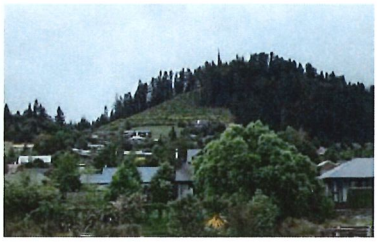




Te Tihi o Rauhea/Conical Hill Reserve

Forest Management Programme 2022 – 2033

Approved By the HSCB April 2022.




Contents Page

1. Preface

This work programme has been prepared by the Hurunui District Council to facilitate the most appropriate use and continued management of Te Tihi o Rauhea/Conical Hill Reserve.

2. Introduction

This work programme outlines the resource of Te Tihi o Rauhea/Conical Hill Reserve and recognises the reserve's significance from a local and regional perspective.

Environmental, social, financial and land use issues have been considered as part of the plan process. As a result of these consideration a goal, with supporting objective and work priorities has been established to provide a framework for the future management of the reserve.

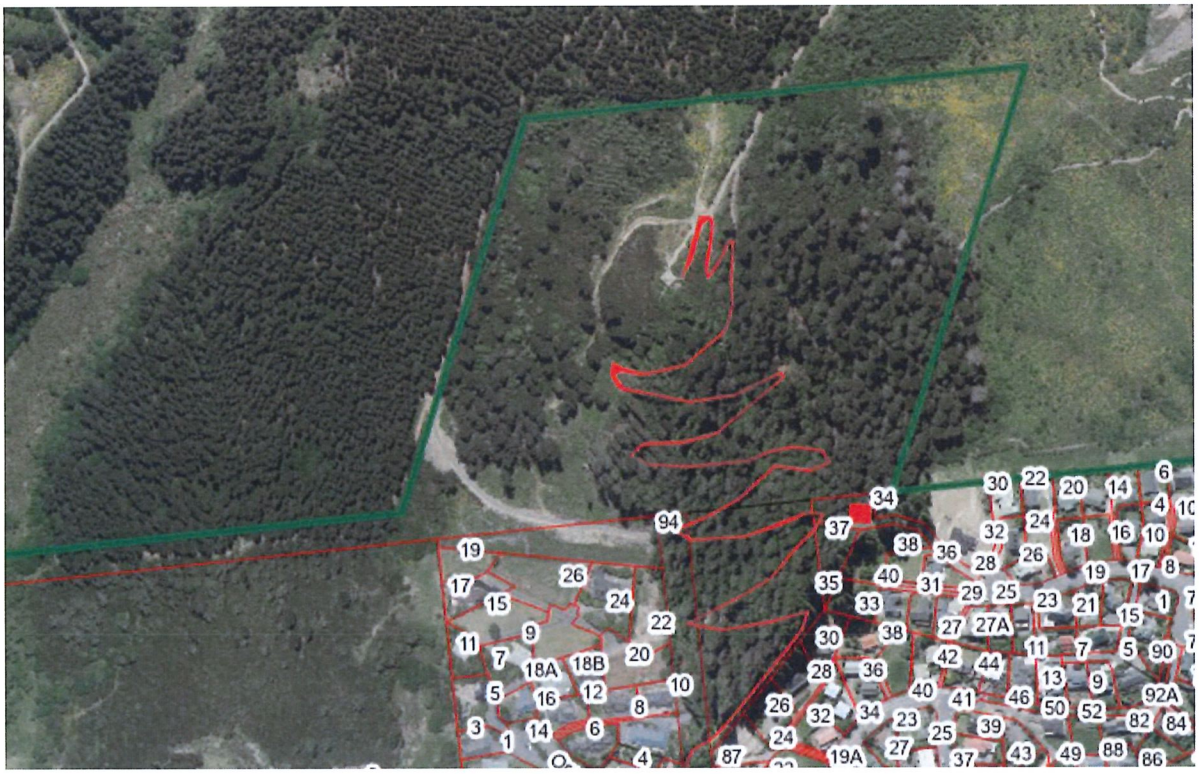
The town of Hanmer Springs is situated in the north-western portion of the Hurunui District inland from the Waiau Ferry Bridge. The reserve occupies an area of 11.7258 hectares of medium to steep terrain. The legal descriptions of the area are GAZ 85-1586 RES 3661 3802 HANMER PLAINS RES BLKS I II LYNDON SD, LOT 28 DP 57326 BLKS I II LYNDON SD, LOT 8 DP 80164 BLKS I II LYNDON SD, LOT 142 DP 48223. The reserve has boundaries with Ngai Tahu forest land managed by Rayonier and private landowner at the base of Conical Hill.

Te Tihi o Rauhea/Conical Hill Reserve was first gazetted as a recreation reserve in June 1993. The Hurunui District Council was appointed to control and manage the reserve.

The Hurunui District Council recognises the important indirect contribution the reserve makes to the district by providing additional support to the Hanmer Springs Thermal Pools and Spa as a place to 'Stretch the legs' before a soak in the pools.

3. Map of Te Tihi o Rauhea/Conical Hill Reserve

Te Tihi o Rauhea/Conical Hill Reserve (hereafter known as the "Hill") is located at the top of Conical Hill Road, Hanmer Springs. An aerial photo of the reserve can be found on the next page.



TeTihi o Rauhea/Conical Hill Reserve	Date:	12/04/2022
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HURUNUI District Council

4. Goal and Objectives

"To add to the Hanmer Springs wellness and education experience by having a highly maintained, near natural and pest free environment on Te Tihi o Rauhea***/Conical Hill Reserve"***

This goal can be achieved through the following objectives:

- By maintaining the hill so that it continues to be the 'Icon' of Hanmer Springs.
- By encouraging native regeneration of tree species already making a presence on the Hill.
- By removing gorse, broom and other noxious weeds and replanting with native seedling.
- By having well maintained infrastructure on the Hill, including tracks, signs and lookout etc.
- By reducing the risk of damage through tree fall and fire to neighbouring properties through
    - Undertaking an arborist assessments every 5 years to identify trees that are in poor health and pose a risk of failure.
    - Reduce fire risk in the lower section of the reserve near adjoining properties by clearing weed and undergrowth.
- By supporting the introduction of a conservation/Ecological Restoration area for the protection of the endangered native fauna present on the Hill.
- By providing information boards and directional signage on the track and at the summit.
- By reducing the impacts that future commercial activities may have on the native species and wildlife.
- By encouraging local groups and working bees to help with maintenance on the Hill in conjunction with HDC.

5. Reserve Description

5.1 Infrastructure

There is approximately 2.5km of formal tracks on the Hill which are used exclusively for recreation purposes. The tracks are well formed but most are in reasonable condition. However, there are many 'short cuts' used by walkers (mainly Children) between the main walkway which are eroded, steep and potentially dangerous.

The main track leads to the 'look out' which is a four sided covered structure with 360 degree views. The 'look out' is scheduled for upgrade along with the removal of the very tired access steps. Access is planned to be re-established as a path providing disabled access.

The Lucas Lane link track was established in 2016 as part of the Conical Hill Revegetation plan resulting in the clear felling operations. The Lucas Lane link track links Lucas lane to half way up the main walking track.

The Majuba link track was established in 2020. Providing an alternative loop track.

Direction sign at the bottom of the Hill track and at points along the main track require updating.

Toilet facilities have been built in 2021 at the base of Conical Hill, as recommended in the Conical Hill Landscape Plan 2018.

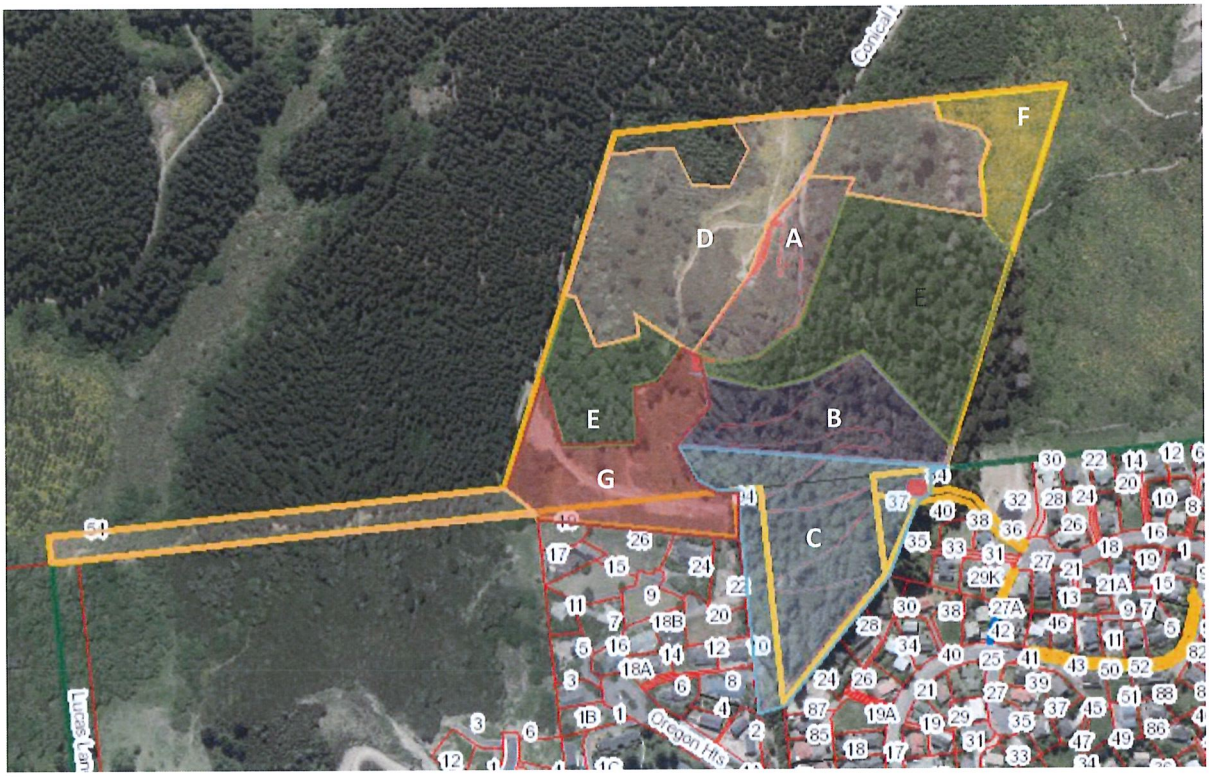
The main entrance to the Hill is scheduled for upgrade in 2022.

