilet for Kingsland Forest users[14].



[13] International Mountain Bicycling Association (IMBA) Guide to Building Sweet Single Track, New Zealand Standard HB 8630:2004 Tracks and Outdoor Visitor Structures

[14] As of June 2020 Council has an active project to provide a public toilet at Easby Park. Council is also planning the expansion of car parking at Easby Park.

Mountain biking

Objectives for Mountain biking

- Provide a range of consistently graded and well-signposted trails for a range of users with a focus on the north-eastern side of the Forest.
- Ensure the number and location of tracks provided over time does not adversely affect other forest values.
- Ensure sufficient resourcing is in place to maintain existing trails before new trail development is considered.

Current State

While there are currently a number of mountain bike tracks in the Forest, there is a need to more cohesively integrate these into the wider network and provide some key linkages.

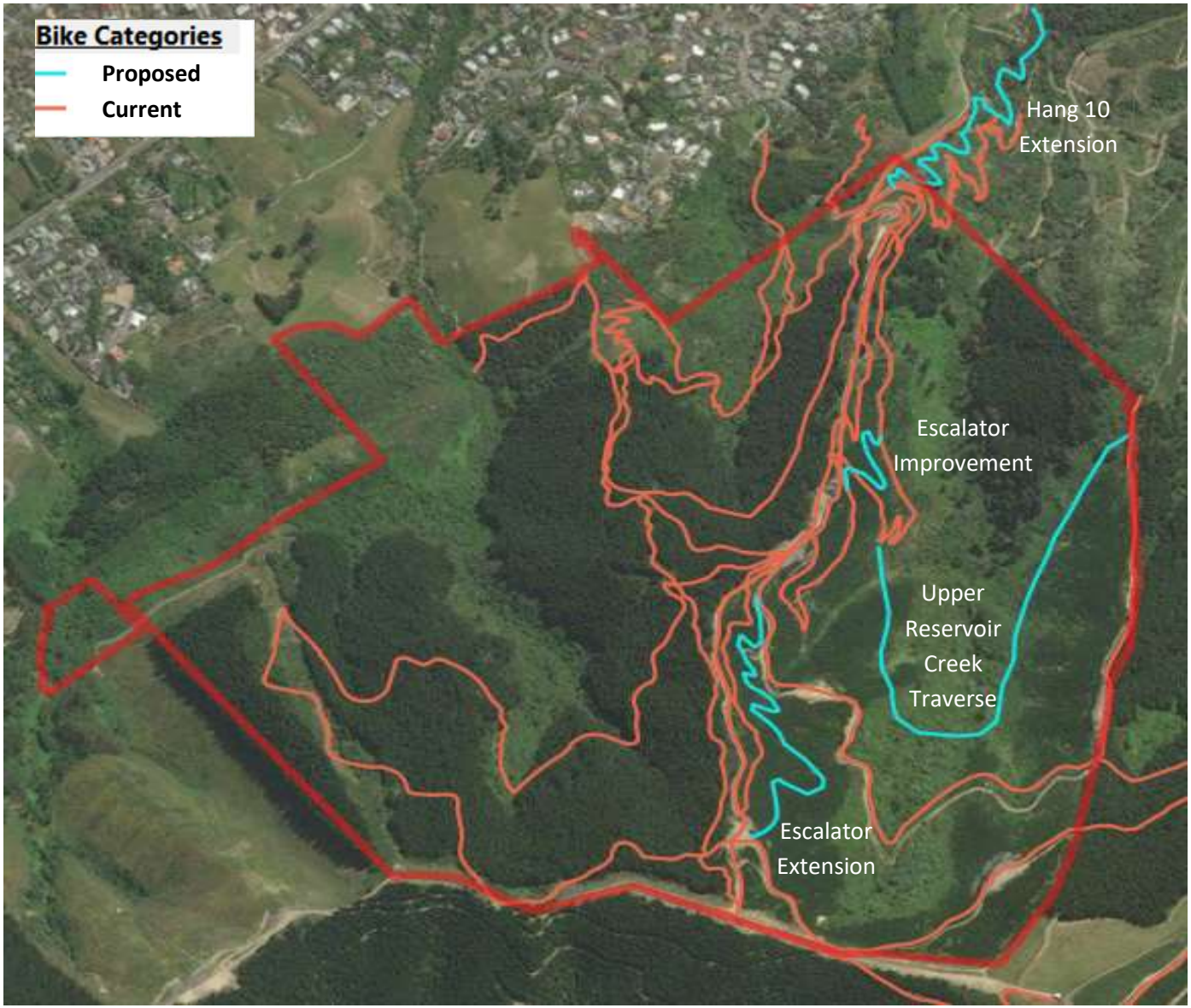
Much track building has historically occurred informally without following a wider plan.

