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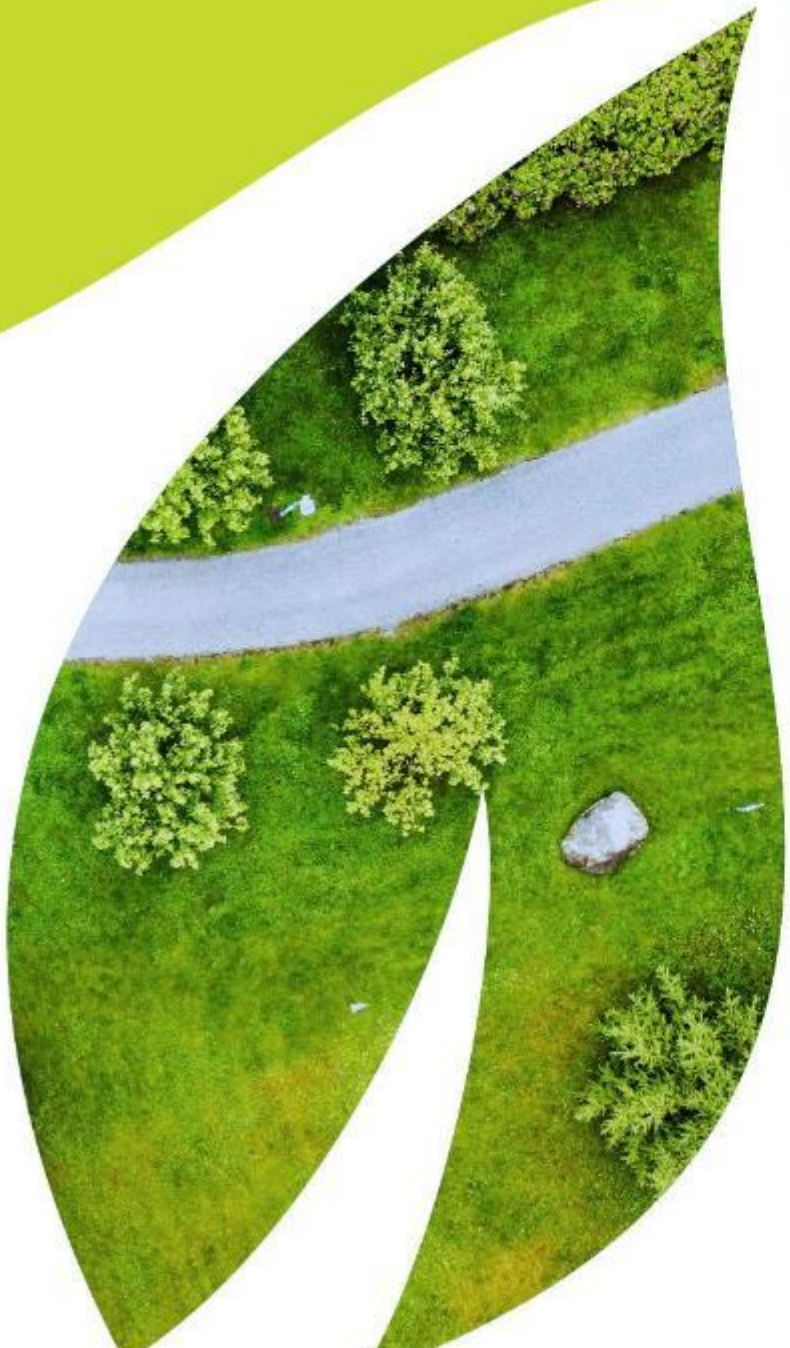
Arboricultural Safety Audit

Te Motu Kairangi



Arboricultural Safety Audit

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Te Motu Kairangi

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1 Executive Summary

Arborlab Consultancy Services Limited has been engaged by Land Information New Zealand (LINZ) to prepare an Arboricultural Safety Audit (ASA) with regards to any tree(s) that on the balance of probabilities pose a foreseeable risk to person and/or property at the historically significant seventy-six (76) hectare parcel of land; Te Motu Kairangi, Maupuia Wellington.

For the purposes of this ASA the site was divided into group specific tree stands, with the trees in each area being assessed by Arborlab's qualified arborists. These assessment methodologies being the internationally recognised Visual Tree Assessment (VTA) and the Quantified Tree Risk Assessment (QTRA).

The following ASA and its recommendations were based on dendronological data collection including; tree maturity, vitality, form and structure. The rudimentary basis of the assessment being primarily concerned with mitigating foreseeable risk and/or impact upon the balance of possibilities to person and/or property.

On review and correlation of the tree assessment data collected annual Risk of Harm tables were compiled by area in accordance with the Quantified Tree Risk Assessment (QTRA) model. Specific group stands and individual trees have been identified with regards to risk. These trees have been mapped, given a specific tree number and where appropriate management recommendations have been provided.

All trees on the aforementioned site were assessed as having Broadly Acceptable to Tolerable annual Risk of Harm under the QTRA methodology. However, a number of proactive removals have been recommended after other tree management considerations were considered.

Best management practice procedures with regards to the pruning of trees in and around historical structures along with general walking track pruning maintenance have also been outlined in this ASA with regards to short and long term tree management.

