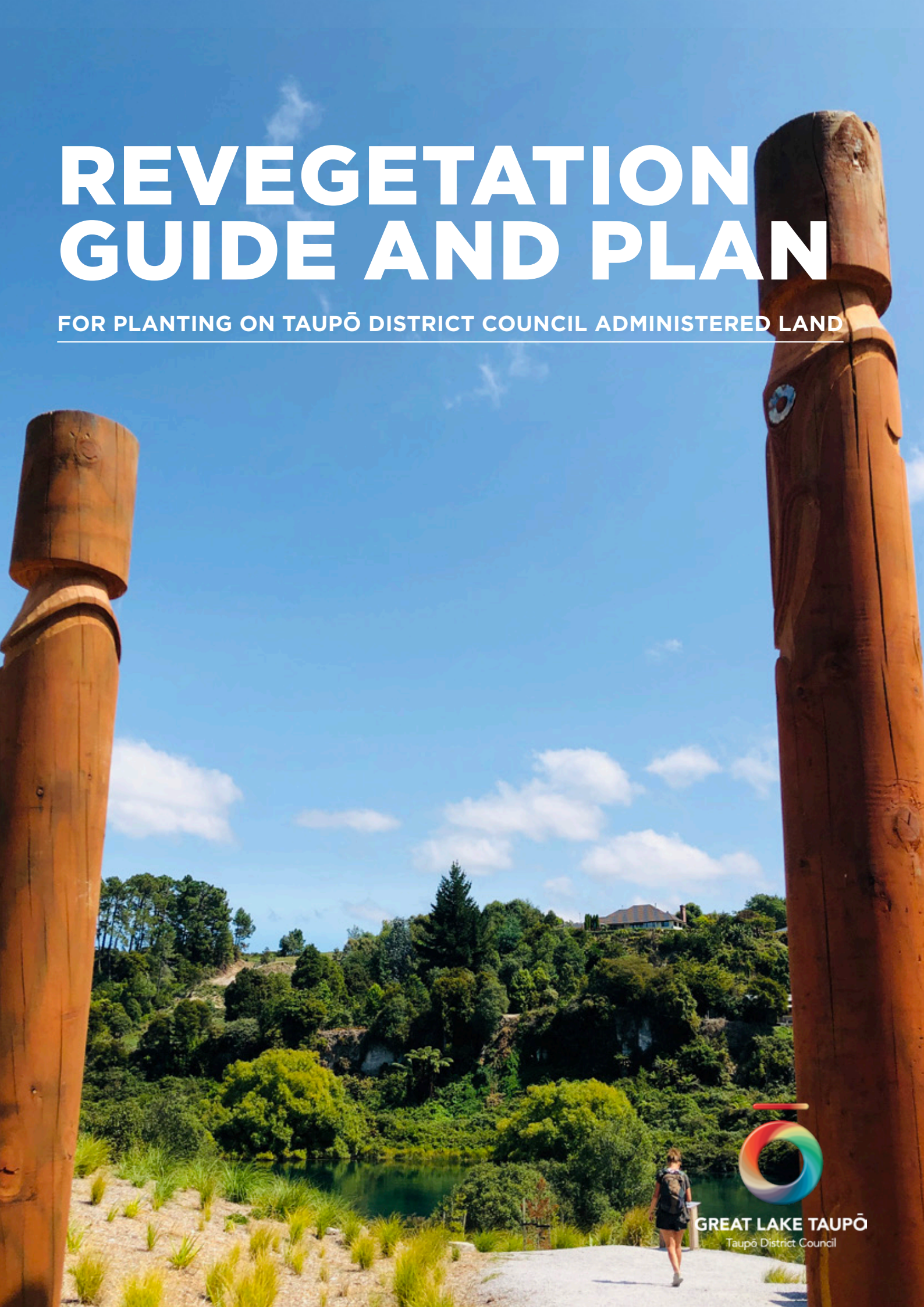
REVEGETATION GUIDE AND PLAN

FOR PLANTING ON TAUPŌ DISTRICT COUNCIL ADMINISTERED LAND



GREAT LAKE TAUPŌ
Taupō District Council

CONTENTS

With Thanks – To Greening Taupō, Kids Greening Taupō, our Iwi Partners, staff at Waikato Regional Council, and staff at Taupō District Council.

Images – Community planting photographs kindly supplied by Greening Taupō. Tree and shrub images sourced online from the late Phil Bendle Collection: citscihub.nz/Category:Phil_Bendle_Collection.

INTRODUCTION

This operational Council Plan and Guideline is intended to assist in staff decision making on Revegetation Plantings on land administered by Taupō District Council. The guide may also be used to inform best practice planting and maintenance methodologies for Revegetation Plantings as part of other community planting programmes, environmental restoration on other land, and mitigation planting as part of a resource consent process.

This revegetation plan and planting guide sets out the project objectives, scope, intended methods and steps to provide a standard methodology for planting on land administered by Taupō District Council. It uses a combination of Mātauranga Māori and 'Western Science' technical terminology as the basis of the objectives that it seeks to achieve. Technical words and terms used in this report are provided in the glossary in section 2.

This revegetation plan and planting guide allows for a range of methods so that planting and maintenance is done to best possible practice as the situation requires. Alternative methods to the guide may be considered where they achieve the desired outcome for each of the planting and maintenance requirements. This plan is a guide and may be updated and amended as required.

BACKGROUND

Taupō District Council has an existing Tree and Vegetation Policy for planting vegetation on Council administered land in the Taupō rohe. Policy 1.10 of that policy supports community plantings on Council administered land subject to approval.

Revegetation planting is one type of community planting. Revegetation planting takes place on Council administered land for several reasons. It supports community health and well-being through the ethics of kaitiakitanga – stewardship, manaakitanga – caring and well-being, and whanaungatanga – sense of belonging. Revegetation planting supports local ecosystems – provides corridors, food and habitat for native and indigenous fauna and indigenous vegetation, medicinal plants for rongoā, and helps restore riparian margins, forest, geothermal and wetland habitat, which in turn can lead to improved water quality and returning mauri or life force to waterways, wetlands and geothermal sites.

Taupō District Council has been partnering for many years with community groups to plant on council administered land. Project Tongariro organisation and its subgroups Greening Taupō and Kids Greening Taupō, are examples. Other organisations such as energy companies, Department of Conservation, Regional Councils and Iwi groups hold regular community plantings on their land also.

Land administered by Taupō District Council is acquired through various methods – such as reserve contributions from developments, and roading corridors where the State Highway network has been upgraded or realigned. Wairakei Drive is one example and has been planted by Greening Taupō, Council and other community groups to enhance the ecological linkages from Wairakei Golf and Sanctuary to town.

There are also other plantings that occur throughout the Taupō District that may eventually become Council administered or are part of mitigation for resource consent applications. Mitigation planting may be required as a condition of approving a resource consent, and so it is very important the vegetation will thrive and achieve the required outcome. This document provides guidance Council's preference for what species are planted and how this planting should occur.

In addition to the plantings, trials are being undertaken around the Taupō District to test appropriate plant species for the conditions by various groups such as Taupō District Council, Greening Taupō, Department of Conservation, Tane Tree Trust Forest Research, Scion, and Regional Councils. This plan aims to gather this information where it is readily available into a usable guide that can be updated as and when required.

OBJECTIVES

THE OBJECTIVES FOR THE REVEGETATION PLANTING PLAN AND GUIDE ARE TO:

- Implement Policy 1.10 of the TDC Tree and Vegetation Policy to provide an informed plan for where community plantings can occur on Taupō District Council administered land.
- Establish criteria for identifying Council or other land that may be suitable for revegetation planting, and a process for determining specific location of plantings.
- Identify Council administered land suitable for revegetation plantings that work towards achieving an overarching ecological restoration plan for the Taupō District.
- Promote indigenous biodiversity in the Taupō District and provide a better way of maintaining difficult sites.
- Planting a range of key species to ensure that local native birds have adequate food supply through all seasons.
- Establish a best practice planting methodology and ongoing maintenance plan for revegetation plantings on Council administered land or mitigation planting as part of a resource consent or plan change.
- Include Mātauranga Māori values and practices with Western Science approaches and apply these to assist in ecological restoration as well as establishing areas for cultural enhancement, such as protecting and enhancing the mauri of streams and waterways.
- Enable the guide to be used voluntarily for plantings on land not administered by the Taupō District Council.
- Develop a plan that can be readily updated to align where required with a regional Biodiversity Strategy, the National Policy Statement on Indigenous Biodiversity, or where relevant advances in research and technology occur.
- Identify where further actions are recommended or required to achieve the above objectives. This may include mapping, ongoing monitoring, or development of detailed planting plans for specific sites.
- Note and update where recommendations are made for further actions, such as ongoing mapping, monitoring, planting plans.