Parts of the Forest are currently difficult to access for bikes - however, this has enabled a level of separation between pedestrian and bike focussed parts of the Forest, although the exception to this is the intensively used Easby Park entrance area.

Options

Feedback received from the mountain biking community and submitters has reinforced the importance of providing a range of trails of different mountain biking grades, as shown in the below table. While difficult to achieve in hilly environments, the provision of high-quality grade two and three trails is particularly important for new riders and families. A high-quality well-graded climbing track is key to this provision.

Mountain biking track grades		
Grade	**Features**	
Grade 1: Easiest	Fairly flat, wide, smooth track or gravel road.	
Grade 2: Easy	Mostly flat with some gentle climbs on smooth track with easily avoidable obstacles such as rocks and potholes.	
Grade 3: Intermediate	Steep slopes and/or avoidable obstacles possibly on narrow track and/or with poor traction. There may be exposure at the track's outside edge.	
Grade 4: Advanced	A mixture of long, steep climbs, narrow track, poor traction and obstacles that are difficult to avoid or jump over. Generally exposed at the track's outside edge. Most riders will find some sections easier to walk.	
Grade 5: Expert	Giant climbs, narrow track and numerous hazards including dangerous drop-offs, sharp corners and difficult obstacles. Expect walking and possibly bike carrying	
Grade 6: Extreme	Downhill/free ride specific tracks. Extremely steep sections with large drop-offs and other unavoidable obstacles. May include manmade structures and jumps	


Bike Categories
Proposed
Current
Hang 10 Extension
Escalator Improvement
Upper Reservoir Creek Traverse
Escalator Extension

Actions

- Realignment of the Escalator climbing track to ensure 6 degrees is maintained and extend to the top of the Forest.
- Extension of Hang 10 to provide grade 3 access out to Easby Park to allow for Escalator to be solely one way.
- Explore options to provide separate bike access to the reservoir (and eastern Reservoir Creek flanks).
- Develop a new trail around the margin of the native area of Reservoir Creek to link with the Silvan Forest boundary.
- Consider options for longer cross-forest return loop from the top of the extended Escalator.
- Provide a range of other downhill tracks of different grades within environmental constraints as demand warrants.
- Prevent mountain bike use of valley floor tracks in the native gully areas of Jimmy Lee, Reservoir Creek and Wills Gully.
- Explore options to provide further easier grade mountain bike tracks.

Walking

Objectives for Walking

- To provide a range of return loop walking options for different abilities from each entry point as well as high, mid and low-level traverses of the Forest.

Current State

There are five main entry points to the Forest via adjacent reserve land of Easby Park and Dellside Reserve.

- Will's Gully/Hart Creek from Hill Street south.
- Jimmy Lee Creek from Hill Street via Jimmy Lee Creek Reserve.
- Valhalla Drive via Dellside Reserve.
- Lodestone Road via Dellside Reserve.
- Marlborough Crescent/Cropp Place via Easby Park.

From each of these access points, a range of walking opportunities are currently available, including the use of forestry roads, and in some cases, tracks also developed for mountain biking.

Issues

Historically walkers within the Forest have used the forestry roads, however many of these are steep in places and present difficulties for some users.

With the growth in mountain biking around the region and higher levels of volunteer capacity to construct tracks, parts of the Forest are dominated by mountain bike tracks. The south western parts of the Forest have a lower intensity of mountain bike tracks, due to access points to the area being less bike-friendly and a bike prohibition on the Jimmy Lee track.