5.2 Forest Types

It has been identified that there are about 7 different forest types over the 11 hectare reserve.

These types are classified as follows and detailed on the map below.

A. **Beech/Kanuka** – Dominated by Kanuka with groupings of mountain beech. Broadleaf, coprosma and other shrub species are also present as coming up under the Kanuka.
B. **Fir/Pine** – These appear to be self-sown wildings from the larger trees planted nearer the base of the Hill. There are still large trees and could be up to 70-80 years old.
C. **Fir/Redwood/Pine** – This is the original planting of tree estimated at around 1910. There are some significant specimens of tree here with Grand Fir being notable trees in the District Plan. Some of these trees are over 40 meters in height. These trees are present right up to the boundary with residential houses.
D. **Kanuka** – These areas are dominated by Kanuka and native woody shrub species with scattered wilding pines.
E. **Pine over Kanuka** – These area are dominated by dense wilding pines with a significant understory of Kanuka and broadleaf native species.
F. **Noxious weeds - Broom/Gorse/Blackberry** – This area is dominated by broom, gorse and/or blackberry, where no replanting has taken place following clear fell operations
G. **Broom, Blackberry, with native plantings and exotics** – This area is where clear felling operations have been carried out and natives have been planted as part of the Conical Hill Revegetation plan 2016 however initial ground preparation and extremely steep terrain has made weed control very difficult.



6. Work Programme

6.1 Work Programme outlined

- Forest Management Areas 1-7 and Ecological Restoration Area ERA
- Weed Control
- Track Maintenance
- Summit Area
- Pest Control
- Education

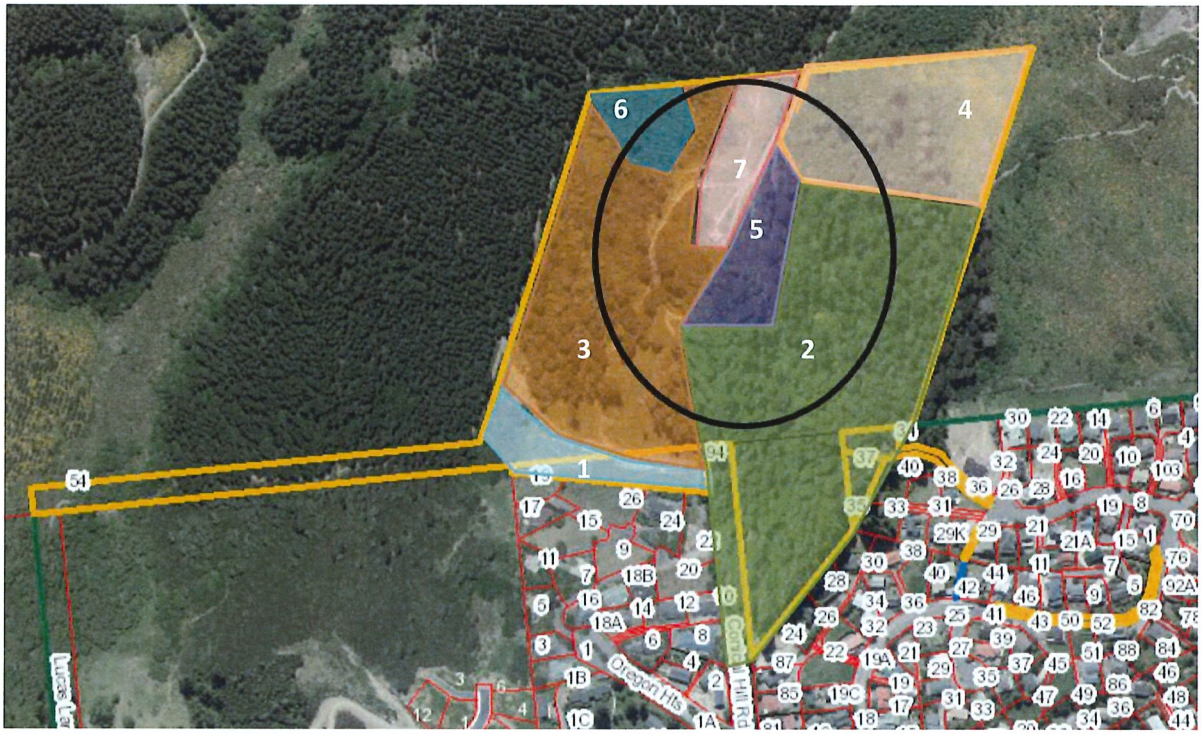
It is expected that some or all of these tasks can run concurrently, and not necessarily in the order detailed above.

6.2 Forest Management Areas

To aid in the appropriate management of the Hill the Hill has been allocated management areas which take into consideration the forest types, activity and accessibility.

There are 7 Management areas as detailed below and the Ecological Restoration Area which covers several management areas.

It is the intention that clear felling is not carried out on the Council owned sections of the Hill except for the areas identified in management area 4 and if any other clear felling is considered, the Community Board is to be consulted first.



TeTihi o Rauhea/Conical Hill Reserve - Management Areas				
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Management area 1

This area runs between the houses and the Lucas lane link, this area was harvested by clear felling operations in accordance with the Conical Hill Revegetation Plan 2016, now predominately covered in broom and blackberry with some native plantings planted as part of the revegetation plan.

RECOMMENDATION:

- That this area is sprayed and cleared to provide a fire break between the houses and the rest of the reserve with the potential to be planted in native as funding allows.

Management area 2 This area covers the main walking track of the Hill.

There are several different forest types in this Management area ranging from Fir, Pines Redwoods and Kanuka.

An arborist report was completed in 2020 that identifies tree maintenance and removal, assessed in a low to urgent priority, over a 5 year term. This work has been priced and work is underway in accordance with the arborist report. **Appendix 1.**

The HDC Maintenance team have been carrying out work on the understory to reduce the fire risk at the lower section of the hill.

RECOMMENDATION:

- That the management of this area continue as recommended in the arborist assessment report.
- That an arborist assessment is carried out every 5 years, to identify the work plan for the next 5 years.
- That the Maintenance team continue with fire retention work on the understory of the lower section of the forest close to the properties and main walkway.
- That the main walking track is maintained and kept as weed free as possible.

Management area 3

Lower section of this area was clear felled and planted in native species in accordance with the Conical Hill Revegetation plan 2016.

The topography of this section of the hill is very steep, proving manual maintenance and weed control to be extremely difficult.

The balance of this area is dominated in wilding pines and Kanuka.

A number of pines in this section close to Management area 7 will need to be reduced or removed to improve the view from the lookout.

A track below this section links Lucas Lane track to Conical Hill track.

RECOMMENDATION:

- That the Kanuka be preserved and encouraged.
- That nature be left to take its course on the lower section previously cleared fell and planted in natives, eventually the exotic species will punch through. Progress on this will be reviewed in conjunction with the plan.
- That the pines that are obscuring the view from the lookout be reduced or removed.
- That the Conical Hill, Lucas Lane link track be maintained and weed free as possible.

Management area 4

The eastern section of this area has been clear felling in conjunction with the Conical Hill Forest Management plan 2012-2022, however no replanting in exotic pines has taken place and this area is now dominated by gorse and broom.

The balance of this area is dominated in Kanuka.

RECOMMENDATION

- That the Kanuka be preserved and encouraged, by weed removal and selective removal of small wilding pines and other exotic trees
- That the eastern section be sprayed and replanted in plantation species for future harvest.
- That the area around the Majuba track is not replanted in exotic to preserve the view from the downward side of the track.

Management area 5

This area forms part of the main walking track before it reaches the summit.

This area is dominated in Beech and Kanuka, there is a distinct smell of Kanuka as you walk though this area.

RECOMMENDATION

- That that Kanuka and native species be preserved and encouraged.
- That the track is maintenance and kept weed free as possible.

Management area 6

This area is dominated in pines and kanuka.

RECOMMENDATION

- That this area is left as it is for the duration of this plan and reviewed in 10 years .

Management area 7 Summit

This area forms the summit of the Hill.

The HDC Maintenance team have undertaken a significant amount of broom and weed clearing in accordance with the Conical Hill Forest Management 2012-2022.

A stand of Kanuka to the left side of the Hill provides a habit for the rough gecko present on the Hill.

A number of Larch and a few pines amongst the Kanuka need to be removed, through ring barking or poisoning.

RECOMMENDATION

- That the continued maintenance of clearance of broom and weed species be carried out.
- That planting in appropriate native species be carried out. That a conservation area be established for the protection of rough gecko.

Ecological Restoration Area (ERA)

The Hill has been identified as a designated site of significance under the Canterbury Biodiversity Strategy due to the presence of Rough Gecko on the Hill

That an Ecological Restoration Area be established for the protection of the native Fauna present on the Hill in particular the Rough Gecko, by creating areas to reduce foot traffic where feasible, blocking off shortcuts present through the reserve between the tracks and areas at the summit, providing a secure habitat.

There are 4 types of Gecko/Lizards found on the Hill as follows:

- Canterbury Grass Skink

- Southern Alps Gecko
- Pygmy Gecko
- Rough Gecko.

The Canterbury Grass Skink, Southern Alps Gecko and Pygmy Gecko species have been classified as At Risk Declining by the Department of Conservation DOC in 2021 and have been detected mainly at or near the summit of the Hill.

The Rough Gecko has been classified as Nationally Endangered by DOC in 2021. The Rough Gecko only occurs in a very small geographic range within New Zealand and has been detected in a number of locations over the Hill.