2 Introduction

2.1 Brief

2.1.1 Arborlab Consultancy Services Ltd has been engaged by Land Information New Zealand (LINZ) to undertake an independent arboricultural safety audit of the tree asset population present on the aforementioned site. The scope of services includes;

- Conduct Visual Tree Assessments (VTA) and Quantified Tree Risk Assessments (QTRA) with regards to identifying any foreseeable risk to person and/or property. The rudimentary basis of these assessments being primarily concerned with mitigating foreseeable risk and/or impact upon the balance of possibilities to person and/or property with regards to the subject trees vitality and structural integrity.

- Put forward arboricultural recommendations as to effective pragmatic tree management plans with regards to the retained tree population. Hence safeguarding Te Motu Kairangi significant tree populations' vitality and longevity.

2.1.2 Assessment and options for the requested removal of logs and slash from former tree felling, including engineers estimates. These areas are plotted on the appended maps PVL-33269-02 (S1) and PVL-33269-04 (S7). (Please note that a contractor has been contacted and has provided a quotation to carry out these works. This quotation has been appended).

2.1.3 Identification of plant pests on site which includes the proposed recommendation of the removal of Pine species saplings.

2.1.4 Vegetation Clearance recommendations to reveal structures and paths; Best management practice pruning guidelines with regards to the walking tracks and structures have been other outlined.

2.2 Background

2.2.1 The abovementioned area covers seventy-six (76) hectares and is a place of historical significance, as it contains significant sites from different periods in the country's history.

2.2.2 During the time of early Polynesian settlement it acquired the name Te Motu Kairangi, meaning "Precious Island". The Miramar Peninsula was once an island teaming with life. Its hills and

gullies supported dense groves of native shrubs and trees such as Miro, Totara, Rimu, Tawa and flowering Rata. Pigeonwood covered most of the ridges and Supplejack filled the deeper gullies with a tangle of vegetation.

2.2.3 Not long after European arrival most of the forest and animals on the peninsula had gone. The forest had been cleared with fire to create gardens. By 1840 most of the peninsula was covered in thick, low vegetation of hardy ferns mixed with flax, Toetoe and small scrub such as Tutu, Hebe, Matagouri, Muehlenbeckia and a few scattered trees. Patches of bush in a few gullies at the northern end of the lake remained, and those remnants were still often visited by Kereru and Kaka. Most of the surrounding bush and vegetation was burned down by settlers and grazed by their cattle and sheep. Very few bush-filled gullies survived. Surface sowing with English grasses overtook the common ferns and shrubs covering the hills.

2.2.4 95% of pre-settlement vegetation in the Wellington region was cleared of native forest by 1900 and the bush is now mostly secondary growth. Several species of flora are now only known historically and are extinct from the area.

2.2.5 Since the Defence Force, which owned it since 1885, decided to stop using it in 2008, the question of what would happen to Te Motu Kairangi has been one of much interest.

2.2.6 In 2011 a small community group named the Te Motu Kairangi-Miramar Ecological Restoration began a revegetation project in the area. In just a few years this small community group has planted over 4000 plants around the peninsula. They strictly use only eco-sourced plants which are provided by the Forest & Bird Nursery, Wellington City Council and as well as from our own little nursery. Seeds are collected around the town reserves which the group are growing themselves or directly scatter around the bushy parts of the peninsula to speed up the regenerating bush and to increase the biodiversity.

2.2.7 In September 2014 the Crown signed an agreement to ensure the heritage of the historic Te Motu Kairangi or Watts Peninsula near Wellington is protected and preserved. A Memorandum of Understanding sets out the relationship between the three parties, which includes the guiding principles for the future of the whenua or land.

3 Site Location

3.1 The seventy-six (76) hectare site has a prominent coniferous tree canopy of mature and semi mature *Pinus radiata* (Monterey Pine). Other major tree species include; *Cupressus macrocarpa* (Monterey Cypress), *Metrosideros excelsa* (Pohutukawa). The understorey consists of a mixture of exotic and native species, with a large percentage of pest plants visible.

3.2 Te Motu Kairangi is popular for recreational walking and sightseeing, with the area offering a number of interesting tracks. Along these walking tracking there are structures of historical interest. Photo Image 1 below shows an aerial photo of the site and these key points of interest.

3.3 The tree population is located predominantly on steep slopes in plantation groups, with pockets of mixed native shrubs, trees and regnant bush. Along the tracks a more native flora selection can be seen such as the Pohutukawa, Ngaio and Cabbage Trees. The gullies and valleyed areas contain a mixture of both exotic and native flora.