GLOSSARY OF TERMS

These definitions are partly from the draft National Policy Statement on Indigenous Biodiversity. For consistency also refer to the NPSIB for any updates.

BUFFER Refers to the space around core areas of ecological value that help to reduce external pressures; and buffering has a corresponding meaning

CONNECTIVITY Refers to the links or connections between habitats and ecosystems that provide for the movement of species and processes among and between the habitats or ecosystems.

ECO-SOURCED Plants grown from seeds collected from naturally-occurring vegetation in a locality close to where they are replanted as part of a native planting project.

ECOLOGICAL Relating to or concerned with the relation of living organisms to one another and to their physical surroundings.

ECOSYSTEM Means the complexes of organisms and their associated physical environment within an area (and comprise: a biotic complex, an abiotic environment or complex, the interactions between the biotic and abiotic complexes and a physical space in which these operate)

EPHEMERAL WATERWAYS Waterway that is not constantly in flow and may be seasonally dry or occasionally in flow.

FRAGMENTATION In relation to indigenous biodiversity, refers to the fragmentation of habitat that results in a loss of connectivity and an altered spatial configuration of habitat for a given amount of habitat loss.

HABITAT The area or environment where an organism or ecological community lives or occurs naturally for some or all of its life cycle, or as part of its seasonal feeding or breeding pattern.

INDIGENOUS FAUNA The animals that are native to the ecological district the area is located in.

INDIGENOUS VEGETATION Vascular and non-vascular plants that, in relation to a particular area, are native to the ecological district to which that area is located.

MAHINGA KAI Garden, cultivation, food-gathering place.

MĀTAURANGA MĀORI Customary Māori knowledge and expertise, traditional knowledge or intergenerational knowledge.

MAURI Life force or essence

MITIGATION PLANTING Planting to minimise or reduce the impact of a development, land use or subdivision, and may be a condition of granting a resource consent application.

PRIMARY SPECIES Types of plants placed in the ground first to begin the revegetation process and establish an initial planting cover.

REVEGETATION PLANTING Endemic, indigenous, or native vegetation with the intention of recreating pre colonisation planting

RIPARIAN MARGINS The edges or banks of rivers, lakes and streams.

ROHE The area, locality or boundary of interest

RONGOĀ Indigenous vegetation used for traditional Māori use for medicinal or health benefits

SECONDARY SPECIES types of plants placed in the ground several years after the primary species are established to progress the initial planting cover to taller growing longer lasting species.

SNA (SIGNIFICANT NATURAL AREA) An area identified within the District Plan as meeting the criteria for having significant indigenous vegetation or significant habitat for indigenous fauna.

PART ONE

PLANTING GUIDE AND SPECIFICATIONS

CHECK LIST FOR PLANTING ON TDC ADMINISTERED LAND

Community plantings on land administered by Taupō District Council must have appropriate staff approval prior to beginning planting. In some instances, depending on the scale of planting, adjacent or potentially affected neighbours should be kept informed or consulted with. The following provides a guide or checklist for community plantings on council administered land:

- Talk to the appropriate council staff to determine if the site is available or suitable for community planting. This may include approval from a relevant parks or asset manager prior to beginning the process.

- What is the council reserve classification? For instance, is it for storm water purposes, recreation, local purpose etc? This will assist in determining the relevant council staff members to consult with.

- Plantings need to comply with the TDC Tree and Vegetation Policy, consistency with reserve classifications, reserve management plans, code of practice, asset management / infrastructure plans, CPTED Principles (Crime prevention through environmental design), mitigation planting requirements or height restriction covenants, and the Taupō District Plan.

- Contact service providers to locate all over ground and underground services, designations and easements. This may include stormwater, wastewater, potable water, power, gas, telecommunications and council assets. Approval may be required from the applicable service providers, designation or easement holders.

- Ensure areas for community planting are safe to do so – determine access to and within the site, possible soil contamination, proximity to roads, ground slope, stability and temperature. For overhead and underground services – check www.beforeudig.co.nz and follow the correct procedures.

- Locate property boundaries, if planting on TDC administered land – check where the boundaries are on site. An on-site survey may be required - don't assume fence lines are legal boundaries.

- For plantings on TDC administered land with particular significance to Iwi Partners; engagement with mana whenua (Iwi/hapū authorities etc) is encouraged both at the planning stage, and involvement in the planting process. If further knowledge is sought relating to mātauranga Māori, contact relevant mana whenua for the chosen site.

- Talk to adjacent neighbours if the proposed planting is likely to change their outlook – have a community neighbourhood day or do a flyer drop with contact details to enable neighbours to have a say.

- Provide council with a plan of proposed planting showing the above – for example: property boundaries, all known services and assets, easements, existing structures and vegetation, and area for proposed planting.

- Wait for TDC approval before beginning. Some revegetation or community planting projects may require Council Elected Members approval. Be aware this has a process and timeframe before planting can commence.

- Ensure sufficient funds are available for community planting site preparation and on-going maintenance.

REVEGETATION PLANTING

Typical revegetation planting areas on Council administered land include gullies, foreshores, banks and erosion control, and mitigation planting. Part 2 of this document outlines the criteria for selecting specific TDC sites. The following provides an overview of revegetation planting in these areas and a list of recommended plants.

The following provides an overview of revegetation planting in these areas and a list of recommended plants.

CRITERIA FOR SPECIFIC PLANTING LOCATIONS WITHIN TDC SITES

- Areas that remove or reduce need for mowing of steep banks.
- Replace retired monoculture or plantation forestry areas with native revegetation.
- Areas that TDC and community groups have identified as an area of educational interest for local schools or organisations.
- Areas that add to existing planting, replace or convert exotic to native, or connect existing planting areas.
- Safe for community to access and work within for planting and ongoing maintenance.
- Feasible to plant – some forestry plantation areas may not be feasible to replace with native, some areas may not be feasible to remove weeds etc.
- Proximity to urban areas can help with engaging local communities to be involved with planting and ongoing maintenance.

CRITERIA FOR TDC SITE SELECTION

- Proximity to existing and proposed Significant Natural Areas (SNAs).
- Potential to improve connectivity, reduces the effects of fragmentation, and creates linkages between SNAs or provides a buffer to SNAs.
- Gullies and riparian areas not suitable or with low development potential, or planned for storm water/ passive recreation network
- Erosion control on waterways or banks of storm water gullies
- Riparian planting on the banks or margins of permanent and ephemeral waterways
- Add to existing planting areas, provide a food source for birds and native insects

GENERAL

As a guide, the plants listed in this section are good colonising or primary species that are tolerant to Taupō conditions and Taupō's pumice soils. Plants may still require areas of good soil particularly where earthworks been undertaken, and care during the maintenance period.

The plant list is not limited to these species, these plants have been most successful in revegetation plantings on Taupō District Council administered land. Once the primary species are established after approximately five years, secondary species can be planted, so long as they are appropriate for the location and height in proximity to adjacent properties. Short lived exotic species that can provide a nectar source out of season for birds or use for weed suppression should also be considered, for example Lucerne to shade out blackberry.

The list of plants also suggests species that are good for planting areas A, B, C and D shown in the cross sections under gullies, erosion and mitigation planting areas.

In all instances, planting on Taupō District Council administered land must adhere to the Taupō District Council Tree and Vegetation Policy.

PRIMARY SPECIES

PLANT NAME

PRIMARY SPECIES

ECOLOGICAL VALUES

BIRD AND INSECT LOVING

RIPARIAN/EROSION USE

TRADITIONAL USE

ABCD PLANTING AREAS

AUSTRODERIA FULVIDA NORTH ISLAND TOETOE

Good bank stablising large growing shrubby grass up to 3.5m tall when in flower. Prefers stream sides, damp free draining soils. Good for erosion and riparian planting.

Good for general revegetation and particularly good species for planting Areas A, C and D.

Traditional use; Leaves and stalks used in baskets, kite, roof thatching, tukutuku panelling.