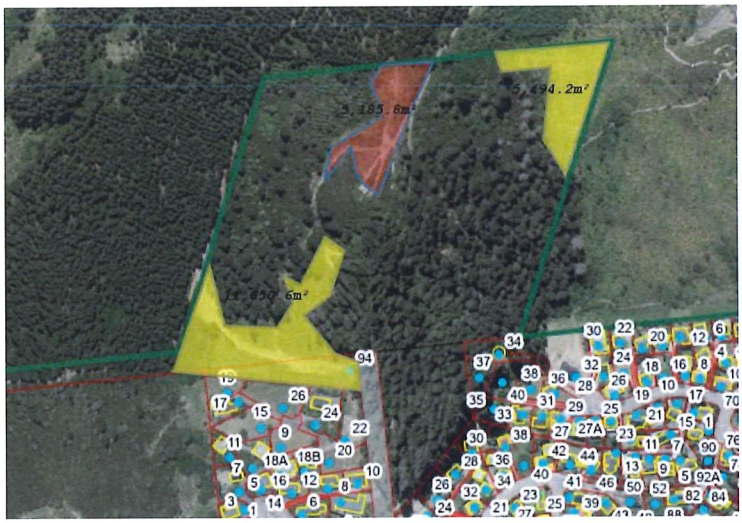
It is therefore very important that measures are put in place to protect the Rough Gecko and other native species.

RECOMMENDATION

- That Council Officers work with DOC establishing the Ecological Restoration Area.
- That the Lease agreement for any future commercial activity identifies the importance of the protection of the endangered Rough Gecko and other native species.
- That users of the tracks are made of aware of the Ecological Restoration Area and the importance of the protection of the Rough Gecko and other native species through information boards.
- That access up or down the rock slope at the summit is fenced at the top to provide protection to the native species present at the summit.

6.3 Weed Control

The two main areas where gorse, broom and wilding pines are present are in the areas that were clear felled harvested as part of the Conical Hill Forest Management plan 2012-2022 and the Conical Hill Revegetation plan. These areas are shown in the plan below in yellow.



Over the past 10 years weed control with the removal of gorse, broom and small wilding pines and fir trees has been carried out in the area shown brown.

The South western area shown in yellow was planted in natives following clear felling harvest operations in accordance with the Conical Hill Revegetation Plan 2016, however due to the steep terrain and limited resource weed control in this section of the Hill has proven to be extremely difficult.

The North eastern area shown in yellow was harvested by clear felling operations in accordance with the Conical Hill Forest Management Plan 2012-2022, the plan was to replant in plantation species, however, this did not happen and the area is now covered in broom and gorse.

There are sections throughout the main walking track that have the presence of broom and gorse, particularly where the track is open to the sunlight.

After clearance of gorse and broom, continued upkeep and maintenance needs to be carried out to keep the weeds returning

RECOMMENDATION

- That the southwestern area shown in yellow below the Lucas Lane link track is to be sprayed out and maintained as grass and a firebreak, and that nature is left to take its course on the balance above the track, due to the steep terrain. Eventually, with good management it is hoped that the native plantings will punch through and dominate.
- That weed control and the removal of small wilding pines will continue in the area shown in brown and along the walking tracks where accessible.
- That the north-eastern area shown in yellow be sprayed out and replanted in plantation species for future harvest as easily accessible and a reasonable distance from the main walking recreational areas of the Hill.
- That weed control continue to be carried out along the track where accessible as part of routine maintenance.
- That native seedling establishment be carried out to aid in weed reduction.

6.4 Track Maintenance

Walking tracks of the Hill consist of the following:

- The main walking track from the Conical Hill Road entrance to the summit.
- Lucas lane link track that links the Lucas Lane track to the main walking track.
- The Majuba link track, providing an alternative loop track.

The tracks are currently maintained to a reasonable standard.

There are a number of 'short cuts' used by walkers (mainly Children) between the main walkway which are heavily eroded, steep and potentially dangerous posing a safety risk, and interfere with the habitat of the endangered Rough Gecko and other native fauna on the Hill

The Conical Hill Landscape Plan was commissioned in 2018 detailing some key issues and opportunities for the development of the Hill. **Appendix 2.**

RECOMMENDATION

- That the tracks are kept as weed free as possible.
- That erosion controls are installed by blocking off the 'shortcuts' and providing educational signage.
- That the tracks continue to be maintained through washout repairs and graveling.
- That improved directional and information signage is installed, detailing track difficulty and return times.
- That as funding allows consideration be given to future development and upgrade of main walking track in accordance with the Conical Hill Landscape Plan 2018 if feasible and in addition consideration be given to the installation of solar lighting and a permanent track surface.

6.5 Summit

One of the most important aspect of the Hill experience is the view the walkers get once they have reached the summit from the lookout.

The current view is dominated by exotic conifers.

There are currently plans in place to remove or reduce the conifers that are obscuring the view of the Hanmer Springs township and basin.

Plans are currently in place to upgrade the lookout and access to the lookout.

RECOMMENDATION

- That the conifers currently obscuring the view of the Hanmer Springs township and basin be removed or reduced.
- That seating at the summit is maintained.
- That habitat protection controls are established to provide a safe habitat for the protection of the endangered native species present at the summit in accordance with the ERA
- That the track information/location board is reinstalled at the correct direction.
- That educational information boards are installed at the summit detailing information of surrounding.
- To improve the access to the lookout building.

6.6 Pest Control

The main pests that pose a threat to the native fauna are from feral cats, possums, mustelids (ferrets, stoats and weasels), hedgehogs, mice and wasps

Native fauna present on the Hill include

- Birds - Bellbird, Tui, Tomtit, fantail, NZ Falcon
- Gecko/Lizards – Canterbury Grass Stink, Southern Alps Gecko, Pigmy Gecko and Rough Gecko.

As mentioned in the ERA section, the Rough Gecko has been classified as Nationally Endangered by DOC in 2021 and as the Rough Gecko only occurs in a very small geographic range within New Zealand and has been detected in a number of locations over the Hill, it is therefore very important that pest control measures are continued to protect the Rough Gecko and other native species.

RECOMMENDATION

- That the Te Tihi o Rauhea Hanmer Spring Conservation Trust continue with current pest control programme to incorporate all areas of the Hill to avoid re-infestation from other areas
- That external funding is investigated for pest control due the significance of the Hill as a habitat for the endangered rough gecko.

6.7 Education

There are a number of interesting features the Hill which could be placed on information boards one the walking track up to and including the summit.

RECOMMENDATION

- That information boards are installed along the walkway and at the summit informing walkers of the notable flora and fauna.

7 Finances

Te Tihi o Rauhea/Conical Hill Reserve is a District reserve therefore is eligible for funding from the District Reserves fund for routine contractor work and general repairs and maintenance.

As The Hill is a designated area of significance under the Canterbury Biodiversity Strategy due to the presence of rough gecko. There is a potential case for applying for funding through the ECAN Environment Enhancement Fund to assist the survival of the gecko through lizards houses and pest control.

8 Implementation

On support of this programme by the Hanmer Spring Community Board and approval of Council the Programme will be primarily implemented by the HDC Maintenance Team with the help of external local community groups and contractors.

9 Review

Undertake a biennial review of the management programme to check progress and incorporating any community feedback and new techniques or methods.

10 Appendix

1 Conical Hill Reserve – Tree Assessment Report 2020.
2 Conical Hill Reserve Landscape Plan 2018.

Arboricultural Report

7th December 2020

Conical Hill Reserve – Tree Assessment Report

Report Prepared by Liz Warner

Warner Tree Care

Liz Warner

Warner Tree Care Ltd

50 Horns Road,

RD1,

Oxford

7495

Contents

1.0 Executive Summary

This report was commissioned by Rhonda Harvey, Project Co-Ordinator at Hurunui District Council.

The report brief was to carry out a tree health assessment of all trees growing on two small strips of land within the Conical Hill Reserve, Hanmer Springs. To carry out a non-invasive tree health assessment of any tree within two trees falling distance of any adjacent properties and to recommend any management requirements for the trees.

A tree inspection and report were completed in December 2019 on trees within the South Western edge of Conical Hill Reserve where it adjoins private properties. In high winds recently two large trees within Conical Hill Reserve on the South Eastern edge of the reserve have failed at the rootplate and fallen onto adjacent properties causing damage. Following these recent tree failures, a tree inspection was requested on all trees within two tree lengths of the adjacent properties, as well as a re-inspection of trees previously inspected in 2019.

Conical Hill Reserve is an iconic feature of Hanmer Springs village and is located on the Northern boundary of the village, the reserve covers an area of approximately 11.5 hectares. On the Sothern half of the reserve there are residential properties which have boundaries with the reserve, Oregon Heights to the West and Alpine Avenue and Acheron Heights to the East. The section of the reserve I was asked to look at (see aerial map below), has 10 residential sections directly adjacent to it, 8 of which currently have properties on them, two of which are currently vacant lots.

"Conical Hill Reserve is one of the best-known features in Hanmer Springs. The walking track to the summit has been popular for almost a century. The main point of access to the reserve is on foot from the top end of Conical Hill Road. The reserve is surrounded on three sides by commercial plantations of radiata pine, douglas fir and larch" (information taken directly from the Conical Hill Reserve Management Plan).

Conical Hill Reserve is a popular area especially in the summer with high visitor numbers. Conical Hill Reserve is owned and maintained by Hurunui District Council.

All trees within two trees falling distance of the 11 properties surrounding the site were included in the tree assessment, but only individual trees and groups of trees requiring any maintenance or removal were recorded. The results of that assessment have been summarised below (the full assessment details can be found in Appendix One).

The condition of each tree or group of trees was assessed using the Christchurch City Council tree condition rating system (*April 2017*).

Of the 12 trees/groups of trees recorded:

- 1 group of trees were in a Good overall condition
- 4 trees/groups of trees were in a Fair overall condition
- 5 trees/groups of trees were in a Poor overall condition
- 2 trees were in a Very Poor overall condition

2.0 Site and Tree Details

Conical Hill Reserve is an iconic feature of Hanmer Springs village and is located on the Northern boundary of the village. On the Sothern half of the reserve there are residential properties which have boundaries with the reserve, Oregon Heights to the West and Alpine Avenue and Acheron Heights to the East. The two areas of the reserve I was asked to look at (see aerial map below), have eleven residential sections directly adjacent to them, ten of which currently have properties on them, one of which is currently a vacant lot.