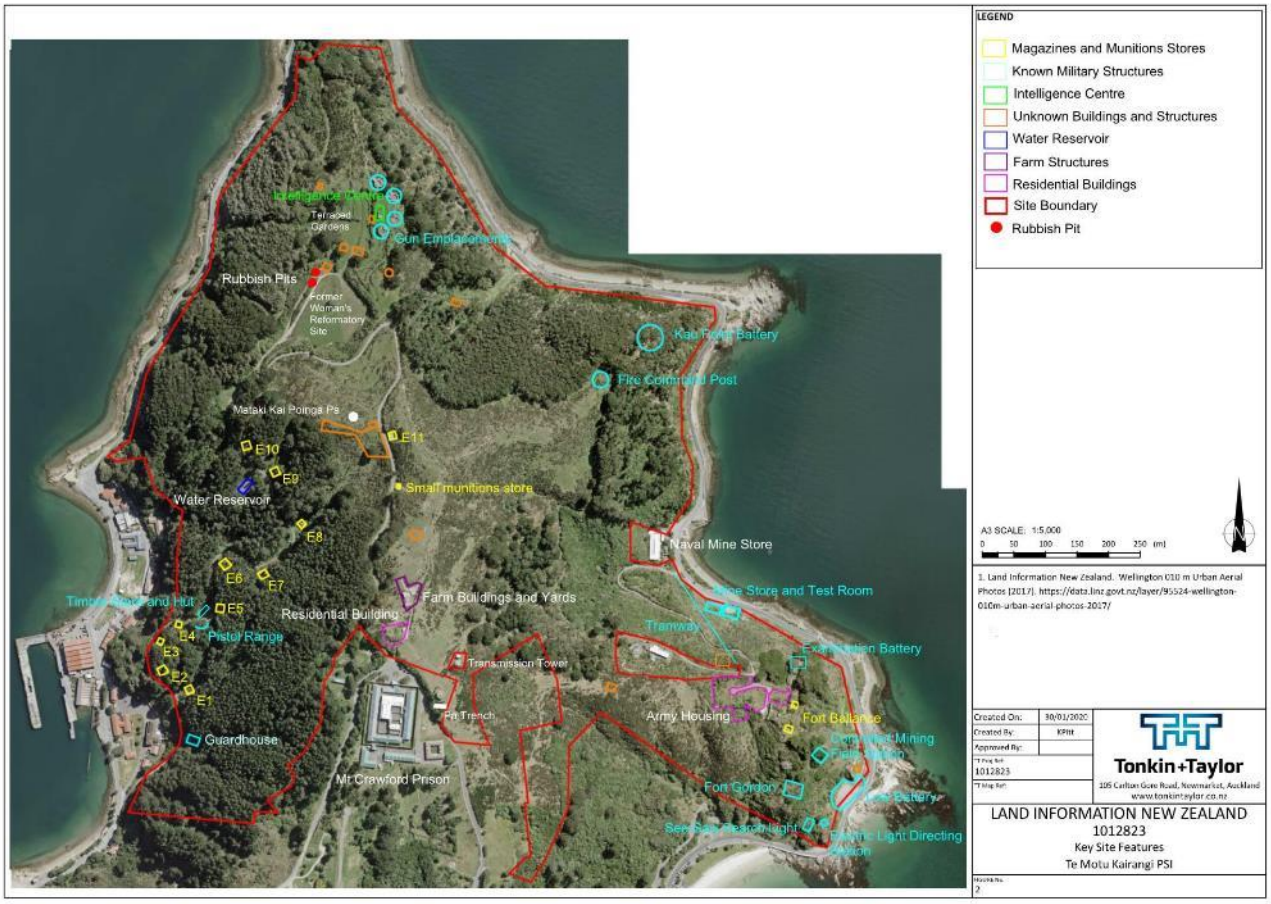


Photo Image 1: Site location with key features.

4 Scope and Limitations

4.1 For the purposes of this ASA all arboricultural recommendations are both based on and/or limited to the appended LINZ correspondence, maps and plans.

4.2 All arboricultural assessments were carried out by a qualified arborist at ground level and therefore classified as 'Level 2' Assessments (Dunster et al., 2013). No soil, tissue sampling and/or geological investigations were carried out at that time. All assessments were conducted without the use of any invasive and/or diagnostic tools and testing.

4.3 Tree heights and canopy spreads were estimated and selected estimates were checked using a digital laser range finder (Nikon Forestry Pro) to ensure ongoing accuracy. Trunk girths were principally estimated and periodically checked using a conventional measuring tape.

4.4 The tools used onsite to gather the necessary dendronological data where; Nikon Forestry Pro, measuring tapes, mobile phones and an I-pads.

4.5 A visual inspection was undertaken on all the trees on site with a target. A target being any structure, object and/or person on the balance of probabilities that could be damaged or injured should any part of the tree fail. The inspection undertaken on any individual tree was proportionate to the size, location and associated target value.

4.6 Where appropriate a nylon percussion hammer was also used to take soundings on the stems of selected trees. Unexpected tonal changes from hammer sounding on the subject tree's stems can indicate that wood decay may be present.

4.7 No other decay detecting equipment was used as part of the inspection process. All comments and recommendations that have been discussed and provided are based on the visual observations and hammer soundings recorded during the site visit.

4.8 Tree risk assessments were carried out by using both the Visual Tree Assessment (VTA) and Quantified Tree Risk Assessment (QTRA) methods.

4.9 An estimate of 20,000 site visitors per year was decided upon. Onsite observations and discussions with the site's frequent walking track users formed the basis of this figure.

4.10 Foot traffic in low use areas was estimated to be 1 pedestrian per hour when averaged across an entire year (24hrs, 365 days).

4.11 Foot traffic in high use areas such as the walking tracks and paths to the structures were estimated to be up to 7 pedestrians per hour when averaged across an entire year (24hrs, 365 days).

4.12 For the purposes of the assessment motor vehicle use in the vegetated areas was deemed to be so infrequent it was not taken into consideration.