ABCD

CHIONOCHLOA FLAVICANS MINIATURE TOETOE

Good bank stablising low growing shrubby grass. Prefers stream sides, damp free draining soils. Good for erosion and riparian planting.

Good for general revegetation and particularly good species for planting Areas A, C and D.

Traditional use; Leaves and plumes were used in whare construction.

ACD

COPROSMA ROBUSTA KARAMŪ

Hardy shrub and good for general mitigation planting areas.

Fruit very popular with native birds. Roots readily from cuttings and can be grown from seed.

ABC

DODONAEA VISCOSA AKEAKE

Forms a small open tree from sea level to 550m above sea level. Attractive bright green foliage.

Good for general mitigation planting areas.

ABC

PRIMARY SPECIES

PLANT NAME

PRIMARY SPECIES

ECOLOGICAL VALUES

BIRD AND INSECT LOVING

RIPARIAN/EROSION USE

TRADITIONAL USE

ABCD PLANTING AREAS

HEBE STRICTA KOROMIKO / HEBE

Shrubby bush to small tree. Hardy, growing in most situations.

Flowers November to early March, flowers good nectar source.

Good species for planting Area A, stream bank and erosion areas, and general mitigation areas.

ABCD

KUNZEA ERICOIDES KANUKA

Mainly found on forest margins and good nurse plant for many species, especially kauri and podocarps. A subspecies called prostrate kanuka can be used for hot ground sites.

Can grow up to 15-25 meters tall. Fast growing, best on easy slopes, high river terraces. Does not grow well on wet sites and hard clays. Good for nitrogen fixing.

Good for planting Area B.

B

LEPTOSPERMUM SCOPARIUM MANUKA

Smaller growing than Kanuka at around 5m tall and can withstand wet sites and hard clays. Good colonising species and nitrogen fixer. Excellent for riparian planting and general revegetation. Good for nitrogen fixing.

Good species for planting Area B and general sites.

ABCD

PRIMARY SPECIES

PLANT NAME

PRIMARY SPECIES

ECOLOGICAL VALUES

BIRD AND INSECT LOVING

RIPARIAN/EROSION USE

TRADITIONAL USE

ABCD PLANTING AREAS

MELICYTUS RAMILFLORUS MAHOE/WHITEYWOOD

Hardy bushy tree tolerates dry conditions, sun or semi-shade. Purple berries in autumn. Can reach 5m in 10 years.

Good species for planting Area B.

Traditional use; The berries of mahoe when mixed with the ashes of kauri gum were used as a pigment for Tā Moko.

B

PHORMIUM TENAX HARAKEKE, FLAX

Supports a large community of animals providing shelter and food source. Nectar from the flax flower is attractive to tui, korimako, tīeke, pekapeka, geckos. Grows up to 3m in height.

Excellent for riparian margins and wet areas. Particularly good for planting Area D to slow velocity within the flow path.

Traditional use; Leaves with strong thread and use for weaving.

ABCD

PHORMIUM COOKIANUM WHARARIKI/MOUNTAIN FLAX

Similar use to P.tenax, smaller size growing to half the height. Good for planting areas that require smaller growing species. Attractive nectar source for birds and insects.

Particularly good for planting Areas A and D.

Traditional use; Leaves with strong thread and use for weaving.

ABCD

PRIMARY SPECIES

PLANT NAME

PRIMARY SPECIES

ECOLOGICAL VALUES

BIRD AND INSECT LOVING

RIPARIAN/EROSION USE

TRADITIONAL USE

ABCD PLANTING AREAS

PITTOSPORUM EUGENIOIDES TARATA/LEMONWOOD

Bushy shrub that can reach up to 12m in height. Hardy, providing bushy coverage of up to 5m wide, good for regenerating forests and new revegetation plantings, provides a good shade canopy. Fast growing.

Good for planting Area B

Traditional use; The flowers and leaves have a fragrant lemon scented resin that is used to make perfume.

B

PITTOSPORUM TENUIFOLIUM KŌHŪHŪ P. COLENSOI/BLACK MAPOU

Similar characteristics to P. euginoides, smaller growing with smaller leaves.

Good for general revegetation planting areas.

ABC

PSEUDOPANAX ARBOREUS FIVE-FINGER/PUAHOU

Fruits August to February and are attractive to tui in particular.

Host to a species of caterpillar that is endemic in the North Island; moth – Declana atronivea

Good for planting Areas B and C.

BC

SOPHORA TETRAPTERA KOWHAI

Very attractive flowers for birds such as tui, kereru, and korimako. Excellent around stream and lake margins.

Good for all planting areas.

ABCD

SECONDARY SPECIES

PLANT NAME

SECONDARY SPECIES

ECOLOGICAL VALUES

BIRD AND INSECT LOVING

RIPARIAN/EROSION USE

TRADITIONAL USE

ABCD PLANTING AREAS

CORDYLINE AUSTRALIS TI KOUKA/CABBAGE TREE

Suitable for colonising planting but depending on location works best in Taupō conditions as secondary planting once colonising species are established and provide more soil moisture content. Good for forest margins, open and damp places. Fruit is favoured by kereru and other native birds.

Good for all planting areas, particularly areas C and D

Traditional use; The leaves provide durable fibre for weaving, textiles, clothing, fishing lines, baskets, cloaks and sandals.

ABCD

DACRYCARPUS DACRYDIOIDES KAHIKATEA

A secondary species, some areas of Taupō are good for colonising plantings such as clusters on river or lake margins. Good for growing in areas where views are not a concern from adjacent properties, and for restoring wetland areas.

Good for planting Areas C and D.

Traditional use; The wood was favoured for making spears. Soot obtained from burning the heartwood supplied a pigment for traditional tattooing (tā moko).

CD

FUSCOSPORA SPP (NOTHOFAGUS) TAWHAIRAUNUI / BEECH

Good secondary species where height and ecological restoration is required, and in areas where views from adjacent properties are not a concern.

Good for planting areas B and C.

BC

SECONDARY SPECIES

PLANT NAME

SECONDARY SPECIES

ECOLOGICAL VALUES

BIRD AND INSECT LOVING

RIPARIAN/EROSION USE

SPECIAL USE/RONGOĀ

ABCD PLANTING AREAS

GRISELINIA LITTORALIS KAPUKA/BROADLEAF

Good for areas with good soil moisture content and free draining.

It has a good range of growing habitats, best suited for planting areas A, B and C.

Berries are enjoyed by the tui.

ABC

HOHERIA SEXSTYLOSA HOHERE/LACEBARK

Graceful bushy growing tree with attractive white fragrant flowers in summer. Forest edges and stream side plantings and general mitigation planting. Prefers free draining moist soils.

Good for planting Areas B and C.

Traditional use; The strength of hohere bark led to its use in ropes and nets.

BC

PLAGIANTHUS REGIUS MANATU/RIBBONWOOD

Similar conditions to hohere and ti kouka. Not as large growing as hohere makes it good for a wider range of planting areas where views may be a concern.

Good for stream side plantings and general mitigation planting.

ABCD

PODOCARPUS TOTARA TOTARA

Good secondary species where height and ecological restoration is required, and in areas where views from adjacent properties are not a concern.

Traditional use; there were many uses for this tree however its wood was possibly the most useful. Totara wood is light in weight and easy to carve therefore could be easily fashioned into canoes or elaborate wall carvings.

BC

SOILS

The Taupō District has high pumice soils. Soils in the U-shaped gullies are derived from water-sorted pumice and ash and can have more fertile soils than say those on hillsides.

Pumice soils are easily compacted under heavy machinery, therefore planting sites that have had extensive machinery work may require loosening or scraping to allow for more aeration. The planting diagrams B and C in section 6 Planting Technique recommend 'breaking up' the surrounding pumice soil to enable improved plant root establishment.

While the majority of soils are pumice there are variations with more site specific environmental conditions occur.

GULLY PLANTING

The Taupō township within Tapuaeharuru Bay has a series of deep gullies running towards the lake from Mount Tauhara and the Kaingaroa plains.

Within the urban areas, these gullies provide ability for storm water management along with recreational opportunities.