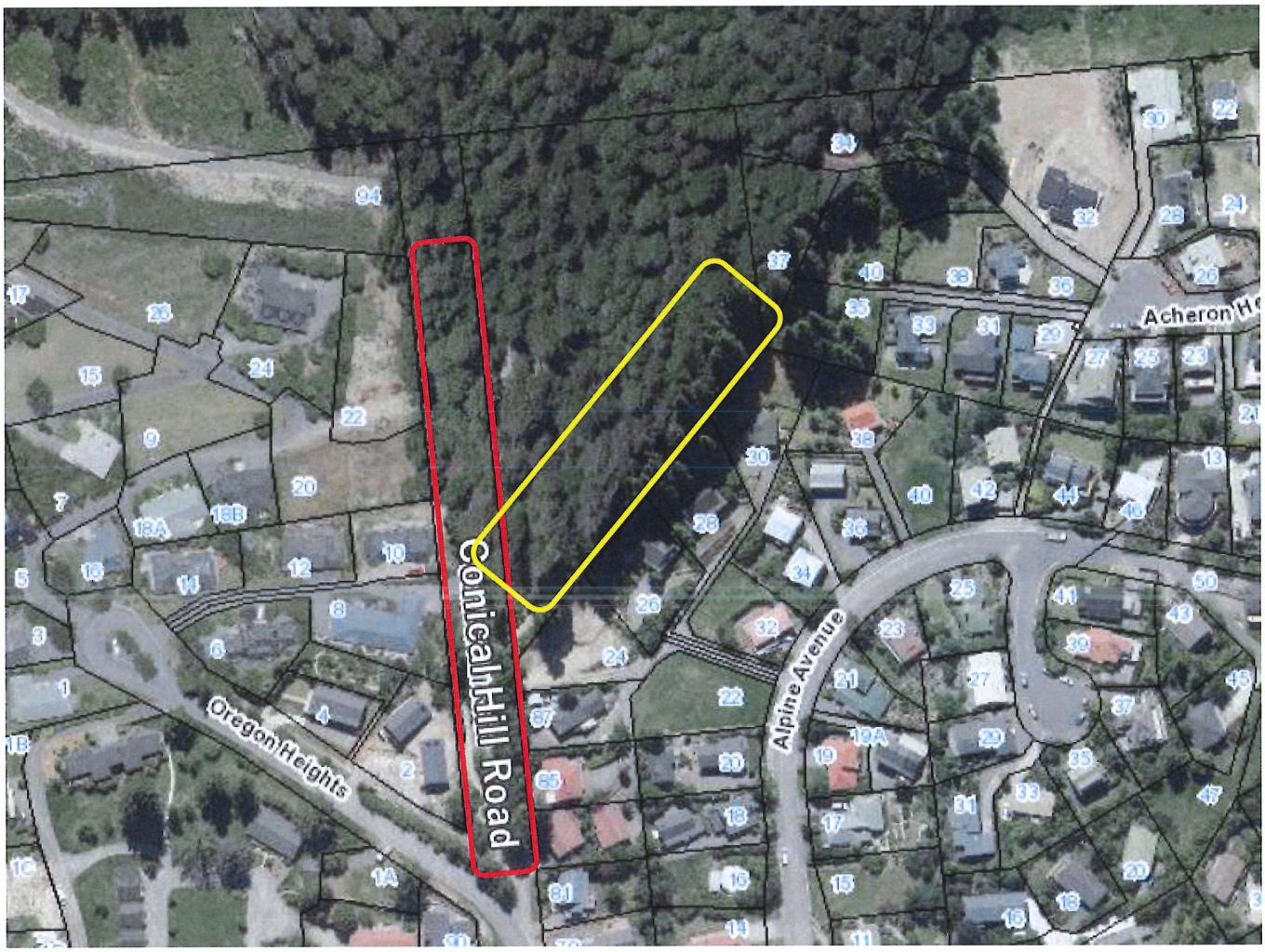


Figure One: Approximate boundary of tree inspection areas (red = 2019, yellow = new area 2020) within Conical Hill Reserve.

The tree cover within the reserve varies considerably across the areas included within this report. Tree species include Douglas Fir, Western Red Cedar, Lawson's Cypress, Radiata Pine, Ponderosa Pine, Grand Fir, Cypress, Rowan, Cherry, Lime etc.

Most of the trees inspected were in a good to fair overall condition. Any trees that were in a poor or very poor condition were assessed individually and recommendations made for the management of these trees.

Below is a description of the trees located within the areas looked at taken from the Conical Hill Reserve Forest Management Programme 2012-2022, as per the below plan.

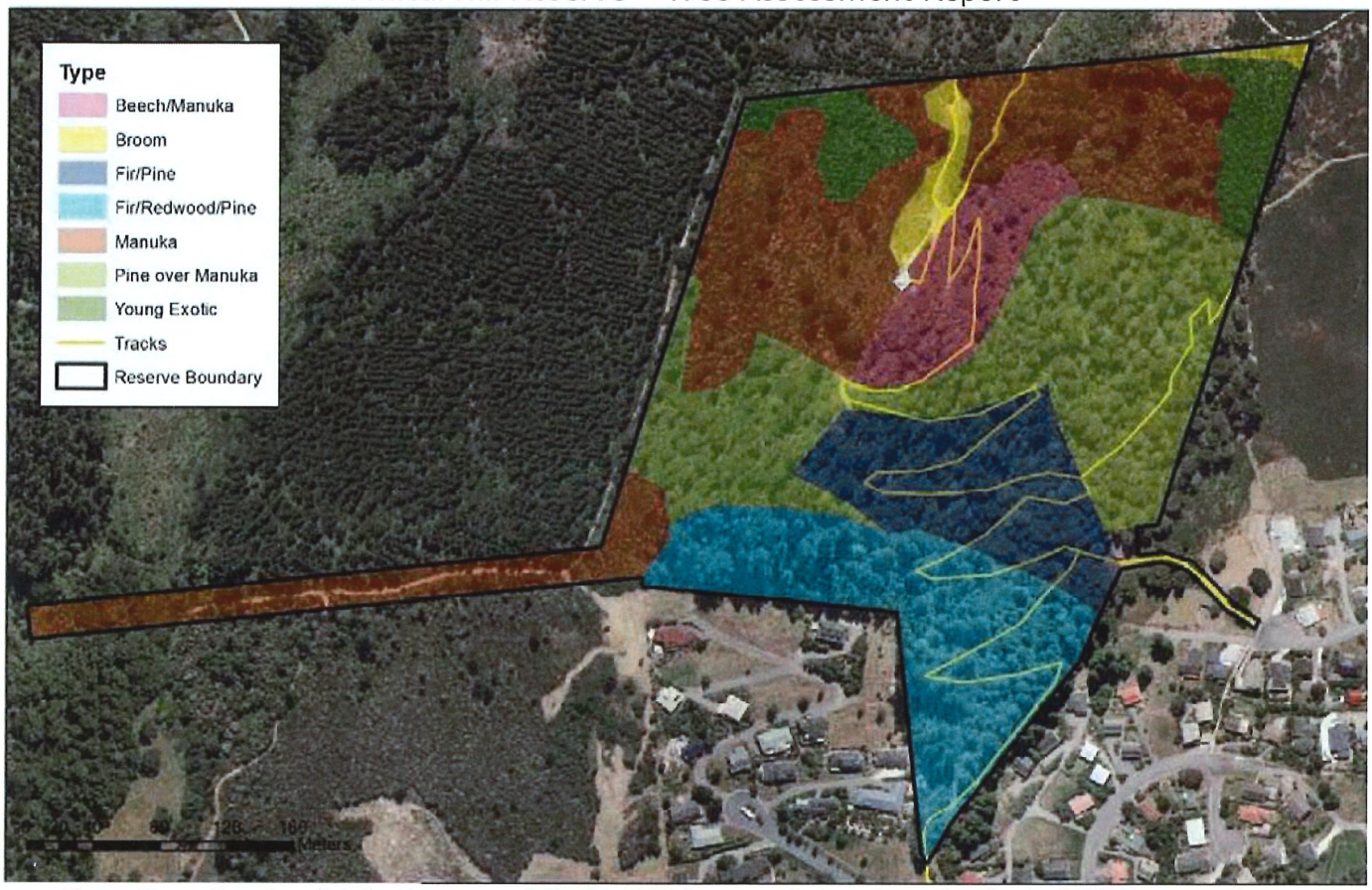


Figure Two: Species distribution map of Conical Hill Reserve (taken from the Conical Hill Reserve Forest Management Programme 2012-2022).

***"Fir/Redwood/Pine** – this is the original planting of trees estimated at around 1910. There are some significant specimens of trees here with the Grand Fir being notable trees in the District Plan. Some of these trees are over 40 metres in height. These trees are present right up to the border with residential houses."*

As stated above some of the trees included in this report are protected within the Hurunui District Plan, listed as T44 (see below). The trees within the Conical Hill Reserve are managed in line with both the Conical Hill Reserve Management Plan and the Conical Hill Reserve Forest Management Programme 2012-2022.

Below is one of the specific policies relating to the management of the trees located within Conical Hill Reserve, taken from the Conical Hill Reserve Management Plan.

"That the forest on Conical Hill be actively managed and maintained to a high standard in accordance with the Forest Management Programme 2012-2022, including the encouragement of native species regeneration."

T44	Giant firs *Abies grandis* California redwoods *Sequoia sempervirens*	Conical Hill Reserve	Hanmer Springs	Planted 1910

Figure Three: Table taken from the Hurunui District Plan Chapter 14 – Heritage, Schedule 14.3 – Notable Trees.

There is a group of very large Ponderosa Pines (CH10), on the South Eastern side of the hill, these are inter-planted with Grand Firs which appear to be some of the first exotic trees planted on Conical Hill circa 1910. It was one of these Ponderosa Pines which recently failed at the rootplate and fell onto an adjacent residential property. I found two of these trees to be twin leadered and to have significant included bark unions present where the trees split into two. These unions have the potential to fail and for either one or both of the twin leaders to split apart from the remaining tree. As these trees are both over 30m in height they have the potential to fail onto the walking track and potentially cause damage.