4.13 Please note that due to any proposed works and a hence a heightened level of amenity value due to these works, it is foreseeable that the aforementioned estimated pedestrian (and possible vehicle) numbers will increase. Therefore it is recommended that due to this foreseeable increase in pedestrian numbers a tree risk assessment such as a VTA / QTRA will need to be carried out annually with respect to the sites greater patronage.

4.14 Whilst this assessment is thorough it should be noted that trees are dynamic organisms exposed to varying weather conditions, which on occasion can be severe. Any tree can fail given the right environmental conditions. This is taken into account by assessing the most likely events and not those which could or might occur.

5 Methodology

5.1 Visual Tree Assessment

5.1.1 Visual Tree Assessments (V.T.A) consistent with modern arboricultural practices (Mattheck & Breloer, 1994) were conducted by qualified arborists from Arborlab on all of the aforementioned subject trees. All assessments were carried out at ground level and therefore classified as 'Level 2' Assessments (Dunster et al., 2013).

Claus Mattheck introduced a biomechanically based system of Visual Tree Assessment (VTA), the basis of which is the identification of symptoms produced by a tree in reaction to a weak spot, or area of mechanical stress. VTA is a non-invasive method of examining the health and structural condition of individual trees. It has become the standard approach for surveying trees. By visually examining a tree, an arboriculturalist can gather information on the condition of its roots, trunk, main branch structure, crown, buds and leaves to make an assessment and draw conclusions about general condition and vitality. It is a systematic approach, which directs the arboriculturalist through a procedure from biological and routine observations to analysis, using their understanding of failure criteria.

In any inspection regarding tree health or safety, an arboriculturalist will look for biological signs, such as undersized leaves, discoloured foliage, dead branches, large or numerous cankers and fungal fruiting bodies. They will be able to recognize the significance of these observations by comparing them with the typical growth patterns and appearance of the tree involved. They will also look at the tree for signs of structural weakness or for a change in growth patterns that may indicate defects. If mechanical weakness is suspected, there may be a need for more investigation using specialist decay detection and measuring equipment.

5.1.2 The abovementioned Visual Tree Assessments (V.T.A) method was used in conjunction with the Quantified Tree Risk Assessment (QTRA). Combining the use of these widely accepted methods provided a more accurate tree risk assessment whilst providing best management practice dendronological alternatives and solutions with regards to urban forest best management practice.

5.2 Quantified Tree Risk Assessment

QTRA was developed for the assessment of tree risk; (Ellison, M.J. 2005. Quantified Tree Risk

Assessment Used in the Management of Amenity Trees). Asset safety management is a matter of balancing the Risk of Harm (RoH) with the benefits of that asset or the cost of eliminating or mitigating that risk.

5.2.1 Although seemingly counterintuitive, when assessing a tree asset, the condition of the tree should not be the first consideration. Instead, tree managers should first consider the usage of the land or the land around the tree (the target zone), which in turn informs the process of assessing the tree.

5.2.2 Quantified tree risk assessment applies established and accepted risk management principles to tree safety management. By quantifying the annual risk of harm as a probability, QTRA enables the tree manager to manage the risk from the tree to within widely accepted thresholds.

5.2.3 The QTRA method moves the management of trees away from labelling them as either 'safe' or 'unsafe', thereby requiring definitive statements of tree safety from tree managers. Instead, QTRA quantifies the risk of harm from trees in a way that enables tree managers to balance safety with cost, and tree value, and operate within predetermined risk thresholds per Chart 1 below.

Chart 1: QTRA advisory thresholds

Thresholds	Description	Action
1/1 000	**Unacceptable** Risks will not ordinarily be tolerated	• Control the risk
	Unacceptable (where imposed on others) Risks will not ordinarily be tolerated	• Control the risk • Review the risk
1/10 000	**Tolerable** (by agreement) Risks may be tolerated if those exposed to the risk accept it, or the tree has exceptional value	• Control the risk unless there is broad stakeholder agreement to tolerate it, or the tree has exceptional value • Review the risk
1/1 000 000	**Tolerable** (where imposed on others) Risks are tolerable if ALARP	• Assess costs and benefits of risk control • Control the risk only where a significant benefit might be achieved at reasonable cost • Review the risk
	Broadly Acceptable Risk is already ALARP	• No action currently required • Review the risk

5.2.4 When taking the QTRA approach tree managers often find they spend fewer resources on assessing and managing tree risk, whilst maximising the benefits trees provide. Furthermore, in the event of a 'tolerable' or 'acceptable' tree risk being realised, they are in a robust position to demonstrate that they have acted reasonably and proportionately.

5.2.5 The QTRA model also incorporates a cost benefit analysis in which a threshold is set for managing the risk to a level which is as low as reasonably practicable (ALARP). Where the cost of risk management exceeds the ALARP cost benefit value, then the cost of the risk management becomes disproportionate to the risk. These figures are thresholds proposed by the QTRA model, ultimately it is the decision of the risk manager (tree owner) whether or not the risks are acceptable or not given peoples' different tolerances to risk.