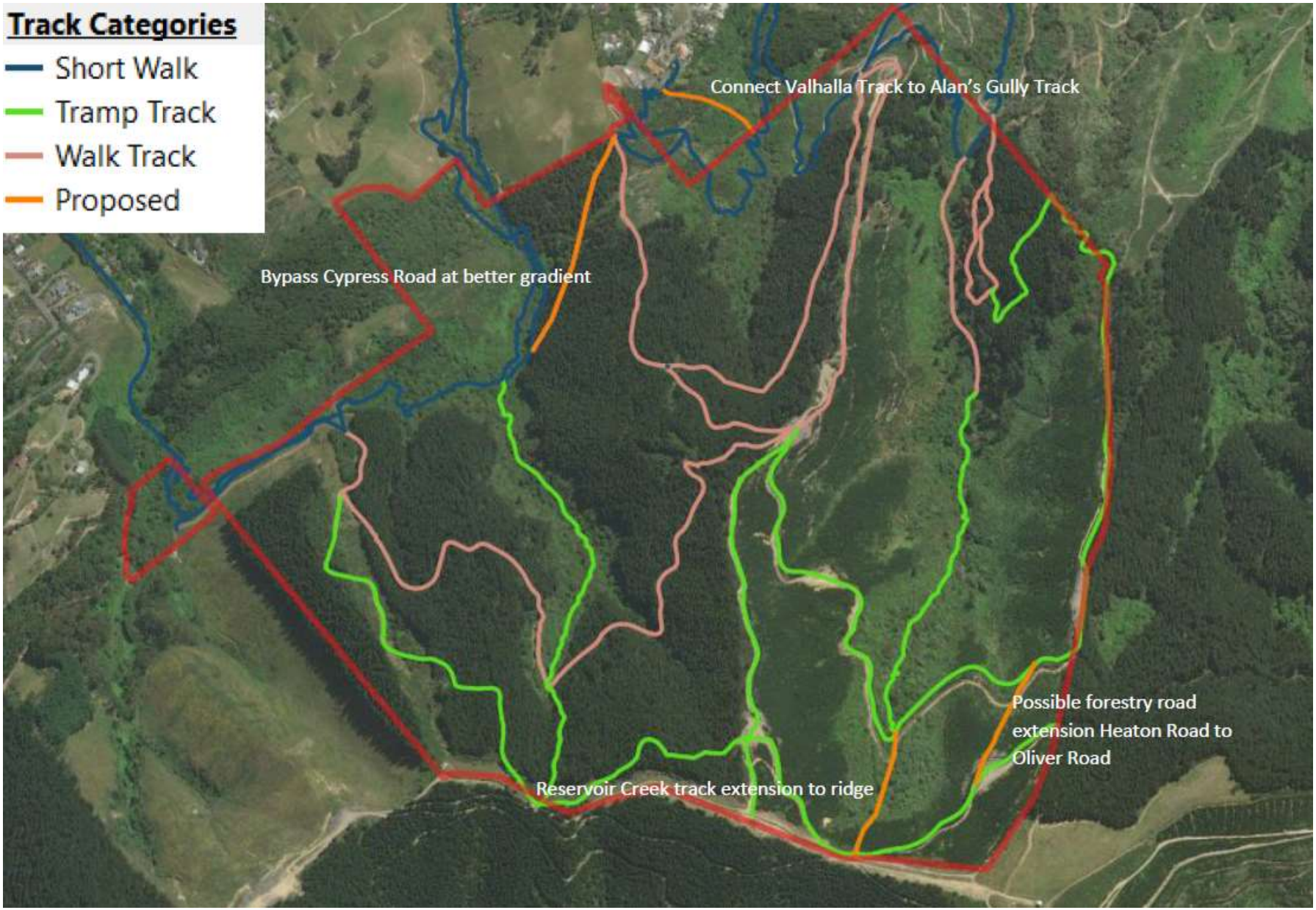
Options

The primary tool that provides a consistent framework for the design, construction, maintenance and management of tracks and outdoor visitor structures in New Zealand is the handbook: Tracks and Outdoor Visitor Structures (SNZ HB 8630:2004). This standard identifies a set of six main categories that cater for corresponding visitor groups to parks and reserves.