There are approximately 16 of the very large Ponderosa Pines in this area that are all in a similar condition. They are all growing on a downward slope forest debris is building up at the rear of the trunk/base of tree and causing some rotting of the bark and possibly the roots of the trees. It is easy to see the buttress roots on the front side of these trees but not the backs. After probing the ground directly adjacent to these trees it was found that the probe can be pushed easily into the ground indicating the possibility that no large structural roots are present in these areas. The majority of these pine trees are in a fair condition for health, with poor vigour and up to 40% foliage density loss. All trees have some form of lateral suppression due to growing in a forest environment in close proximity to each other.

There are several options for the management of these trees in the future.

The first option would be to retain all of the trees at the current time and get a detailed risk assessment carried out on the trees, either a QTRA or TRAQ assessment. These risk assessments can give a more defined risk analysis of potential tree failures.

The second option would be to reduce the height of all the Ponderosa Pines, effectively reducing the sail area and therefore the wind loading of the crown. Also, by reducing the height of these trees by up to a third of their current height it would reduce the risk of any of the trees reaching private properties if they were to fail at the rootplate. This operation would need to be carried out in a sensitive way to prevent damage to the surrounding Grand Firs and the understory planting.

The third option would be to remove all of these Ponderosa Pines in one go, whilst being very careful not to disturb the surrounding vegetation.

If all of these pines were removed it would let a lot more-light through and space to allow the natural regeneration of the firs which are growing in proliferation beneath the current mature trees. This would also change the wind loading on the remaining mature grand firs but all of these trees appear to be in good health and have large structural roots for the full circumference of the trunks, unlike the pines.

See excerpts below from Conical Hill Reserve Forest Management Programme 2012-2022, which talks about commercial harvesting of some of these original very large trees.

"5.3. Forest harvesting of commercially viable trees

Harvesting trees on the Hill could have a significant impact on the view from most of Hanmer Springs.

Therefore, any work done will have to be undertaken on a well-managed basis minimising the impact on the use of the walkway and the view from the village. There are three main areas of trees identified for potential harvesting. The first is the large trees on the lower slopes of the Hill and the slightly smaller (possibly younger), trees further up the Hill, which all appear to be deliberately planted.

Any harvesting of older "notable" trees on Conical Hill would require a resource consent."

"5.3.1.1 Management units 1A, 1B and 2

Consider low impact selective logging of trees that pose a danger to neighbouring properties or walkers on the track network. Investigate the helicopter harvesting method of extracting these selected trees; this will cause minimal impact to the native understory and track network. An annual assessment of the health and safety of these trees should be made to determine which trees should be removed."

3.0 Tree Assessment Method

The tree inspections for this report were carried out in October 2020 and included non-invasive visual tree assessment methods. The condition of each tree or group of trees was scored using the Christchurch City Council tree condition rating system (*April 2017*). All measurements are approximate.

The system evaluates the Health and Structure of a tree. The overall condition rating provided is the worst score for either Health or Structure (e.g. if a tree scores Good for Health and Poor for Structure, the overall Condition rating will be Poor).

Of the twelve individual trees/ groups of trees assessed one group of trees were found to be in an overall good condition, four trees/groups were found to be in a fair overall condition, with five trees/groups in an overall poor condition and the remaining two trees in an overall very poor condition.

Of the twelve individual trees/ groups of trees assessed, three trees/groups of trees scored a good for health, where a tree has no more than approximately 6-10% foliage density loss.

Of the twelve individual trees/ groups of trees assessed, seven trees/groups of trees scored a fair for health, where the condition of a tree is representative of the species, with approximately 11-30% decline.

Of the twelve individual trees/ groups of trees assessed, two trees/groups scored a poor for health, where the condition of a tree is below average for the species, with approximately 31-70% decline

Of the twelve individual trees/ groups of trees assessed, one group of trees scored a good for structure, where tree defects do not affect the structural integrity or continued well-being of the tree.

Of the twelve individual trees/ groups of trees assessed, four trees/ groups of trees scored a fair for structure, where defects are present but can be rectified in order to maintain the structural integrity and continued well-being of tree.

Five trees/ groups of trees assessed, scored a poor for structure, where tree maintenance may improve the framework or the continued well-being of tree. Where defects result in loss of structural integrity and may be mitigated but are unlikely to be rectified.

The remaining two trees/ groups scored a very poor for structure, where tree maintenance cannot improve the framework or the continued well-being of tree. Where defects result in a total loss of structural integrity and cannot be mitigated or rectified.

These survey results are only valid at the time of the report being written as changes that occur to the trees and/ or site conditions cannot be accounted for.

4.0 Observations

In general, the area to the West which was included within this report has been left to be as natural as possible, fallen trees and dead stumps are left to be used as wildlife habitats and natural regeneration can occur. The area to the East has been more managed as it is directly adjacent to the walking track up Conical Hill.

As per the tree survey data (found in appendix one), there were very few trees found in the areas inspected that require any removal or maintenance.

A very large Ponderosa Pine has recently blown over in strong winds taking a very large Noble Fir with it on the way down. The pine tree appears to have had very few large structural roots on the back side of the rootplate and mostly just smaller feeder roots. This would appear to be the cause for the catastrophic rootplate failure.

The pine tree hit the roof of a house (28 Alpine Ave), causing significant damage to the roof. Both trees when they fell also caused some damage to other trees, mostly just snapping branches on the way down (see photos below).

Figure 4: Showing the stumps of the recently fallen Ponderosa Pine and Grand Fir trees.

Figure 5: Showing a close up of the rootplate of the Ponderosa Pine with very few large structural roots visible.

Tree CH08 is a very large mature Ponderosa Pine which is growing less than 2m away from an adjacent Noble Fir. The Noble Fir has a very large (3m, 0.55m), girdling root which is growing into the base of the trunk of the Ponderosa Pine tree for a length of up to 1.2m. The Pine tree also is twin-stemmed with a significant included bark union at approximately 15m from ground level. The tree has significant suppression as is usual in a forest environment. The tree has poor vigour with up to 40% foliage density loss within the canopy. Tree is approximately 20m from a private property and only 5m from the main walking track. On the uphill side of the trees rootplate the probe can be easily pushed into the ground up to 0.5m.

Figure 6: Showing tree CH08 and its proximity to the adj Grand Fir and walking track.

Figure 7: Showing tree CH08 which is twin-stemmed with a significant included bark union.

Figure 8: Showing some of the Ponderosa Pines in group CH10 with younger Firs growing underneath.

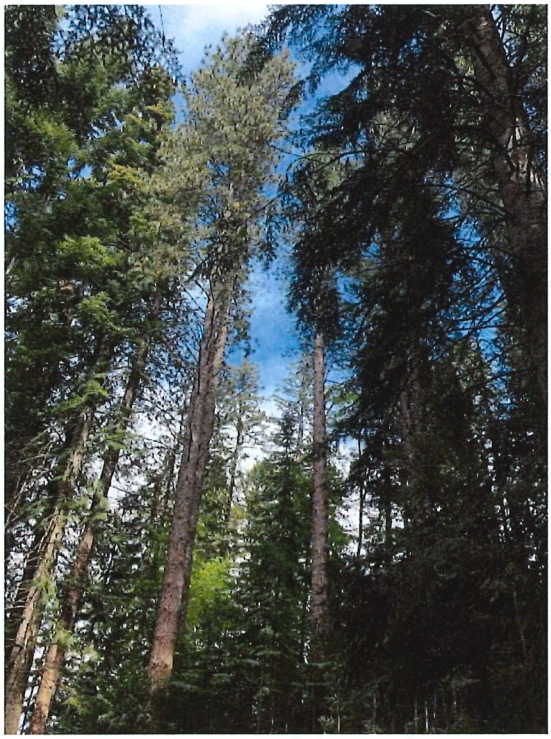


Figure 9: Showing some of the Ponderosa Pines in group CH10 with younger Firs growing underneath.

5.0 Recommendations

It is recommended that all urgent priority tree pruning, and removals are carried out within a six-month timeframe.

It is recommended that all high priority tree pruning, and removals are carried out within a twelve-month timeframe.

It is recommended that all medium priority tree pruning, and removals are carried out within a three-year timeframe.

It is recommended that all low priority tree pruning, and removals are carried out within a five-year timeframe.

It is recommended that the whole site and all trees are assessed on an annual basis to ensure that any changes to the trees or the site conditions are discovered in a timely manner and appropriate action can be taken to ensure public safety.

It is recommended that all tree pruning, and removals are carried out by suitably experienced and qualified arboricultural contractors, to improve tree health and for public safety.

It is recommended that all monitoring and tree assessments are carried out by suitably experienced and qualified arboricultural consultants, to ensure both tree and public safety.

Liz Warner - *BSc (Hons) Arboriculture*

Consultant Arborist

Warner Tree Care Ltd

Tree ID	Common Name	Latin Name	Height (m)	Canopy Width (m)	DBH (m)	Tree Health	Tree Form	Overall Condition	Tree Details	Recommendations	Priority
CH01	Laburnum	*Laburnum anagyroides x2*	4.0	5.0	0.06				Trees have been removed.		
CH02	Western Hemlock	Tsuga heterophylla	15.0	9.0	0.65	4	4	4	Tree is located on Eastern side of footpath, adj to an empty section. Majority of the lower canopy on the Eastern side is dead and upper crown looks sparse. Tree has significant ooze on Eastern side of trunk from ground level up to approx. 4m. Tree appears to have some decay present in lower trunk. Tree has not changed since last inspection, maybe even improved health in the upper canopy.	Monitor tree on an annual basis. Possibly long-term removal.	M
CH03	Douglas Fir	*Pseudotsuga menziesii x5*	15.0-20.0			3	3	3	Lots of soil and debris (large tree stumps, branches etc.), have been pushed up onto rootplate of several trees at the rear of number 10 Oregon Heights. This does not seem to have affected the trees as yet but is not recommended and if left as is will significantly affect the health of the trees and reduce the lifespan of the tree also. Unable to see root flare or buttresses on 5 trees. Ground level changed by at least 0.9m around one tree. No changes since last inspection.	Recommend removal of all soil and debris back to original ground level.	H