5.3 Pest plant survey

5.3.1 For the purpose of the pest plant survey, the site area was separated into five vegetation units (Aerial image 1). The five areas are:

- Western Pine Forest
- Northern Point
- Summit Farmland
- Eastern Pine Forest
- Eastern Coastal Scrub

5.3.2 Pest plant survey methodology involved a walk-through survey of each vegetation unit. Each pest plant species observed and recorded, along with the following information:

Abundance
- Dominant
- Abundant
- Frequent
- Occasional
- Rare

Growing location
- Edges
- Cliffs
- Light gaps
- Groundcover
- Understory
- Sub-canopy
- Canopy

Age/Size classes
- Seedling/Small
- Sapling/Medium
- Mature/Large

5.3.3 Abundance was measured using a DAFOR scale. The DAFOR scale is a method for rapid survey which provides a semi-quantitative representation of the relative abundance of species within an area. Table 1 below details the DAFOR scale used for this project.

Table 1: DAFOR Scale of abundance

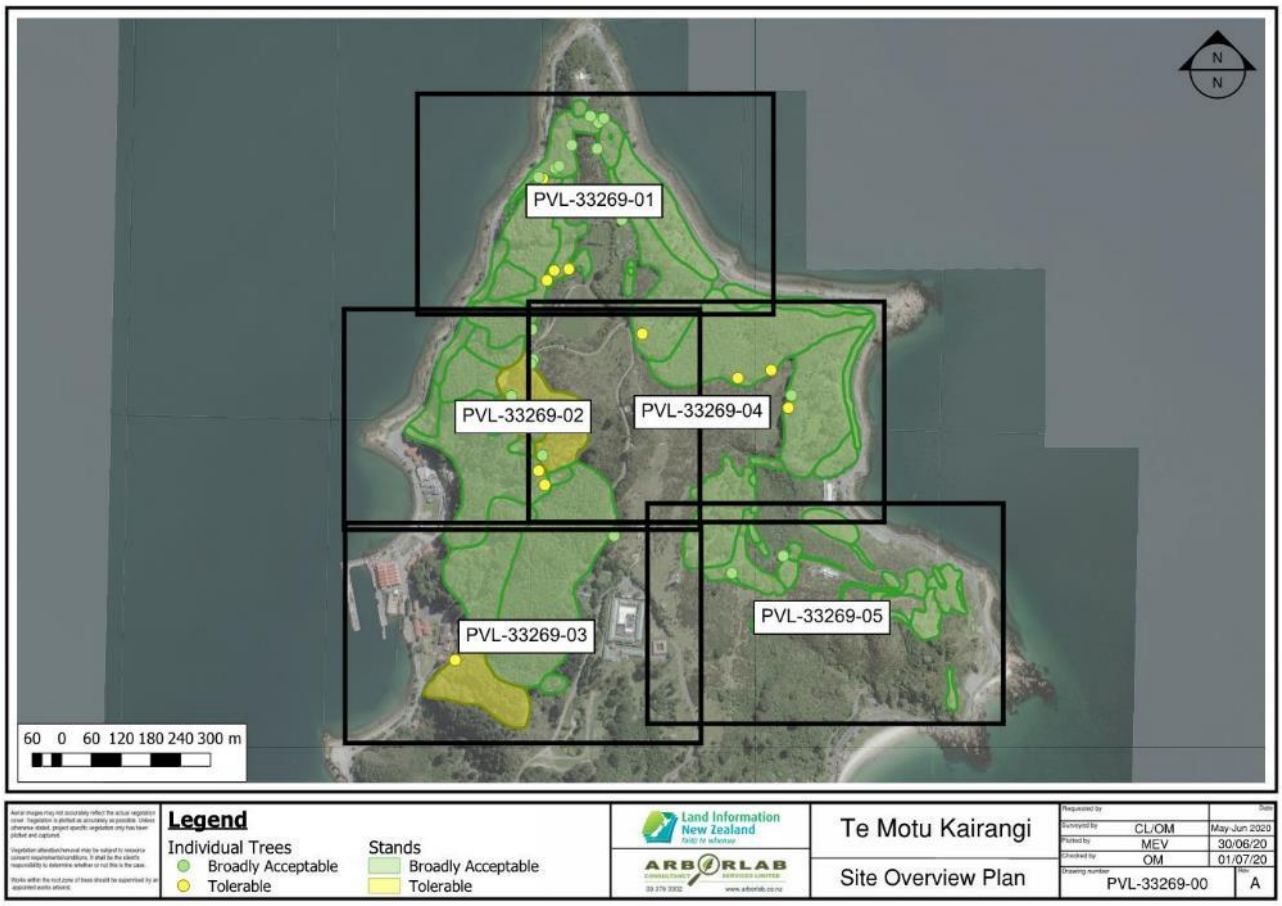
Abundance	Seen every	Proportion of Vegetation
D - Dominant	5-10m	>50%
A – Abundant	10-20m	30-50%
F – Frequent	20-40m	15- 30%
O – Occasional	40-100m	5-15%
R - Rare	100m+	<5%

5.3.4 The pest plant survey was conducted over a three day period. It is acknowledged that, considering the size of the site, not all pest plants present within the site may have been recorded, specifically those found in low abundance or in localised areas.

Aerial Image 1: Vegetation units for pest plant surveying

6 Main Findings

6.1 With regards to this assessment the tree population has been grouped into stands and numbered as per the satellite map provided below. The more detailed aerial maps referred to can be found in the Appendix section of this document.