Track categories		
Track classification	**Features**	**Visitor group**
Path	Well-formed on a durable surface such as concrete, chip seal, asphalt or compacted gravel. Easy walking, mostly in urban settings, and for all ages and most fitness levels. Many will cater for people with mobility difficulties.	Urban Residents (UR)
Short Walk	Well-formed. Up to 1 hour's easy walking (return). Suitable for most ages and fitness levels. All watercourses are bridged. Some may cater for people with mobility difficulties.	Short Stop Travellers (SST)
Walking Track	An extended walk that takes from a few minutes to a full day return. Suitable for relatively inexperienced people with a low level of backcountry skill. All but the smallest watercourses are bridged.	Day Visitors (DV)
Tramping Track • Great Walk • Easy Tramping Track	Generally multi-day tramping track catering for relatively inexperienced backcountry trampers. Well-constructed tramping track with a track surface and bridges across rivers and major streams.	Backcountry Comfort Seekers (BCC)
Tramping Track	Marked tramping track that generally follows the lie of the land and is commonly not formed. May be multi-day or backcountry tracks taking less than a day. Key river crossings are bridged.	Backcountry Adventurers (BCA)
Route	Generally unformed, lightly cut route catering for the most experienced of backcountry visitors. Routes follow the lie of the land and are not formed.	Remoteness Seekers (RS)

(Table 2 SNZ HB 8360: 2004)

Of these the Short Walk, Walking Track and Easy Tramping Track categories are most relevant to consider for tracks within the Forest.


Track Categories
Short Walk
Tramp Track
Walk Track
Proposed
Connect Valhalla Track to Alan's Gully Track
Bypass Cypress Road at better gradient
Possible forestry road extension Heaton Road to Oliver Road
Reservoir Creek track extension to ridge

Actions

- Develop a new track to bypass Cypress Road at a better gradient
- Provide a connection track back to Valhalla Track from Allans Gully Track
- Extend Reservoir Creek track to the ridge.
- Utilise forestry road extension, if constructed, for walking to connect Heaton Road to Oliver Road.
- Review gradients of the forestry roads to determine if they meet necessary standards for use as walking tracks and easy tramping tracks and consider developing bypass tracks on steeper sections.
- Consider bridges for the lower Jimmy Lee and Reservoir Creeks.

Dog Walking

Objectives

- There are places in Kingsland Forest where dogs are permitted.
- There are no adverse effects on other users, wildlife and other values.

Current State

The Dellside Reserve, including track up into Richmond Hills, is currently identified as a dog exercise area within the Dog Control Bylaw 2014[15].

Within a dog exercise area, every dog "shall be kept under the effective control of a responsible person, responding to voice commands, whistles, hand signals, or other effective means." Also, "on any occasion a dog is likely to injure, endanger, or cause distress to any stock, poultry, domestic animal or protected wildlife, it shall be kept under continuous leash control. " [16]

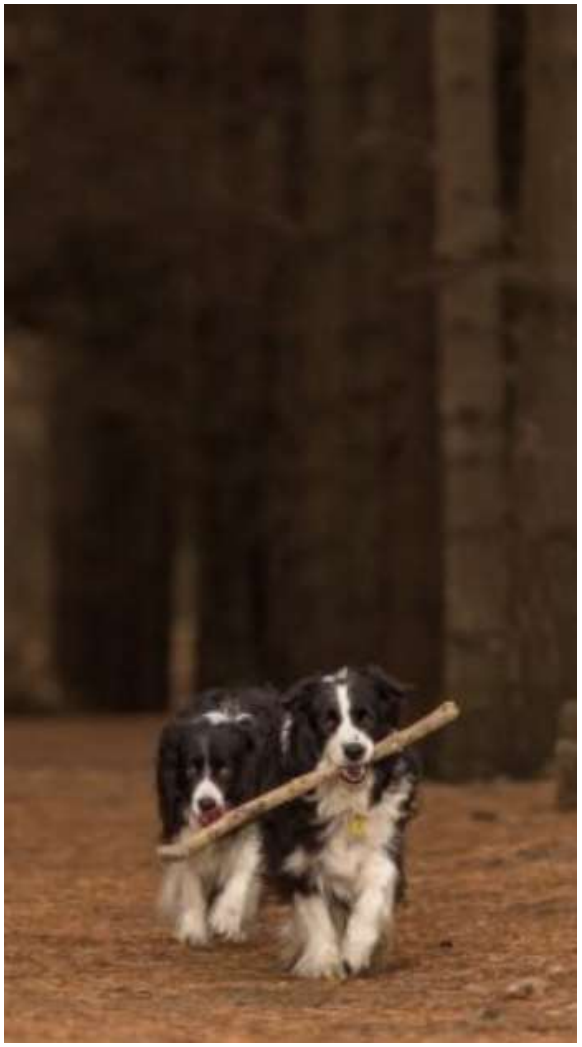
The area is very popular with dog walkers given its proximity to Richmond but is also home to an increasing amount of native wildlife (including weka) that is vulnerable to uncontrolled dogs.