Conical Hill Reserve – Tree Assessment Report

Tree ID	Common Name	Latin Name	Height (m)	Canopy Width (m)	DBH (m)	Tree Health	Tree Form	Overall Condition	Tree Details	Recommendations	Priority
CH04	Douglas Fir	*Pseudotsuga menziesii*	15.0	5.0	0.50	3	5	5	Tree has failed at rootplate some time ago and is now growing on a 45degree angle. One large side limb has grown upright as a new leader. No changes since last inspection.	Either removal of tree altogether or just remove the original head back to the new leader and leave it as is.	L
CH05	Douglas Fir	*Pseudotsuga menziesii*	27.0	8.0	0.45	3	5	5	Partial rootplate failure some time ago, tree has since straightened up. Tree is leaning East away from the adjacent properties. No changes since last inspection.	Remove tree to ground level.	M
CH06	Lime	Tilia platyphyllos x3	12.0-14.0	6.0-8.0	0.15 - 0.25	2	3	3	Trees are directly adjacent to a building site for a new house. Soil has been mounded up against one side of the trunks up to 0.8m.	Recommend removal of all soil from against the trunk, back to original ground level.	M
CH07	Lawsons Cypress	Chamaecyparis lawsoniana	30.0	8.0	0.80	2	3	3	Tree has recently received mechanical damage to its trunk and surface root. Trunk wound is 2m above ground level, 1m length and up to 0.25m wide. Bark has been ripped off leaving bark hanging from the wound. Surface roots have been crushed by a heavy vehicle which has stripped the bark as well leaving bark hanging off.	Trim back loose bark with a clean sharp knife to help encourage reactive growth around the wound.	H

Tree ID	Common Name	Latin Name	Height (m)	Canopy Width (m)	DBH (m)	Tree Health	Tree Form	Overall Condition	Tree Details	Recommendations	Priority
CH08	Ponderosa Pine	Pinus ponderosa	30.0	10.0	1.35	4	4	4	Very large (3m, 0.55m), girdling root is growing into the trunk of tree 1.2m. Tree also is twin-stemmed with a significant included bark union at 15m up. Tree is growing less than 2m from adj Noble Fir. Significant suppression and die-back within the canopy. Tree is approx. 20m from private property and only 5m from walking track. On the back side of trees rootplate the probe can be easily pushed into the ground up to 0.5m.	Either removal of tree altogether or reduce height of tree by up to one third of its current height.	H
CH09	Ponderosa Pine	Pinus ponderosa	28.0	5.0	1.00	3	4	4	Tree appears to have poor vigour and up to 40% foliage density loss. Tree is approx. 3m away from large tree which has recently failed at the rootplate. Tree has some decay on rear side of trunk at the base going down into the roots. Probe easily goes 0.4m into ground at base of tree. Possibly not many live roots on this side of tree. Tree is sheltered by adjacent trees.	Either removal of tree altogether or reduce height of tree by up to one third of its current height.	H
CH10	Ponderosa Pine	Pinus ponderosa x16	30.0	N/A	N/A	3	4	4	There are multiple (approx. 16 total), mature Ponderosa pine trees which have a very similar issue to CH09 in that as they are growing on a downward slope forest debris is building up at the rear of the trunk/base of tree and causing rotting of the bark and possibly the roots of the trees. It is easy to see the buttress roots on the front side of these trees but not the backs. After probing the ground directly adjacent to these trees it was found that the probe can be pushed easily into the ground indicating the possibility that no large structural roots are present in these areas. The majority of these pine trees are in a fair condition for health, with poor vigour and up to 40% foliage density loss. All trees have some form of lateral suppression due to growing in a forest environment in close proximity to each other.	Either removal of trees altogether or reduce height of trees by up to one third of its current height.	M

Tree ID	Common Name	Latin Name	Height (m)	Canopy Width (m)	DBH (m)	Tree Health	Tree Form	Overall Condition	Tree Details	Recommendations	Priority
CH11	Grand Fir	Abies grandis x3	10.0-20.0	N/A	N/A	2	2	2	Trees have multiple snapped hanging branches from where two large trees fell over recently and hit these trees on the way down.	Remove all snapped hanging branches.	H
CH12	Ponderosa Pine	Pinus ponderosa	28.0	7.0	0.95	3	4	4	Tree is twin-stemmed with a significant included bark union at 12m up. Significant suppression and die-back within the canopy. Tree is approx. 30m from private property and only 5m from walking track, on back side of trees rootplate the probe can be easily pushed into the ground up to 0.5m.	Either removal of tree altogether or reduce height of tree by up to one third of its current height.	H
CH13	Grand Fir	Abies grandis x2	30.0	N/A	N/A	3	3	3	Trees have multiple dead branches within the lower canopy, which is expected with trees growing in close proximity in a forest environment. There are also several dead hanging branches directly over the walking track.	Remove dead hanging branches only, over the walking track.	H

Field	Description
Tree ID	Asset identification numbers
Tree Species	Scientific tree names
Assessment Date	Date of tree inspection for this report
Height (m)	Tree height in metres
Canopy Width (m)	Canopy width in metres
DBH (mm)	Trunk diameter(s) at 1.4 metres above ground
Condition Rating	1 = excellent
	2 = good
	3 = average
	4 = poor
	5 = very poor
Tree Details	Descriptions and tree defects
Maintenance Recommendations	Maintenance actions required
Maintenance Priority	L = low (Within 5yrs)
	M = medium (Within 3yrs)
	H = high (Within 1yr)
	U = urgent (Within 6Months)


Conical Hill
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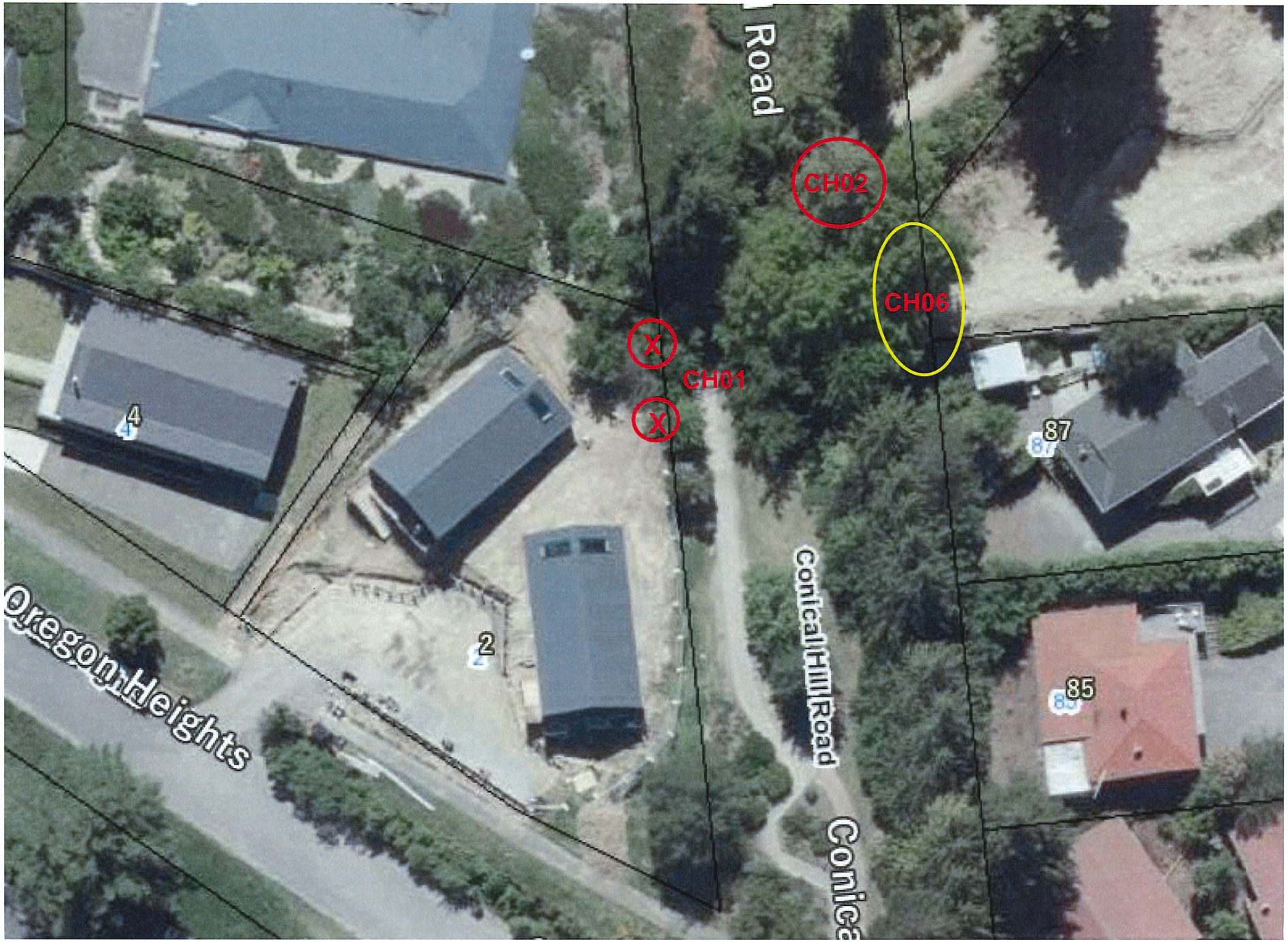
Road
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CH06
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CH01
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Oregon Heights
Conical Hill Road
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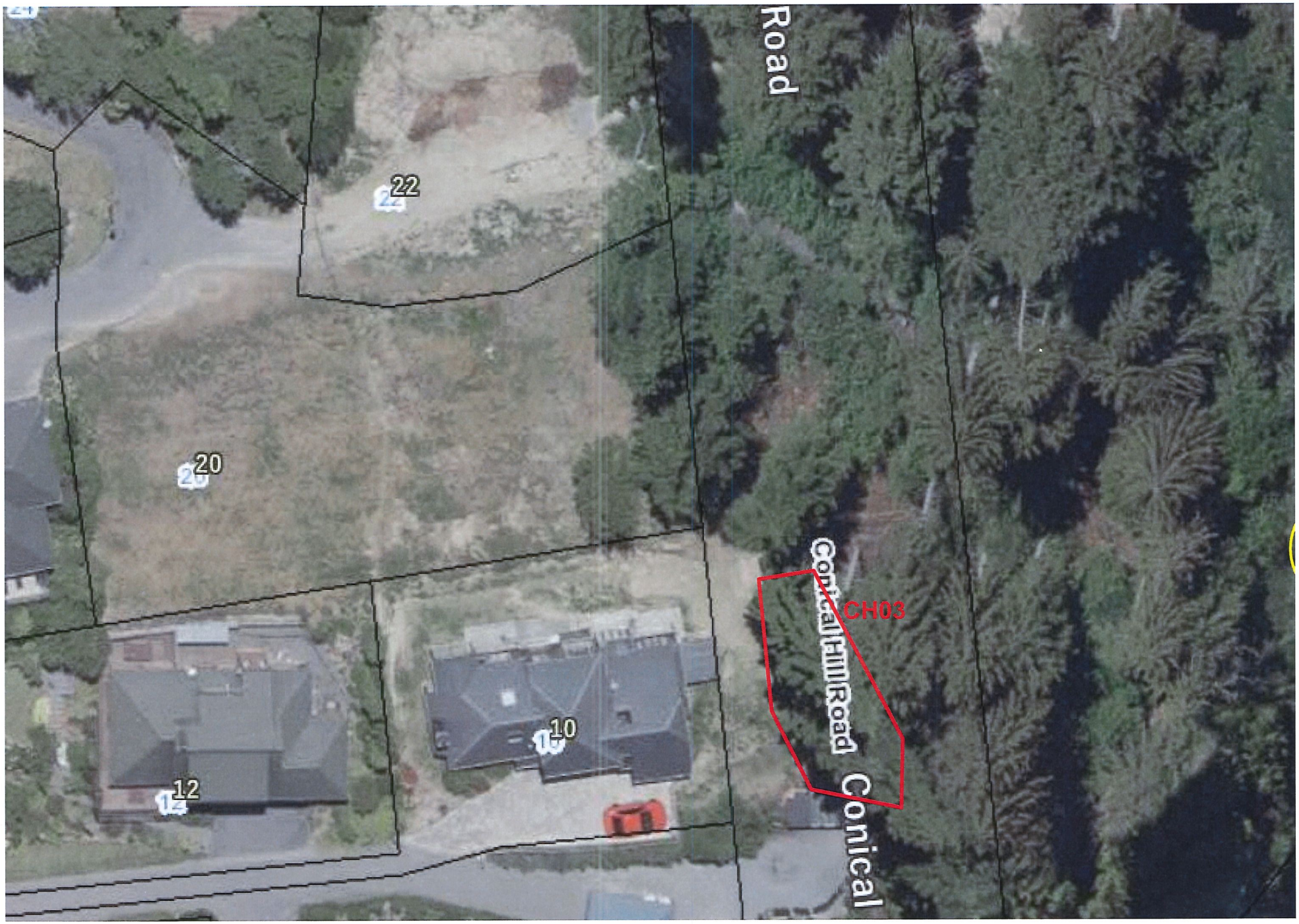
Road
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22