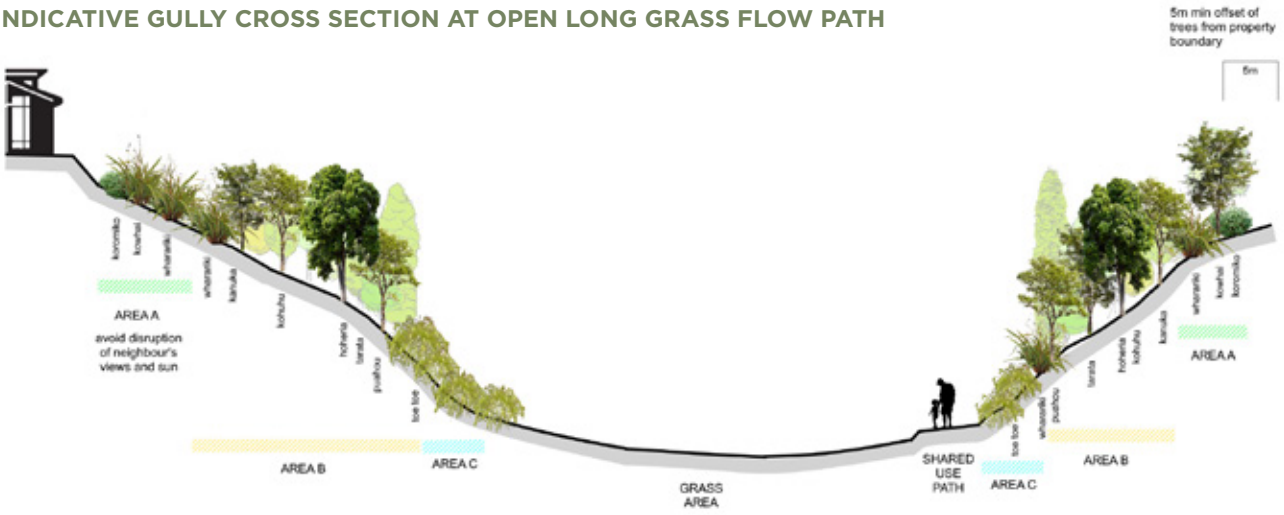
PLANTING WITHIN THE GULLIES PROVIDES A NUMBER OF FUNCTIONS:

- Bank stability
- Reduce water velocity within the flow path
- Aid the stormwater filtering process
- Increase native bird and wildlife activity in the area
- Amenity value for recreation users

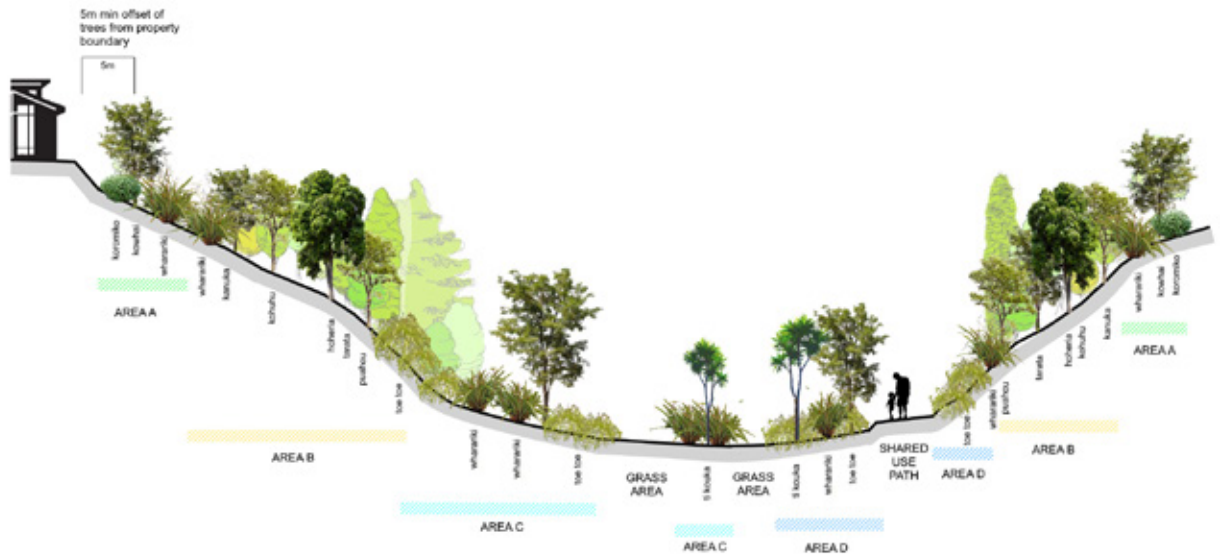
Most gullies within Taupō township have adjacent residential areas. Planting within these gullies in particular must minimise potential adverse effects to adjacent property owners. The Tree and Vegetation Policy provides guidance and requires trees to be planted no closer than 5m from adjacent property boundaries.

In general gully planting is recommended to have an area of lower growing species on the tops of the gullies, higher growing species on the lower banks. The gully floors are generally in grass interspersed with 'islands' of planting to reduce water velocity within the flow path. Indicative cross sections below show give general areas of planting as a guide.

INDICATIVE GULLY CROSS SECTION AT OPEN LONG GRASS FLOW PATH



INDICATIVE GULLY CROSS SECTION WITH GULLY FLOOR PLANTING TO REDUCE WATER VELOCITY IN STEEP AREAS



EROSION AND RIPARIAN PLANTING

Riparian planting may be used to restore permanent or ephemeral waterways. The purpose of this type of planting may be to assist in soil conservation on farmland of slopes greater than 20% or may be undertaken as part of a resource consent application to achieve improved environmental outcomes

The high pumice soils within the lake catchment may require hardy species to establish first before planting with secondary species.

Erosion control methods will differ depending on the needs and requirements of protection required. Where plants are used to assist erosion control, plants with fibrous roots tend to work best. Trials in Taupō have found the best native species are; flax Phormium spp, and toetoe Austoderia, with the assistance of existing grass layer to bind the soil until the native species are established. Once established, other secondary species such as kowhai and manuka may be introduced to provide amenity and biodiversity planting to attract native birds.

INDICATIVE CROSS SECTION; PLANTING ON SLOPES STEEPER THAN 20% WITH FLAX AND TOETOE SPECIES NEAR WATER'S EDGE.

MITIGATION AND AMENITY PLANTING

In the Taupō District, planting may also occur for the purposes of mitigation of a resource consent, or to improve amenity values. This section applies to instances when native revegetation planting is used for mitigation proposes.

This type of planting often occurs on private land or in roading corridors. Because it is subject to a resource consent application, there is an expectation by Council and the community that the proposed mitigation planting will be successful and achieve its objective.

The objective of mitigation planting associated with resource consents may be to minimise or reduce the visual appearance of a change in the landscape. This change may include new built structures, subdivision, earthworks, roading or a change in landuse.

Mitigation planting may include earth bunding to assist in adding height to the proposed planting or to assist in noise reduction.

It is important in these instances that the type of plants selected will achieve the height required for their level of mitigation, and that they are spaced at appropriate distances for the level of screening required. In general mitigation planting will use plants spaced around 1.5 to 2m apart. Soil must be appropriate to sustain plant life. Pumice soils will require a layer of topsoil prior to planting.

INDICATIVE MITIGATION PLANTING ON EARTH BUND (CROSS SECTION ABOVE, PLAN VIEW BELOW), PLANTING AT 1.5M SPACINGS AND LAYER OF TOPSOIL APPLIED

Please note: The following sections provide a guide to site preparation, planting technique and maintenance. They are outcome based so that other techniques not discussed in this section can be considered that still achieve the same outcome.

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SITE PREPARATION

TIMEFRAME FOR PLANTING

Desired outcome: Planting is undertaken when it is less susceptible to drought conditions and high summer temperatures.

- Planting shall begin in the first planting season following completion of site preparation (as a guide this may be from April to September).
- For health and safety reasons; plant preparation holes should not be left unplanted.

SITE PREPARATION

Desired outcome: Areas for revegetation provide good plant growing conditions. The success of planting is dependent on good site preparation.