Issues

While some dog owners would have 'effective control' over their dogs, many others would not meet this definition. While the current bylaw is not definitive, it seeks to strike a balance of discouraging owners that are unable to adequately control their dog, while not unreasonably restricting those that can.

Options

It would be difficult and a potentially excessive approach to require all dogs on leads in all locations within Kingsland Forest, given the popularity of this activity. It is also difficult to accurately identify specific areas that are particularly vulnerable to dogs, given that weka can occur throughout the exotic part of the Forest, as well as in the native area.



[15] Tasman District Council Consolidated Bylaw, Chapter 2
[16] Dog Control Bylaw, Schedule 2

As the restoration and recovery of native wildlife continues, it will be worthwhile reviewing the best means of controlling dogs in the next scheduled Bylaw review.

Actions

- Monitor issues associated with current Bylaw provision for Kingsland Forest as a dog exercise area.
- Consider seeking future change to the Bylaw to 'dogs on lead' within native forest restoration areas if required.

Supporting Facilities

Objectives

- Supporting facilities enhance the visitor experience by meeting essential needs while retaining the undeveloped natural character of the Forest.

Current State

Signs are well distributed throughout the Forest but of variable age, design standard and content. Mountain biking signs have recently been upgraded, but the standard of signs for walking tracks remains poor. Several interpretive signs have been installed by volunteer groups working within the Forest, which adds useful information and interest for visitors. Seats and picnic tables are well distributed within Dellside Reserve, but few exist within the Forest itself.

The provision of toilets and carparks is currently poor, however, work is under way to install a toilet installation at Easby Park and planning is underway to improve car parking at this location.

Issues

In general terms, Kingsland Forest has few supporting facilities apart from signs. For a relatively small cost, the visitor experience can be significantly improved through the installation of some of these items.

Actions

- Upgrade and replace signs in a coordinated way as required.
- Consider a simple vault toilet for Richmond Hill.
- Provide picnic tables or benches at hubs and major viewpoints.

10 Summary of Actions

Value/Component	Action	Priority
Forest Cover	• Develop a planting plan that provides for: ○ reestablishment of native forest on lower compartments ○ the extension of native forest in gullies to the ridge, and ○ replanting the remaining mid and upper compartments with permanent evergreen exotic woodland species best suited to the site.	High
Biodiversity Restoration	• Harvest practices are undertaken using techniques that minimise damage to areas of native forest in the gullies and adjacent flanks.	High
	• Biodiversity corridors are developed to link existing native gullies from the top of the Barnicoat Range to the backyards of urban Richmond.	Medium
	• Continue to develop a band of native vegetation on lower slopes by not replanting exotics in lower compartments.	High
	• In conjunction with recreational track development objectives, provide access tracks around the edges of native forest areas to provide for good access for weed (and pest) control activities.	High
	• Maintain an active weed and pest control programme to prevent damage to forest values and forest reestablishment.	High
	• Work with volunteer groups to better define biodiversity objectives for the important work that they do and establish robust monitoring to measure results and advocate for the work being undertaken.	High
	• Work with adjoining landowners to encourage control of invasive weeds such as woolly nightshade.	High

Value/Component	Action	Priority
Landscape Protection and Enhancement	• Ensure forest is re-established on the site to ensure a green backdrop to Richmond is maintained.	High
	• Where there is alignment in aspirations for landscape development with neighbouring properties, consider a common approach to achieve a wider positive landscape effect.	Medium
	• Seek to limit new network utility assets to existing areas.	High
	• Create and maintain a selection of viewpoints within the walking and biking track network.	Medium
Recreational Use	• Seek opportunities to increase the number and quality of entrance points into the Forest.	High
	• Review track naming, signage and wayfinding hierarchy to ensure necessary information is available at each intersection and align between GIS records.	Medium
	• Take into account activity zones when planning for new track development.	High
	• Seek geotechnical advice before construction of new tracks that require earthworks in sensitive areas.	High
	• Follow best practice guidelines when constructing, and maintaining tracks.	High
	• Assess intersections between downhill mountain bike tracks and walking tracks to provide as much safety as possible for users.	High
	• Retain forest roads as shared-use tracks.	Medium
	• Improve base car parking and toilet for Kingsland Forest users	High