CH13
CH12
CH10
CH09

CONICAL HILL RESERVE

Landscape Concept Plan

January 2018

HURUNUI
District Council

Align

CONICAL HILL RESERVE LANDSCAPE CONCEPT PLAN

Prepared for: Hurunui District Council (HDC)	
Prepared by: Align Ltd	
Concept Plan	19.01.18
Designed: Align Ltd - Tim Reed & Anne Wilkins	19.01.18
Approved: Align Ltd - Anne Wilkins	22.01.18

CONTENTS

Introduction

Conical Hill is a key asset for the Hanmer Springs community and is described as "a significant aspect of the Hanmer Springs experience, particularly as a family outing or as a prelude to soaking in the thermal pools." (Hurunui Reserves Management Plan 2012).

The Conical Hill walkway is located approximately 1.5km away from the Hanmer Springs Thermal Pools and Spa and the centre of the township. The Conical Hill walkway leads to a lookout at the 550m summit, providing views across the town and wider region (southward over the entire Hanmer Basin, westward to the Waiau River, and northward toward Jacks Pass and the Hanmer Range).

Originally, Conical Hill was covered in kanuka and tussock reflecting the Maori name for the Hanmer Plains, 'Mania Rauhea' or 'plain of shining tussock' (Hurunui Reserves Management Plan 2012). At the start of the 1900's the zigzag track was cut into the hillside with exotic forests first planted in 1910.

The site is owned and managed by Hurunui District Council, and comprises 11.7 hectares of medium to steep terrain, surrounded by forest land and private landowners at the base of Conical Hill. Vegetation on Conical Hill consists of a mixture of exotic species and regenerating natives.

Project

Align are investigating options to upgrade Conical Hill Reserve on behalf of Hurunui District Council. This is designing refurbishments to address several relevant objectives within the Hurunui Reserves Management Plan (2012) that are yet to be met; including:

- *"That the walking tracks to the Conical Hill summit be maintained to a high standard"*
- *"That the Conical Hill summit lookout be enhanced and kept in a tidy condition, including the removal of weeds and exotic tree species blocking the view to the Hanmer Basin, and the installation of an interpretation panel detailing surrounding place names which can be seen from the summit."*
- *"That educational panels are installed along the walkway as appropriate to inform walkers of relevant flora and fauna."*
- *"That the eroded short cuts to the summit be closed or stabilised with steps as appropriate."*
- *"That mountain bikes and other wheeled vehicles be prohibited from the reserve."*
- *"That a toilet be installed."*

Concept Plan

The concept plan will address these issues by designing for several key components.

Create refurbishments in key areas implented through:

- *Public amenities such as seating, bins, amenity features, and hard surfaced environments; and*
- *Creation of a public toilet block representing appropriate placement, location and circulation around its immediate area.*

Increase legibility and information by:

- *Aligning path routes with desire-lines*
- *Wayfinding linkages*
- *Signage for user groups (pedestrian / vehicle prohibition etc)*
- *Stabilising eroded short cuts; and*
- *Entrance signs and information boards.*

Ecological planting design:

- *Enhancing existing native planting; and*
- *Establishing options for removal of weeds and exotic tree management.*

Conical Hill Key Issues and Opportunities

1. Entrance Legibility
Current primary entrance to Conical Hill is not well signposted.

Opportunity to create a more prominent gateway by designing the entrance with signage, planting and footpath to base of stairs.

2. Eroded Short Cuts
Numerous shortcuts across the walkway are heavily eroded, steep and potentially dangerous.

Opportunity to formalise a number of the shortcuts where appropriate and restrict access where shortcuts are not appropriate.

3. Wayfinding
Limited signage containing track information.

Opportunity to improve signage at key points with track (track difficulty, return trip times etc.) and educational (flora and fauna) information.

4. Key Area Refurbishments
Poorly developed key areas including Conical Hill Rd Entrance and the Conical Hill Summit Lookout, lacking public amenities and maintenance required.

Opportunity to address maintenance issues and introduce enhanced public areas through landscaping features.

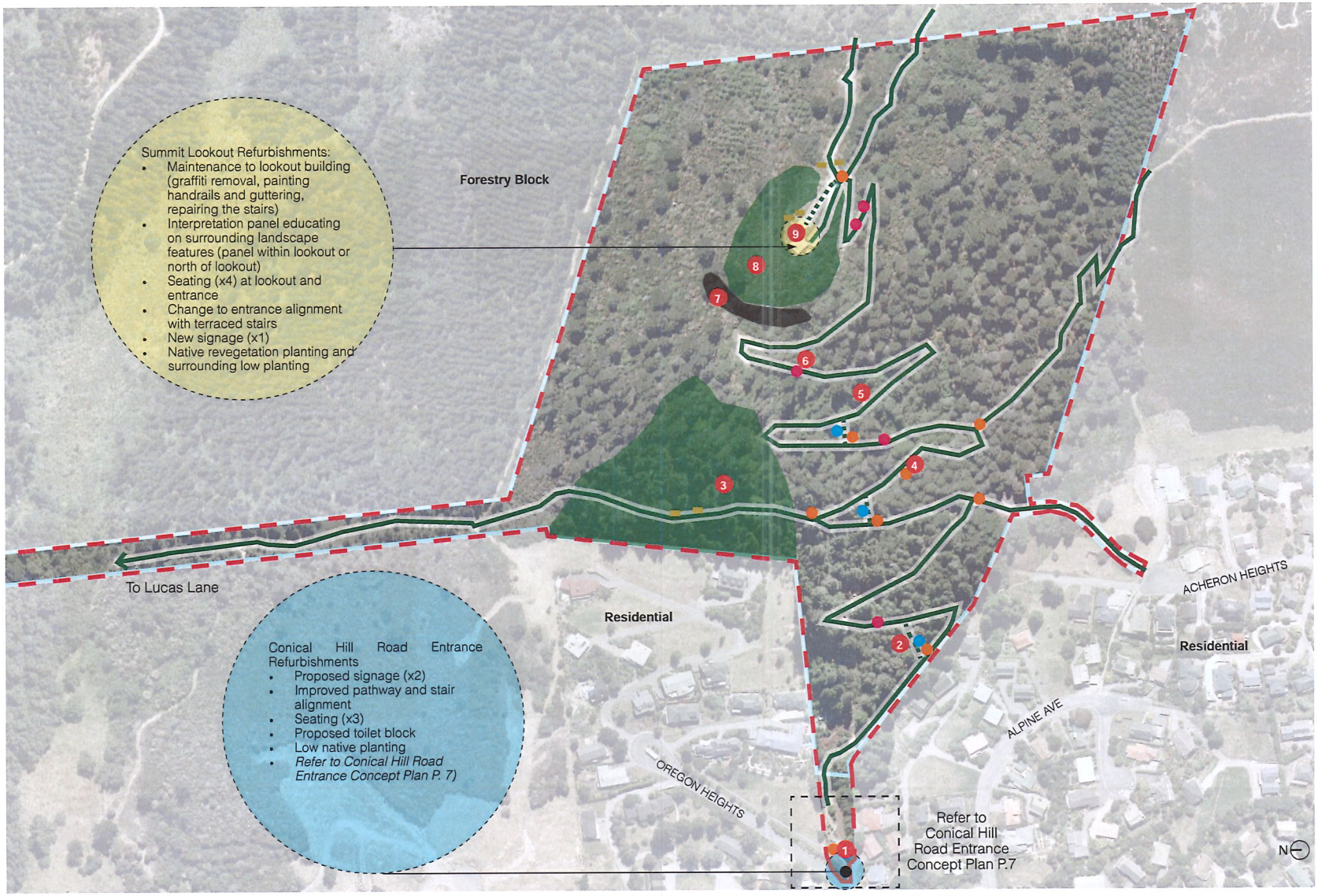
5. Ecological Design
Large areas of Conical Hill covered in exotic trees and groundcover plant species with pockets that block views across the Hanmer Basin.