Aerial Image 2: Map key

6.2 The VTA and QTRA methods enable a range of approaches from the broad assessment of large collections of trees to where necessary, the detailed assessment of an individual tree. When assessing populations or groups of trees, the highest risk in the group is quantified and if that risk is tolerable, it follows that risks from the remaining trees will also be tolerable, and further calculations are unnecessary. Where the risk is intolerable, the next highest risk will be quantified, and so on until a tolerable risk is established.

6.3 For the purpose of the Quantified Risk Tree Assessments the tree population was divided into

two (2) categories; fifty-six (56) groups of trees and thirty-three (33) individual trees. This corresponds to the site usage/targets and character of tree cover in each area per the abovementioned Aerial Maps in the Appendix. Each area has then been assigned an annual Risk of Harm based on the assessment.

6.4 Trees within each area which have been identified as being of particular note or relevance to the risk assessment have been given a specific identifying number, and where appropriate a management recommendation has been provided. The appended Aerial Maps show the specific location of these trees.

6.5 An inventory of the risk assessment areas for the groups and the individual trees assessed is provided below.

Table 2: Inventory of Areas Assessed: Group Stands.

ID	***Overstory Species***	Age Class	Size Class	Topography	Comments
S1	*Felled Pinus radiata*	Dead	0-5m	North West Facing Slope	Area along 1885 Military Road, felled pines. Timber left in situ. Pest plants in regrowth require control before replant 100% native revegetation replant recommended Pine regeneration control Felled timber does not pose risk to public using formed tracks. Vegetation cover prevents public access. Forestry track formed within area. Lying timber may have resale value. 400V line along Military Road.
S2	*Pinus radiata*	Mature	15m plus	Steep West Facing Slope	Partially undercut pine removal over 1885 Military Road general maintenance- not necessitated by risk. Lower steeper slope has little (<5%) understory. Upper slopes developing native understory dominated by Tree Lucerne. Climbing pest species present at low levels. Excluding *Pinus radiata* over track - group broadly acceptable.

ID	*Overstory Species*	Age Class	Size Class	Topography	Comments
S3	*Pinus radiata*	Mature	15m plus	North West Facing Slope	Pohutukawa, Eucalyptus and Karaka on Military Road edge close to Prison Large stand of mature even age pine. Suitable for harvest. Steep slope but access to access track. Commercial harvest native understory varying density across stand, generally sparse. Thicker in areas of greater light penetration and north facing slop
S4	*Mixed Natives*	Mature	0-5m	West Facing Slope	Climbing pest plants starting to overtop natives control required.
S5	*Pseudopanax arboreus*	Mature	0-5m	West facing gully	Native regeneration in gully to rear of building E7. Climbing pest plants over topping natives. Refer to pest plant layer.
S6	*Pinus radiata*	Mature	15m plus	West Facing Slope	Majority of land below pines is grazing land- fenced area next to track at bottom of stand has better developed (semi-mature) understory. Large amount of timber (Whole tree)on ground- if not removed as part of commercial harvest remove - winch/excavator or skidded, 24inch chipper and trees crew 16hrs Heavily branched trees on upper side of stand- possibly unsustainable for commercial harvest Broadly acceptable once dead wooded over track
S7	*Felled Pinus radiata*	Dead	0m	West facing gully	Gully surrounding building E9. Pines have been felled and native's vegetation has reached maturity on northern side of group, remaining area mix of weeds and juvenile natives. Weed control and replant required.
S8	*Pinus radiata*	Mature	15m plus	Steep West Facing Slope	Majority of stand has a well-developed native understory with a closed canopy. Except the area indicated in the annotated photo which has no understory. Gully bisects the stand East to West which has limited pine canopy and well developed native understory. Should be protected during timber extraction. Area along the 1885MR has large areas of cape ivy and German ivy that requires control
S9	*Pinus radiata*	Mature	15m plus	Steep West Facing Slope	100% replant

ID	*Overstory Species*	Age Class	Size Class	Topography	Comments
S10	*Mixed shrubs*	Juvenile	0-5m	Flat	Reservoir site with native regeneration
S11	*Native shrubs*	Juvenile	0-5m	West Facing Slope	Area of native regeneration with no exotic over storey
S13	*Pinus radiata,* *Pinus pinaster*	Mature	15m plus	Steep West Facing Slope	Stand of predominantly Pinus pinaster with sporadic larger Pinus *radiata*. Well-developed native understory worth protecting during harvest Area would require replanting.
S14	*Pinus radiata*	Mature	15m plus	Steep West Facing Slope	Understory has canopy closure mix of weeds and natives.
S15	*Pinus pinaster*	Mature	15m plus	Steep West Facing Slope	Understory has canopy closure mix of weeds and natives.
S16	*Pinus radiata*	Mature	15m plus	Steep West Facing Slope	Understory has canopy closure mix of weeds and natives.
S17	*Metrosideros excelsa,* *Myoporum laetum,* *Pseudopanax arboreus*	Mature	5-10m	Steep North West Facing Slope	Over storey predominantly Pohutukawa Tradescantia control
S18	*Metrosideros excelsa,* *Pinus radiata*	Mature	5-10m	West facing cliff	Small stand of Pohutukawa and pine. Proactive - Remove pine Enrichment planting for bank stability Abseiling access
S19	*Pinus radiata*	Semi-mature	0-5m	Steep West Facing Slope	Self-set semi mature pine stand on cliff/bank. Remove pines and replant for bank stability. Abseiling access
S20	*Pinus radiata*	Mature	5-10m	Steep West Facing Slope	Steep slope over Massey Road. Native understory with sporadic mature pines Remove mature pines and pine regeneration Control weeds and enrichment replant Abseiling access