Value/Component	Action	Priority
Mountain biking	• Realignment of the Escalator climbing track to ensure 6 degrees is maintained and extend to the top of the Forest.	High
	• Extension of Hang 10 to provide grade 3 access out to Easby Park to allow for Escalator to be solely one way.	High
	• Explore options to provide separate bike access to the reservoir (and eastern Reservoir Creek flanks).	Medium
	• Develop a new trail around the margin of the native area of Reservoir Creek to link with the Silvan Forest boundary.	High
	• Consider options for longer cross-forest return loop from the top of the extended Escalator.	Low
	• Provide a range of other downhill tracks of different grades within environmental constraints as demand warrants.	Medium
	• Prevent mountain bike use of valley floor tracks in the native gully areas of Jimmy Lee, Reservoir Creek and Wills Gully	High
	• Explore options to provide further easier grade mountain bike tracks.	Medium
Walking	• *Develop a new track to bypass Cypress Road at a better gradient*	Medium
	• Provide a connection track back to Valhalla Track from Allans Gully Track	Medium
	• Extend Reservoir Creek track to the ridge.	Medium
	• Utilise forestry road extension, if constructed, for walking to connect Heaton Road to Oliver Road.	Low

Value/Component	Action	Priority
Dog Walking	• Review gradients of the forestry roads to determine if they meet necessary standards for use as walking tracks and easy tramping tracks and consider developing bypass tracks on steeper sections.	Medium
	• Consider bridges for the lower Jimmy Lee and Reservoir Creeks.	Low
	• Monitor issues associated with current Bylaw provision for Kingsland Forest as a dog exercise area.	Medium
	• Consider seeking future change to the Bylaw to 'dogs on lead' within native forest restoration areas if required.	Medium
Supporting Facilities	• Upgrade and replace signs in a coordinated way as required.	High
	• Consider a simple vault toilet for the Richmond Hill.	Medium
	• Provide picnic tables or benches at hubs and major viewpoints.	Medium
Cultural, Historical and Archaeological Values	• Ensure the manawhenua iwi association with the land and partnership with Council is reflected on any new signboards for the reserve.	High
	• Rongoā/medicinal species and species used for rāranga/weaving form part of the planting plans for native restoration areas and are available for sustainable harvest for use.	Medium
	• As a registered historic site, Reservoir Creek dam is protected and interpreted.	High

Stormwater Management	• Ensure best practice harvest techniques to manage runoff and mobilisation of sediment, including limiting the construction of new roads and consider debris barriers and further detention areas if required. These actions should be developed and recorded in the harvest plan following consultation with Council stormwater and parks staff.	High
	• Ensure active revegetation of harvested slopes occurs as soon as practicable after harvest using species with good erosion controlling properties.	High
	• Replant additional streamside areas where further shade is required.	Medium
	• Identify any further fish passage obstacles downstream and pursue resolving these.	Medium
Fire Presentation, Control and Safety	• Placement of signs at entry points to the Forest with steps to take in case of a fire and the installation of markers at designated safe areas.	High
	• Consider using broadleaf natives and species with low flammability alongside tracks.	Medium
	• Regular maintenance of designated safe areas to remove vegetation to make these sites suitable as an evacuation point.	High
	• Work with FENZ on closing public access to the Forest during periods of high fire risk.	High
Utilities Infrastructure	• Follow relevant codes of practice and consult with Transpower in the development of planting plans, earthworks and construction in proximity to the National Grid assets and associated access.	High

11 References

- Boffa Miskell, 2016. Nelson Landscape Study.
- International Mountain Bicycling Association (IMBA) Guide to Building Sweet Single Track.
- Natural Habitats Tasman - Biodiversity Reports.
- PF Olsen, Tasman District Council Forest Management Plan 2014-2019.
- Richmond Reserves Management Plan.
- Recreational Use of Council Plantation Forests, TDC Internal Policy April 2018.
- Standards New Zealand NZS HB 8630:2004 – Tracks and Outdoor Visitor Structures.
- Tasman District Council, 2012. Native Habitats Tasman Ecological Assessment Report B1 Jimmy Lee Creek.
- Tasman District Council, 2012. Native Habitats Tasman Ecological Assessment Report B34 Reservoir Creek.
- Tasman District Council, Open Space Strategy 2015-2025.
- Tasman Resource Management Plan.
- Track Construction and Maintenance Guidelines, 2006, Department of Conservation.
- Willis, Gerard, Enfous Addressing New Zealand's Biodiversity Challenge: A Regional Council think piece on the future of biodiversity management in New Zealand.