Opportunity to remove weeds and exotic trees blocking views across the Hanmer Basin. Target revegetation planting of native species in key areas.

6. Path Routes
Current path alignment does not match walking desire-lines (tracks worn into grass or planting).

Opportunity to formalise routes through hardsurface and planting relocation, removal or reinstatement.

Concept Plan - Overall



NOTES:

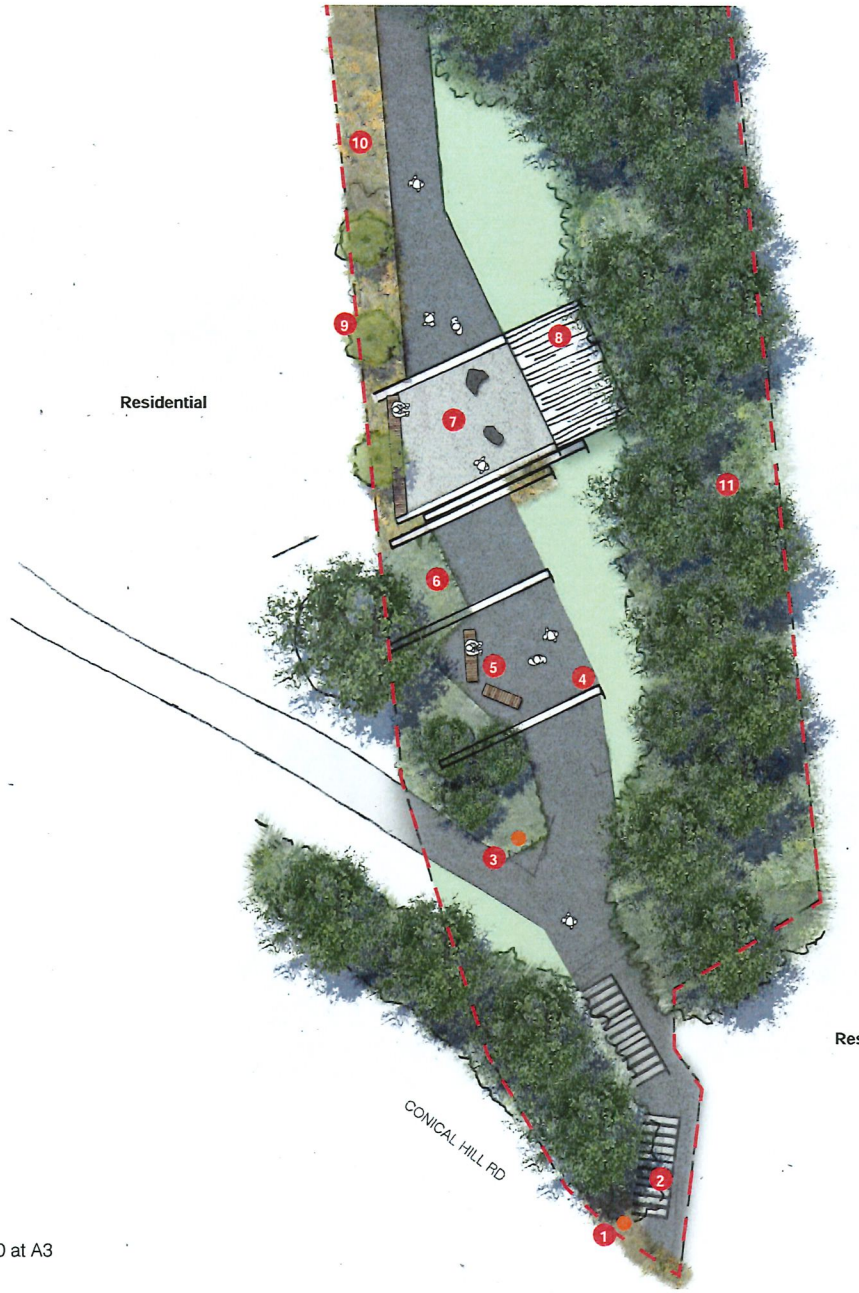
1. Conical Hill Road Entrance Refurbishments (See notes adjacent)
2. Formalising of shortcut paths with steps, planting and signage.
3. Native revegetation planting
4. Nine new track wayfinding / education panels within native revegetation (at locations shown) to highlight restoration and list plant species
5. Infill planting of existing native vegetation areas across Conical Hill where required
6. Shortcut closed. Replaced with native planting, rocks or timber barriers to restrict access
7. Clearance of exotic trees blocking views across the Hanmer Basin
8. Native revegetation planting of Summit Lookout area
9. Summit Lookout Refurbishments (See notes adjacent)

KEY:

- Existing Walking Tracks
- Proposed Walking Tracks
- Proposed Entrance Signage
- Proposed Track Wayfinding/ Educational Signage
- Proposed Seating
- Shortcuts to formalise: clearance of vegetation and path installed
- Shortcuts to close; combination of planting, and timber path edge barriers
- Proposed Native Revegetation
- Existing Exotic Trees to clear
- Proposed Refurbishment Key Areas

Scale: 1:2500 at A3

Concept Plan - Conical Hill Road Entrance



NOTES:

1. Proposed signage at base of stairs.
2. Widening of stairs from Conical Hill Road and relocation of existing handrails to the left side of stairs to allow users to alternate between the stairs and ramp. Stairs shortened to allow for the addition of a footpath at the base of the steps to ensure users aren't stepping directly onto road. Additional planting between kerb and footpath to direct users along footpath.
3. Additional clear and legible wayfinding signage within planting area.
4. Realignment of paths and planting areas. Removal of planting and existing trees to better allow sightlines through the space.
5. Inclusion of seating areas.
6. Existing low native planting retained with weeding carried out to remove pine saplings and other undesired species.
7. Terraced area in hardsurface with feature rocks. Timber seating area with native planting behind to define the space.
8. Toilet block with water fountain and drink bottle filling station.
9. Proposed new specimen trees
10. Low native planting to boundary to define space.
11. Existing exotic vegetation retained.

KEY:

- Proposed Signage
- Proposed Trees
- Existing Trees
- Proposed Planting
- Existing Planting
- Grass
- Timber Seats
- Rocks

Perspective Sketch - Eroded Slope Formal Stabilisation

Proposed

NOTES:

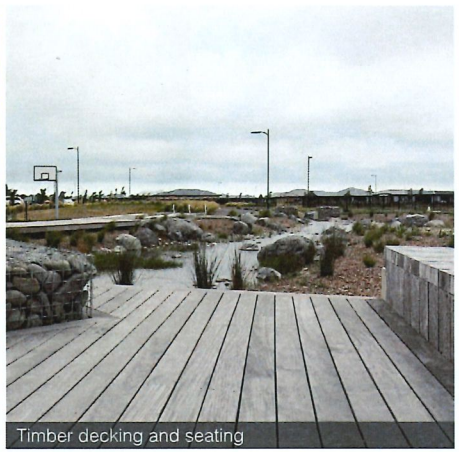
1. Boulders to integrate stairs within surrounding area and define pathway.
2. Concrete and timber stairs with potential timber fengraving detail on tread.
3. Signage with wayfinding information to direct users. Signage to also display educational panels with information on flora and fauna.
4. Native revegetation planting.

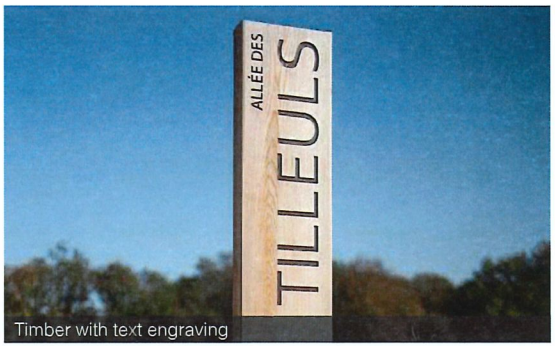
Existing

Exemplar Imagery


Terraced seating/stair combination


Clear, legible signage


Timber decking and seating



Timber with text engraving

Engaging education panels


Native revegetation planting


Toilet block example


Native revegetation planting and rustic character furnishings

Revegetation Planting Palette

SHRUBS & GROUND COVERS

Carex
- Carex testacea

Narrow leaved Snow Tussock
- Chionochloa rigida

Mingimingi
- Coprosma propinqua

Hebe
- Hebe odora

Dwarf Toe toe
- Chionochloa flavicans

Red Tussock
- Chionochloa rubra

Broadleaf/ Kapuka
- Griselinia littoralis

Hebe
- Hebe subalpina

SHRUBS & GROUND COVERS

Whararíki/ Mountain Flax
- Phormium cookianum

Silver Tussock
- Poa cita

Harakeke
- Phormium tenax

TREES

Mountain Beech
- Fuscospora cliffortiodies

Ribbonwood
- Plagianthus regius

Kanuka
- Kunzea ericoides

Totara
- Podocarpus totara

Two types of planting are proposed in the concept plan for Conical Hill.

1. Feature Planting
For key areas such as entrances, formalised shortcuts etc, low flaxes, small shrubs and tussocks should be used to provide structure to spaces and aid in wayfinding while maintaining viewsheds to surrounding areas.

2. Revegetation planting
Adjacent to the track and on other areas of the hill, plant species shall include beech and totara trees on higher slopes to blend the revegetation in with the existing vegetation on Conical Hill.

Planting types to be developed further in next stages of design.