ID	*Overstory Species*	Age Class	Size Class	Topography	Comments
S21	*Pinus pinaster,* *Pinus radiata,* *Cupressus macrocarpa,* *Metrosideros excelsa*	Mature	15m plus	West Facing Slope	Paddock with scattered over storey of mature conifers. Paddock has scattered mix of pest plants & natives Patches of dense weeds in paddock Remove conifers
S22	*Pinus radiata*	Juvenile	0-5m	East Facing Slope	Pine regeneration on road edge Replant following removal for stability and to prevent pine recolonising
S23	*Pinus radiata*	Mature	10-15m	East Facing Slope	Over storey of pines Steep slope natives understory / deadwood over tracks & fence
S24	*Pinus radiata*	Mature	15m plus	Steep East Facing Slope	Remove exotic over storey Enrichment plant bank Very steep slope
S25	*Pinus radiata*	Mature	15m plus	North Facing Slope	Group of open grown mature Pine growing in a paddock.
S26	*Pinus radiata*	Mature	15m plus	Steep South East Facing Slope	Over storey of mature mixed age *Pinus radiata* Sparse native understory
S27	*Pinus radiata*	Juvenile	0-5m	Steep South East Facing Slope	Over storey of juvenile self-set pine on bank over road Native understory Remove pines and replant
S28	*Pinus radiata*	Juvenile	0-5m	Steep East Facing Slope	Closed native canopy on slope above road Scattered over storey of self-set pine- remove Area of canopy ivy plotted as pest plant Replant for pest plant captured on pest plant record
S29	*Pinus radiata*	Mature	10-15m	Steep East Facing Slope	Poison pines outside of fall zone of road Pest plant Banana PF control in separate record
S32	*Pinus radiata*	Mature	10-15m	West Facing Slope	Lift prune group over path & road – low priority.
S33	*Pinus pinaster*	Mature	5-10m	West Facing Slope	Lift prune group over path & road - low priority.
S34	*Pinus pinaster*	Mature	10-15m	West Facing Slope	Lift prune group over path & road – low priority.

ID	*Overstory Species*	Age Class	Size Class	Topography	Comments
S35	*Metrosideros excelsa*	Mature	5-10m	West Facing Slope	Lift prune group over path & road – low priority
S36	*Metrosideros excelsa*	Mature	5-10m	West Facing Slope	Lift prune group over path & road- low priority
S37	*Metrosideros excelsa*	Mature	5-10m	East Facing Slope	Lift prune group over path & road – low priority
S38	*Pinus radiata*	Mature	5-10m	East Facing Slope	x2 *Pinus radiata*
S39	*Mixed species*	Mature	0-5m	East Facing Slope	Shrub planting around the structure. Remove pest plants (retain small plants around structures)
S40	*Dead*	Dead	0-5m	East Facing Slope	x3 Dead trees on fence line
S41	*Pinus radiata*	Mature	15m plus	East Facing Slope	x2 large *Pinus radiata* - retain.
S42	*Eucalyptus regnans*	Mature	10-15m	North Facing Slope	Small stand of Eucalypts - erosion control
S43	*Pinus radiata*	Mature	10-15m	North West Facing Slope	Maybe harvest - steep bank on fence line under storey has a few hangers and pine debris
S44	*Pinus radiata*	Mature	15m plus	North Facing Slope	Mill - steep slope (edge of the stand on fence line)
S45	*Eucalyptus regnans*	Mature	10-15m	North Facing Slope	Small stand of Eucalypts.
S46	*Pinus radiata*	Mature	15m plus	North West Facing Slope	Mill small stand
S47	*Eucalyptus regnans*	Mature	10-15m	North West Facing Slope	Retain small stand of Eucalypts.
S48	*Pinus radiata*	Mature	5-10m	North Facing Slope	Mill small stand
S49	*Pinus radiata*	semi-mature	5-10m	North Facing Slope	Mill small stand
S50	*Pinus radiata*	semi-mature	5-10m	North Facing Slope	Mill small stand
S51	*Pinus radiata*	Mature	15m plus	North Facing Slope	Mill small stand

ID	*Overstory Species*	Age Class	Size Class	Topography	Comments
S52	*Cupressus macrocarpa*	Mature	5-10m	North East Facing Slope	Various *Cupressus macrocarpa* on the bank edge.
S53	*Pinus radiata*	Mature	10-15m	North Facing Slope	X5 *Pinus radiata* in amongst *Cupressus macrocarpa*
S54	*Pinus radiata*	Mature	10-15m	North Facing Slope	X5 *Pinus radiata* in amongst *Cupressus macrocarpa*
S55	*Cupressus macrocarpa*	Mature	5-10m	Steep North Facing Slope	Predominantly Macrocarpa with x5 *Pinus radiata*
S56	*Cordyline australis*	Mature	0-5m	West Facing Slope	Retain x10 trees along roadway (amongst natives)
S57	*Cupressus macrocarpa*	Mature	5-10m	West Facing Slope	Retain group - erosion
S58	*Cupressus macrocarpa*	Mature	5-10m	North Facing Slope	Retain group - erosion
S59	*Cupressus macrocarpa*	Mature	5-10m	North Facing Slope	Retain group