- If weeds and pests such as rabbits and hares are a serious problem they need to be controlled or eradicated before any planting takes place.
- Initial site clearance may need to take place months prior to planting if weeds are a problem – over summer months is good. After initial site clearance, allow for remaining weed seeds to germinate. Then selectively control these by chemical or manual means prior to planting.
- Avoid clearing an area greater than can be dealt with in any one year. The remaining seeds of the removed weed plants will quickly germinate and grow, and new weed species may invade.
- Use foliar sprayed herbicides with care and to manufacturers specifications. Use surfactant, marker dye, and addition of a foaming agent to prevent spray drift (see also pest management under Maintenance).
- Once weeds are eradicated, planting preparation can begin. Provide adequate planting holes larger than the existing root ball.
- Ensure hard pumice areas are well broken to enable good root growth. Appropriate machinery may be required.
- It may be more appropriate not to remove weed vegetation such as blackberry and broom, which can assist with stabilisation on steep sites with erosion prone banks, Instead, pockets can be cleared and planted with bird attracting plant species to encourage natural native regeneration.
- Further guidance on site preparation can be found in the following document. **CLICK HERE>**

TOPSOIL DEPTH

Desired outcome: Plants and trees are growing in nutrient-rich, free-draining soil.

- The topsoil depth for specimen tree planting areas shall be no less than 200mm for plantings.
- The topsoil mix for grassed areas, revegetation, and street tree planting shall consist of 60% loam topsoil, and 40% rotted organic compost.
- Topsoil shall be sourced either from the original surface layer of grassland on site, weed free sites, or from land with non-contaminated use.
- Use mulch immediately after planting (see mulching under Planting Technique).

PLANTING TECHNIQUE

SHRUBS AND TREES

Desired outcome: Plants and tree specimens are healthy, in good condition, and acclimatised to their growing environment.

- Native plants shall be obtained from local nurseries and eco-sourced where practicable.
- Plants and trees shall not be root bound and shall be easily removed from their growing bag or pot and have a well-formed root ball. Consider using open ground plants.
- A range of plant sizes may be used for general revegetation.
- Plants shall be well watered before they arrive on site and planted as soon as practicable to the day of delivery and protected from drying.

PLANTING TECHNIQUE CONTINUED

PLANTING TECHNIQUE

Desired outcome: Plants and trees are given the best possible growing conditions in ground.

- Trees (street trees and reserve trees) shall be planted generally in accordance with Diagram A and B; Taupō District Council standard for tree planting detail.
- Revegetation plants shall be planted generally in accordance with Diagram C; Taupō District Council standard for revegetation planting. Plants shall be watered prior to and after being planted.
- In areas near recreation pathways, plants shall be planted no closer than 0.5m from the pathway.
- Trees on reserves (excluding street trees and low growing revegetation shrubs) shall be planted no closer than 5m to adjacent private property boundaries – unless with approval from affected landowners.
- Prior to and following planting all plant and tree root balls shall be thoroughly watered.

STAKING REQUIREMENTS

Desired outcome: Taller plants are protected from strong and drying winds and supported during the maintenance period.

- Street tree and reserve trees shall be staked as shown in Diagram A and B; Taupō District Council Tree Planting Detail standard.
- Revegetation plants 1.2m or higher shall be single bamboo staked. Bamboo stakes shall be removed at the end of the maintenance period.
- Revegetation plants under 1m do not require staking.
- Secure tree to stake with non-abrasive tie. Use one tying point approximately two thirds the height of the plant stem. Allow for some movement of the stem when fixing ties.

MULCHING

Desired outcome: Plant growing conditions minimise impact from drought, and measures are taken to reduce weed infestation.

- Use an appropriate method of weed suppressant such as a coarse bark, or wood chip mulch applied at a depth of 100mm for revegetation plants or weed suppressant mat or carpet squares at a diameter sufficient to cover growing root area.
- Weed suppress plants within 72 hours after planting.
- Mulching should occur where practicable.