12 Attachment 1 – Assessment of Forest Planting Options against Objectives

	Option 1: Status Quo - Pinus radiata	Option 2: Permanent Exotic forest	Option 3: Combination permanent native forest/exotic woodland	Option 4: Native forest
Catchment Management (runoff and sediment)	A shorter period until tree reestablishment and forest cover, although clear-felling required every 25-30 years.	A longer period than Radiata until tree reestablishment and forest cover, although permanent forest cover thereafter.	A longer period than Radiata until tree reestablishment and forest cover, although permanent forest cover thereafter. Native areas slowest to re-establish.	Native planting or natural regeneration is the slowest to establish forest cover and this would be over a wide area with this option.
Biodiversity Restoration	Faster establishment period provides a shorter opportunity for weed infestation, however more risk to existing native areas with production forestry adjacent.	Somewhat increased weed threat due to slightly slower establishment rates than Radiata, however permanent forest cover would provide a good buffer for existing native areas.	Biodiversity values able to be enhanced on lower slopes and native gullies extended to the ridge. A relatively fast-growing permanent exotic cover elsewhere would provide good protection.	Significant challenges and costs to achieving native cover rapidly over the whole site with significant weed smothering risks. The end state of native forest would be the best outcome for biodiversity but difficult to achieve.
Landscape Protection	This option would achieve the objectives with more synergies to the SW privately owned land.	This option would achieve the objectives with more synergies to the NE privately owned land.	This option would achieve the objectives with more synergies to the NE privately owned land.	This option would achieve the objectives with more synergies to the NE privately owned land.
Bike and Walking Tracks	Assets would be severely damaged at each harvest.	No future damage to assets provided adequate ongoing maintenance.	No future damage to assets provided adequate ongoing maintenance.	No future damage to assets provided adequate ongoing maintenance.

	Option 1: Status Quo - Pinus radiata	Option 2: Permanent Exotic forest	Option 3: Combination permanent native forest/exotic woodland	Option 4: Native forest
Cultural and Natural Values	Objectives able to be achieved – although care needed at harvest.	Objectives able to be achieved.	Objectives able to be achieved.	Objectives able to be achieved.
Fire Prevention Control and Safety	Higher flammability vegetation with this option although risk acceptable provided user safety actions implemented.	Higher flammability vegetation with this option although risk acceptable provided user safety actions implemented.	Lower risk due to less flammable native vegetation on lower slopes close to likely ignition sources.	Lower risk due to less flammable native vegetation on lower slopes close to likely ignition sources.
Utilities Infrastructure	Objectives able to be achieved.	Objectives able to be achieved.	Objectives able to be achieved.	Objectives able to be achieved.
Costs	Lowest cost forest reestablishment option estimated at $206,000 over the next 10-year period.	Mid-range cost for forest reestablishment estimated at $415,000 over the next 10-year period.	Higher cost option for forest reestablishment estimated at $780,000 over the next 10-year period.	Significantly more expensive option with forest establishment costs over a 10-year period likely to exceed $3,000,000
Summary	Lowest cost option but one that achieves few of the objectives.	A relatively low-cost option that achieves permanent cover including reduced risk of sedimentation as well as protection of native margins.	Medium cost option that provides for expansion of biodiversity restoration areas while also achieving permanent forest cover, including reduced risk of sedimentation and protection of native margins.	High cost option with significant establishment risks due to weed threat, slope sedimentation risk etc. Would result in a better outcome for biodiversity if able to be achieved but significantly greater short-term risks.

13 Appendices (available as a separate document at www.tasman.govt.nz)

Appendix 1: History

Appendix 2: Physical and Biological Features

Appendix 3: Statutory Framework

Appendix 4: Partners and Key Stakeholders

Appendix 5: Kingsland User Survey Summary

Appendix 6: Native Habitats Tasman Sites

Appendix 7: Fire Evacuation Safe Zones

Appendix 8: Track Counter Data

Appendix 9: Carbon Sequestration Estimates

Appendix 10: Recreational Track Intersection Risk Analysis