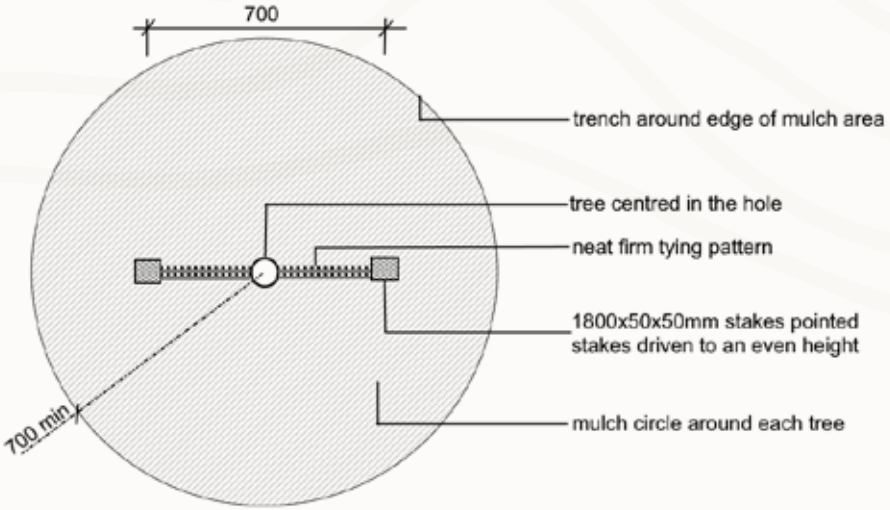


DIAGRAM A
INDICATIVE PLAN VIEW FOR STREET TREE AND RESERVE TREE PLANTING

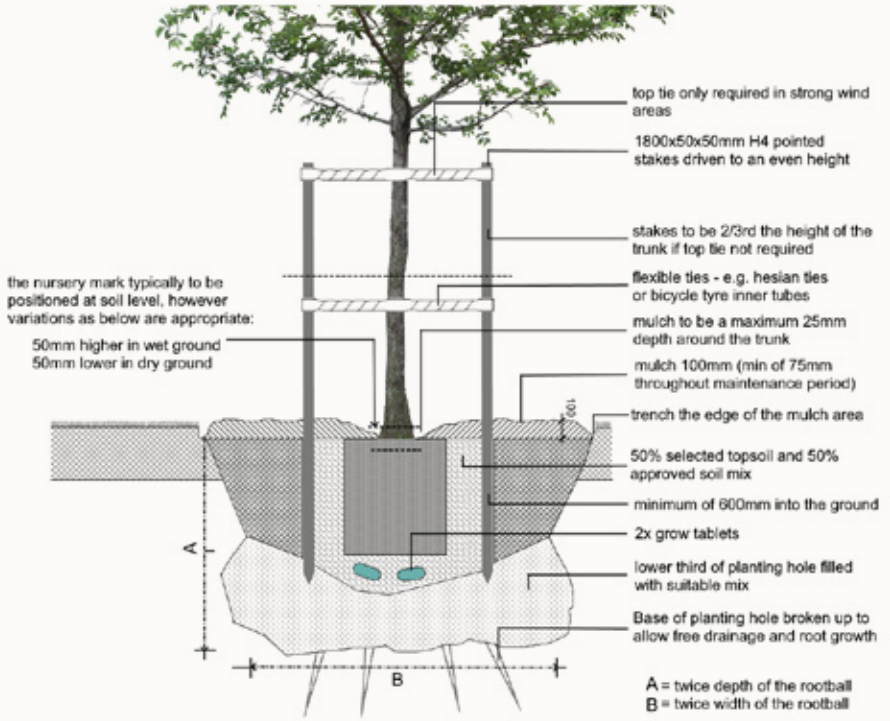


DIAGRAM B
INDICATIVE CROSS SECTION FOR STREET TREE AND RESERVE TREE PLANTING

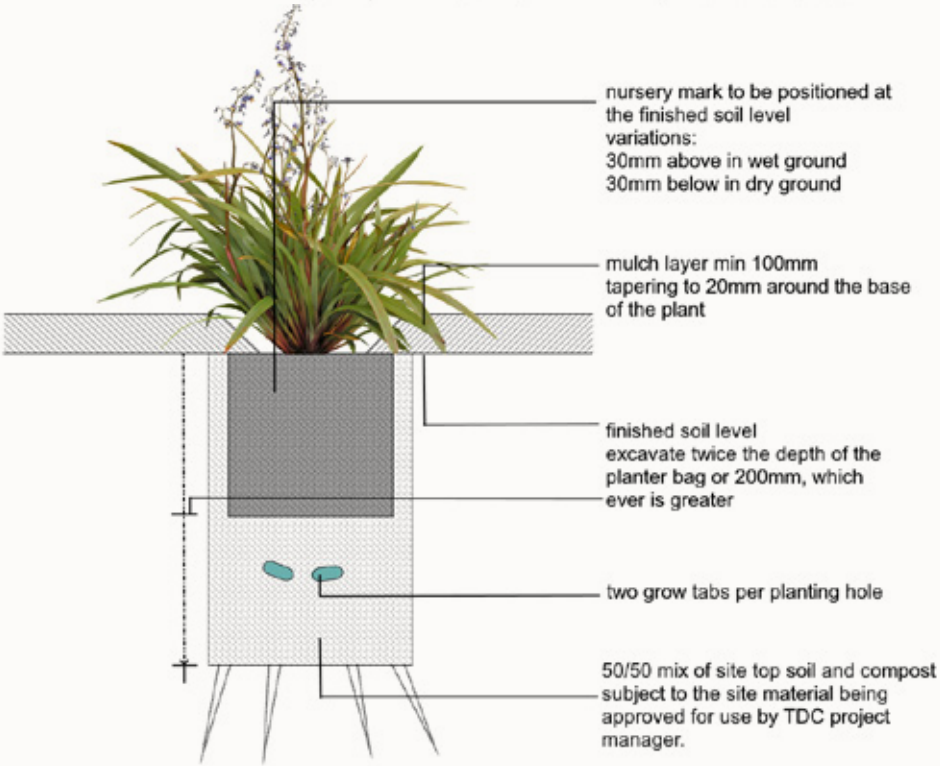


DIAGRAM C
INDICATIVE CROSS SECTION FOR REVEGETATION PLANTING

MAINTENANCE

MAINTENANCE PERIOD

Desired outcome: New plants are maintained during the maintenance period so they are able to thrive once established.

- Tree and revegetation planting shall be weed supressed, maintained and weeded on a regular basis for the first five years following planting or until canopy coverage reaches a minimum of 80%, whichever is sooner.
- Plants should be checked as early as the first week after planting and then quarterly inspections for the first two years.
- Following 18 months revegetation planting shall be weeded every three months.

MAINTENANCE PROCEDURES

Desired outcome: New plants are maintained to a healthy, vigorous growing condition during the maintenance period.

- Watering new plants shall be watered at least every two weeks during dry periods or drought.
- Weeding Existing weeds that are growing in the planting areas shall be removed by spot spraying, weed eating, hand pulling, or a combination of all three. Weeds include those identified on the Weedbusters website: weedbusters.org.nz/weed-information/weed-list/
- Ongoing weeding of the newly planted areas during the maintenance period shall be by hand pulling (releasing) from the outside of the planting within a 1m diameter.
- Weed eaters are not to be used within 0.5m of the base of newly planted shrubs and trees.
- Mulching where mulch is used; maintain levels throughout the maintenance period to supress weeds and conserve moisture. If required, top up mulch levels in early summer months after removal of weeds.
- Replacement of dead, dying, or unhealthy plants shall be replaced as soon as conditions are suitable. No replacements will be made in any season unfavourable for planting.

PEST MANAGEMENT

Desired outcome: Pest species are managed appropriately.

- Pests and diseases animal pests such as rabbits, and plant diseases shall be controlled before planting and during the maintenance period using the most effective and practicable methods.
- When planting in an area where rabbit numbers are known to be high, it is recommended to spray with PlantSkid repellent (or similar), folBait laying for animal pests and spraying for plant diseases shall be done to manufacturer's specifications.

PART TWO

REVEGETATION PLANTING ON TDC ADMINISTERED LAND

SITE SELECTION

Revegetation planting sites within Taupō District Council administered land have been selected where they are considered to have a positive impact on our natural environment, assist in environmental enhancement, have educational benefits, and have capacity to enable revegetation planting to occur. The following criteria has been used in site selection.

CRITERIA FOR TDC SITE SELECTION

- Proximity to existing and proposed Significant Natural Areas (SNAs). SNAS are mapped and listed in the Taupō District Plan.
- Potential to improve connectivity, reduces the effects of fragmentation, and creates linkages between SNAs or provides a buffer to SNAs.
- Gullies and riparian areas not suitable or with low development potential, or planned for storm water/ passive recreation network
- Erosion control on waterways or banks of storm water gullies
- Sites to replace exotic forests or large infrastructure development or removal/rehabilitation
- Riparian planting on the banks or margins of permanent and ephemeral waterways
- Add to existing planting areas

CALCULATING REVEGETATION

CRITERIA FOR TDC SITE SELECTION

Calculating the area of revegetation on Taupō District Council administered land will be on-going and will require mapping of the existing revegetation sites. This information can then be used for calculating carbon accounting and monitoring biodiversity gains. The aim is to undertake mapping of existing sites and update this document once the information is available.

PRIORITY OR POTENTIAL PLANTING AREAS ON TDC ADMINISTERED LAND

The following reserves have been identified as a priority for community planting. There are also areas identified where developers may assist in planting as part of subdivision or land use consent.

The revegetation planting areas are not limited to the areas listed here. In all instances detailed planting plans or approval from appropriate TDC staff is required (refer to section 3 for checklist).

KEY

NOTES

YELLOW | TDC ADMINISTERED LAND

GREEN | SNA - SIGNIFICANT NATURAL AREA

RED DOTS | MARKERS OF APPROXIMATE LOCATIONS

SNA information referred to in this document derived from: Wildland Consultants "Significant Natural Areas of the Taupō District 2019 Volume 2" R4881a Vol.2 August 2019.

CROWN ROAD GULLY - TAUPŌ

Crown Road Gully – steeply sided on lower portion of the gully, predominantly large exotic species with some underplanting on native species. Not easily accessible but some areas may be suitable for community planting, with local schools nearby.

Upper part of the gully is hot ground and existing SNA 188 (proposed SNA 1177) due to having habitat for threatened and at-risk species, and uncommon vegetation and habitat is present. Pest control within the SNA undertaken by WRC has been successful. In 2014 approximately 30% of the geothermal kanuka shrubland was burnt.

PRIORITY OR POTENTIAL PLANTING AREAS ON TDC ADMINISTERED LAND

KAHURANGI DRIVE CONSERVATION AREA - TAUPŌ

Gully area extending from Kahurangi Driver to the Waikato River (proposed SNA 1247). Features of SNA 1247 include: geothermal vegetation in areas of geothermal waters along the Waikato River, and the Waikato River forms an ecological corridor connecting Lake Taupō with the Tasman Sea.

Not currently an SNA and over-grown with weed species. Good potential for connection to SNA1247. Potentially good gully for community planting, particularly area close to reserve/ playground – good access. Some planting existing, rest is dominated by weed species.

SPA THERMAL PARK - TAUPŌ

Good opportunities throughout for continuation of revegetation planting on steeper grass slopes along path and accessways to Waikato River to the west (proposed SNA 1247). Bordered by Otumuheke Stream – SNA 133 (proposed SNA 1124) and pockets of proposed SNA 1263 throughout the park. Features of proposed SNA 1263 include: geothermal kanuka.

The site was previous geothermally active but has now "cooled off" resulting in areas of previously heated, unvegetated-ground being covered in geothermal kanuka. Soil temperatures have decreased significantly since 2006.

Grassed steep slopes good for community planting, particularly down the 'gut'. The park is popular for a range of recreation activities and revegetation planting should be done with reference to the reserve management plan and recreation needs in mind. The whole site would benefit from an overall detailed revegetation planting plan to determine most appropriate locations for planting. Linkages to proposed and existing SNA sites and connection corridors to Waikato River recommended.

Opportunities for community planting at the entrance.

PRIORITY OR POTENTIAL PLANTING AREAS ON TDC ADMINISTERED LAND

TRIANGLE AT TAUPŌ GOLF COURSE - TAUPŌ

Triangle portion of land adjacent to the Taupō golf course and opposite BP Tauhara. Provides a connection to existing SNA 180 (proposed SNA 1052), and the Taharepa walkway that Tauhara College students are working on.

Features of proposed SNA 1052 include: geothermal kanuka, at risk species including NZ pipit. Potentially currently contributing to weed species invading proposed SNA 1052.

Currently listed as Department of Conservation administered land and identified as a Hot Ground Hazard site. Potential for a revegetation site with removal of exotic pines needed. Potential for community plantings subject to further investigation of hot ground hazard, and with ownership approval.

LISTON AVE GULLY - TAUPŌ

Steep to gently sloping grass and mix native plantings. Good location for community plantings. Plantings would need to be considerate of surrounding neighbours and views – see typical gully planting plan.

Liston Ave has potential to link and join into Dr Armstrong Reserve – which is adjacent to SNA 156 (proposed Waipahihi Valley SNA 1261). Features of this SNA include indigenous vegetation (subject to site visit to check values).

PRIORITY OR POTENTIAL PLANTING AREAS ON TDC ADMINISTERED LAND

KINLOCH LAKE FRONT AND ESPLANADE RESERVE - TAUPŌ

Lake front plantings planned for late Autumn. Will include planting for erosion. Kinloch esplanade cliff edge opportunity to change mowing to planting areas.

Potentially opportunity to work with DoC to enhance Whangamata Stream. This stream corridor is currently SNA 275 (proposed SNA 1202). This SNA provides an ecological and recreation connection along the length of Kinloch settlement. Areas are proposed to be removed from the SNA due to previous mapping errors identifying plantation vegetation as SNA. There may be opportunity to work with DoC to provide revegetation planting in these areas.

The key ecological features of proposed SNA 1202 are noted as: area of wetland meets the SNA criteria, ecological buffer to Whangamata Stream, new plantings undertaken in 2008 of koromiko, harakeke, tarata, red beech, kowhai, kahikatea and ti kouka.

BRENTWOOD GULLY - TAUPŌ

Opportunities to increase planting within the gully floor to reduce water velocity, minimise mowing areas on slopes, and increase planting on steep banks.

Gully planting standards to be developed to show different planting areas within the SW gullies. These gullies do not currently have SNA areas around them; however, they do form important connections to the Waikato River (proposed SNA 1247) and Taupōmoana (proposed SNA 1293).

These gullies will also possibly be extended through to the Nukuhau Plan Change area.

PRIORITY OR POTENTIAL PLANTING AREAS ON TDC ADMINISTERED LAND

WAIPAHIHI AND NGA ROTO GULLIES - TAUPŌ

Waipahihi gully to be planted by the developer as part of the next subdivision to the south.

Ngaroto gully is a good example of the type of the planting by the developer; that is preferred on the slopes. Set back of 5-10m from private boundaries at the top of the gully, low growing species e.g. hebe, toetoe and flax at the top, taller growing species further down.

Maintenance requirement is 5-years. Gullies provide good ecological connections to Taupōmoana (proposed SNA 1293).

CHAD STREET GULLY - TAUPŌ

Opportunity to reduce mowing slopes and increase/enhance islands of planting within the gully floor.

PRIORITY OR POTENTIAL PLANTING AREAS ON TDC ADMINISTERED LAND

AC BATHS BANK AND HICKLING BANK - TAUPŌ

Bank area surrounding AC Baths – potentially suitable for community planting. Good ecological link to Spa Thermal Park SNA.

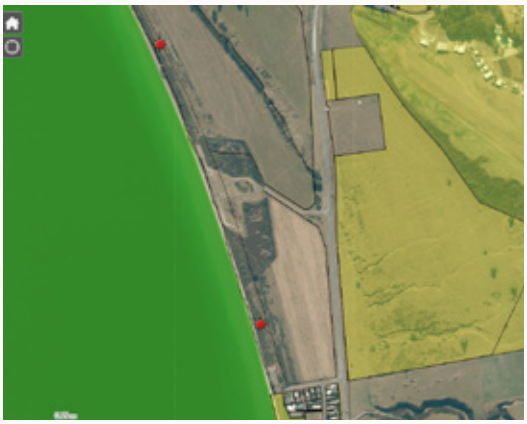
RIVERSIDE PARK AND RICKIT STREET TO RIVER WALK - TAUPŌ

River edge planting -possibly good for community planting (depending on proximity to river edge). Direct ecological link to Waikato River SNA.

SECOMBE PARK TO 4 MILE BAY - TAUPŌ

Ongoing vegetation management and planting, good area for community planting. Will need to be low growing species, avoid conflict of planting and views. Direct ecological link to Taupōmoana SNA.

PRIORITY OR POTENTIAL PLANTING AREAS ON TDC ADMINISTERED LAND



FIVE MILE BAY - TAUPŌ

Erosion and foreshore planting on the Tawhaa paper road corridor of the foreshore. Potentially good for community planting. Direct ecological link to Taupōmoana SNA.

CONTROL GATES BOWL - TAUPŌ

Amenity planting – good for community planting. Mercury ownership. Direct ecological link to Waikato River SNA.

HIPAPATUA - TAUPŌ

Amenity planting – good for community planting. Direct ecological link to Waikato River SNA.

PRIORITY OR POTENTIAL PLANTING AREAS ON TDC ADMINISTERED LAND

MANGAKINO GOLF COURSE - MANGAKINO

Hazardous tree removal required. Planting areas to remove some areas of mowing. Direct ecological link to Waikato River SNA.

HANGARITO STREAM AND WIREMU STREET RESERVE - TURANGI

Long corridor extends from Turangi industrial area north to Turangi sports park. Partially in TDC ownership, remaining parts Ngāti Tūrangitukua. No directly adjacent SNAs, however potentially forms a connection to Te Ponganga Saddle Road Forest SNA 70 (proposed SNA 1158).

Key features of this SNA include wetland habitat, part of a contiguous indigenous vegetation area extending from Tongariro National Park to the Otorohanga District. A botanic survey of this area has not been undertaken.

PRIORITY OR POTENTIAL PLANTING AREAS ON TDC ADMINISTERED LAND

KURATAU LAKEFRONT, WHIOWHIO RESERVE AND OMORI BANKS - KURATAU

Lake front and esplanade opportunities. Connections to Taupōmoana SNA. Also, opportunities to connect to Rangitukua Scenic Reserve SNA 232 (proposed SNA 1131). Features of this SNA include healthy representative example of kowhai-kanuka forest and cliff and rock outcrop vegetation, ecological buffer to Taupōmoana and the lower portion of the Kuratau River SNA 64 (proposed SNA 1100).

Features of this SNA include mistletoe habitat, native bird habitat, kanuka-manuka forest, rushland, raupo reedland, whauwhaupaku-mahoe shrubland, broadleaved-podocarp species, carex, kowhai, Halls' totara, five finger.

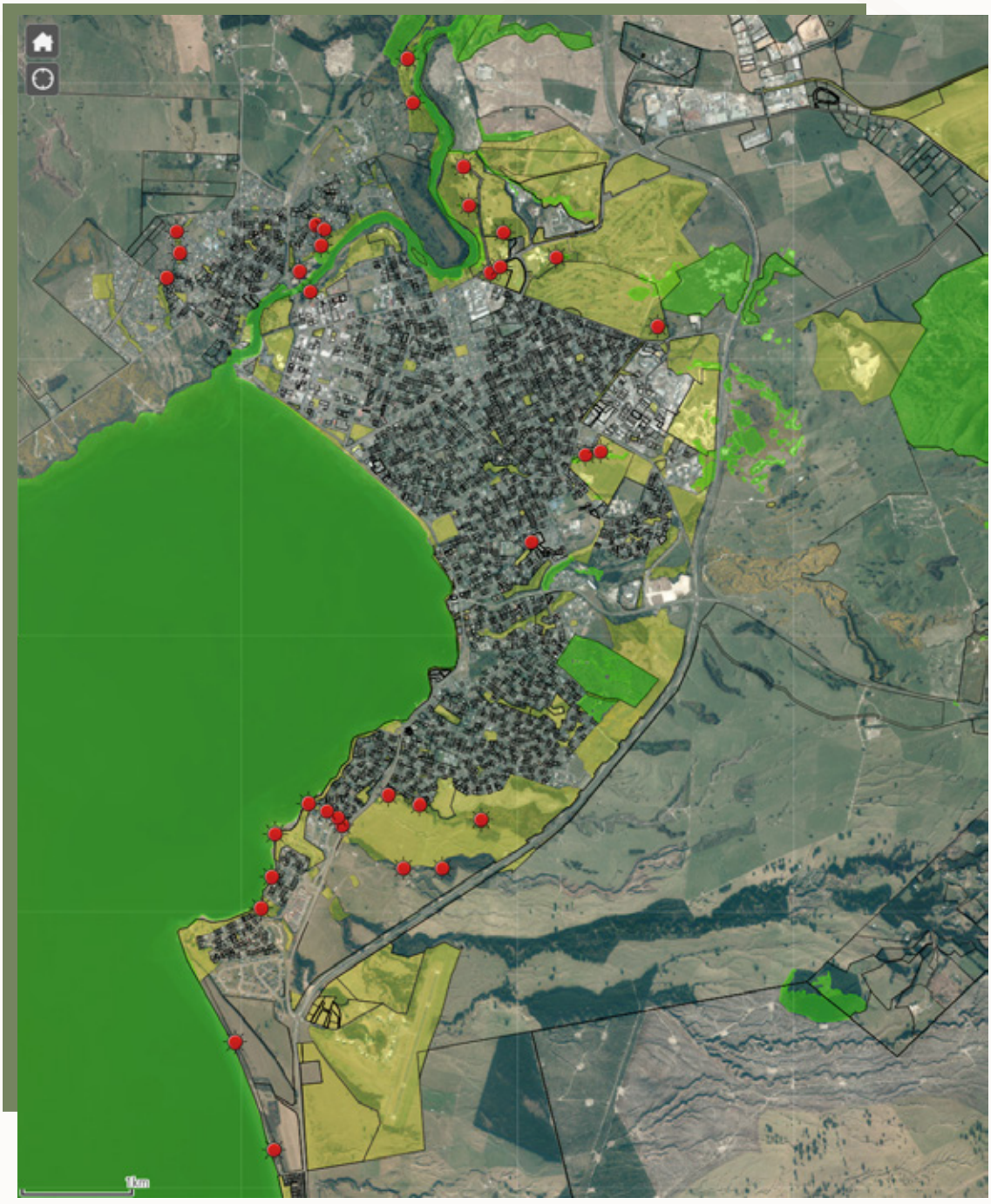
TOKAANU STREAM - TURANGI - TURANGI

Direct connection to Kuharua-Kakaramea-Tihia Massif SNA 143 (proposed SNA 1079) and Tokaanu Thermal Park SNA 236 (proposed SNA 1104) – Tokaanu stream is part of these wider SNAs. Key features of SNA 1079 include: kanuka-mingimingi scrubland, raupo, matai-rimu/kamahi-rewarewa forest, ecological stream buffer to Tokaanu stream.

Key features of SNA 1104 include: semi-parasitic mistletoe, geothermal kanuka. This site is also part of an extensive natural area extending from the shores of Lake Taupō to the summit of Kakaramea, Tihia, and Pihanga, including Lake Rotopounamu and Lake Rotoaira.

AERIAL PLANS

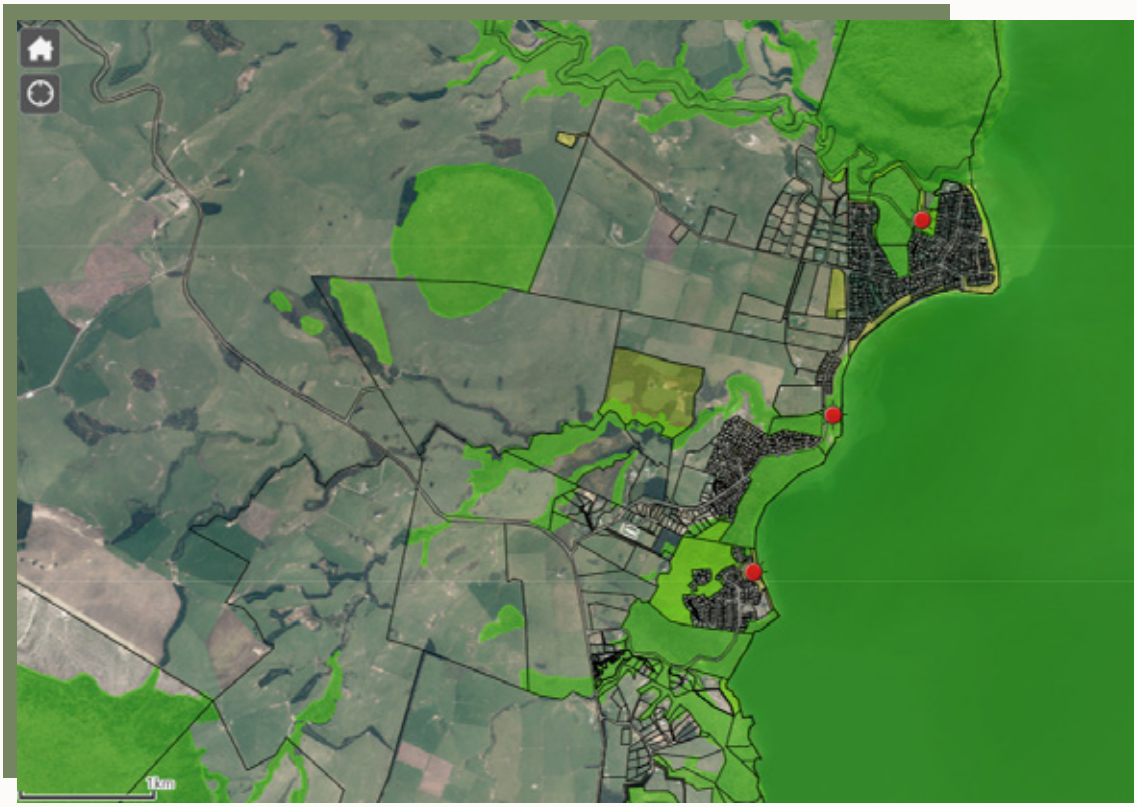
TAPUAEHARURU BAY - TAUPŌ TOWNSHIP



AERIAL PLANS

KINLOCH

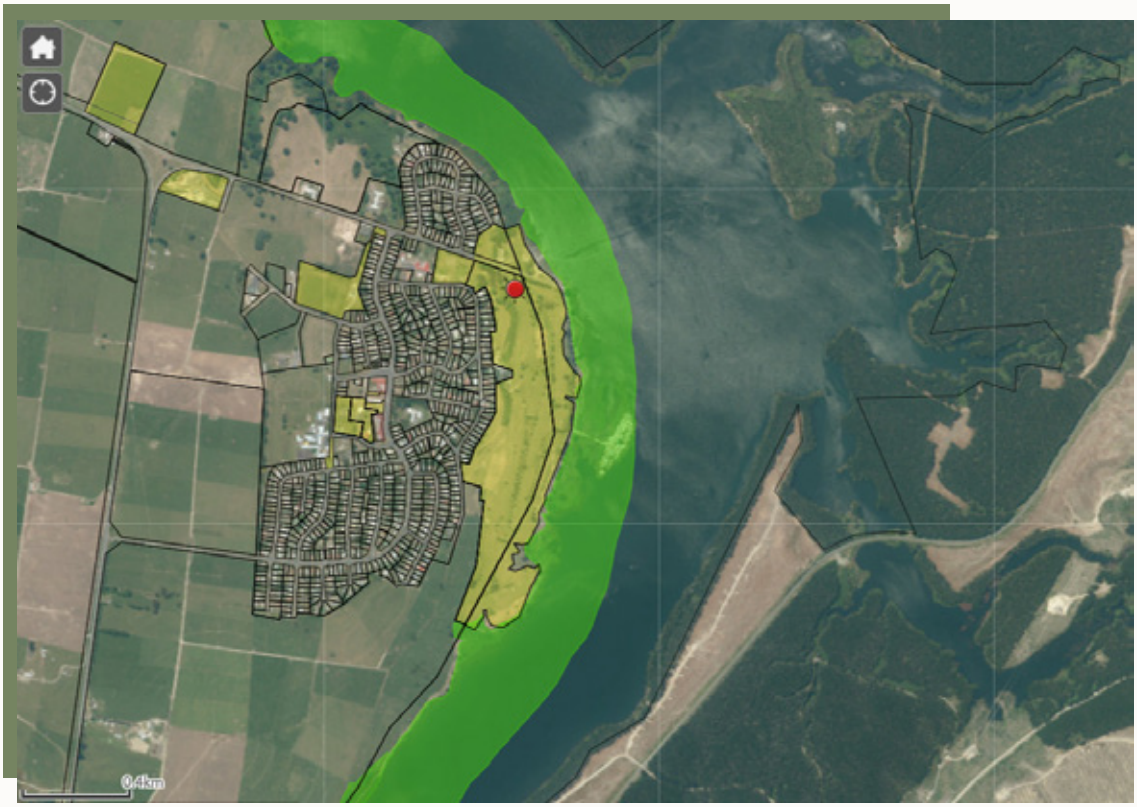
OMORI - KURATAU



AERIAL PLANS

TURANGI

MANGAKINO



GREAT LAKE TAUPŌ

Taupō District Council

VERSION DATED 29/09/2020