Table 3: Inventory of Single Tree Assessment

ID	Botanical Name	Height (mm)	Girth (mm)	CSR* (m)	Age Class	Tree Health	Single Tree Comment
T2.1	*Pinus radiata*	8	900	3	Mature	Fair	bank erosion exposing the structural root zone
T3.1	*Pinus radiata*	25	3000	7	Mature	Fair	Deadwood over path
T6.1	*Pinus radiata*	8	500	2	Semi Mature	Fair	Deadwood over path
T6.2	*Pinus radiata*	9	900	2	Semi Mature	Poor	Bank below tree has recently partially collapsed. Increase PoF to reflect this.
T6.3	*Pinus radiata*	10	1400	4	Mature	Fair	Deadwood over path
T6.4	*Pinus radiata*	23	4000	10	Mature	Fair	Deadwood over path

ID	Botanical Name	Height (mm)	Girth (mm)	CSR* (m)	Age Class	Tree Health	Single Tree Comment
T6.5	*Pinus radiata*	7	2500	0	Mature	Dead	Dead
T8.1	*Pinus radiata*	20	2000	8	Mature	Fair	Powerline encroachment
T8.2	*Pinus radiata*	25	1400	4	Mature	Fair	Powerline encroachment
T14.1	*Pinus radiata*	25	3000	9	Mature	Fair	Deadwood over path
T15.1	*Pinus pinaster*	10	1200	3	Mature	Fair	bank erosion exposing the structural root zone
T17.1	*Metrosideros excelsa*	8	2500	8	Mature	Fair	Deadwood over path
T17.2	*Quercus robur*	5	1000	4	Semi Mature	Fair	Powerline encroachment
T17.3	*Metrosideros excelsa*	10	3000	5	Mature	Good	Lift prune & deadwood
T17.4	*Corynocarpus laevigatus*	6	750	2	Semi Mature	Fair	Start of track - lift prune
T17.5	*Pinus pinaster*	12	3000	5	Mature	Fair	Deadwood over path
T17.6	*Pinus pinaster*	10	2100	5	Mature	Fair	Lift over footpath
T21.1	*Pinus radiata*	12	2000	4	Mature	Fair	Powerline encroachment
T21.2	*Pinus pinaster*	6	1600	3	Mature	Fair	Removal is recommended in stand management
T21.3	*Pinus radiata*	20	3000	8	Mature	Fair	Tree recommended for removal as stand management
T21.4	*Pinus pinaster*	9	1500	3	Mature	Fair	Tree removal recommended as part of stand management
T21.5	*Pinus pinaster*	9	2000	4	Mature	Fair	Tree removal recommended as part of stand management
T23.1	*Pinus radiata*	20	1800	8	Mature	Fair	Major Deadwood

ID	Botanical Name	Height (mm)	Girth (mm)	CSR* (m)	Age Class	Tree Health	Single Tree Comment
T23.2	*Pinus radiata*	20	2500	8	Mature	Fair	Major Deadwood
T24.1	*Pinus radiata*	20	2000	4	Mature	Fair	Group of 4 similar pines all with fire damaged and decayed stems.
T26.1	*Pinus radiata*	20	2000	4	Mature	Fair	Deadwood over path
T26.2	*Pinus radiata*	17	2000	6	Mature	Fair	2 neighbouring trees both with hangers over path
T31.1	*Pinus pinaster*	10	2100	4	Mature	Fair	Deadwood over path & structure
T31.2	*Pinus radiata*	10	1200	1	Mature	Fair	Remove
T33.1	*Pinus pinaster*	15	3000	5	Mature	Good	Deadwood over path & structure
T43.1	*Pinus radiata*	15	3600	8	Mature	Good	General interest tree - large species
T44.1	*Metrosideros excelsa*	6	3000	4	Mature	Good	Interesting specimen
T51.1	*Pinus radiata*	18	3300	5	Mature	Good	Deadwood over path

*CSR – Crown Spread Radius. The greatest distance from the edge of the main stem, to the furthest distal branch tip.

6.6 QTRA Analysis

Table 4: QTRA Group Stand Area Risk Analysis

ID	Description of Assessed Risk	Annual Risk Of Harm	ALARP* Cost Benefit	Management Recommendation
S2	Assessment of pines growing on eroding bank over 1885 Military Road. Whole tree failure onto track due to bank failure. Multiple trees	1/1,000,000	$4.34	Recommended removal of under-cut *Pinus radiata* on bank over 1885 Military Road.
S3	Whole tree failure onto 1885 Military Road	<1/1,000,000	< $4.34	No work recommended based on risk
	Limb failure onto road	<1/1,000,000	< $4.34	No work recommended based on risk
	Whole tree failure onto power lines	<1/1,000,000	< $4.34	No work recommended based on risk
S6	Whole failure on to track	<1/1,000,000	< $4.34	No work recommended based on risk
	Branch failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
	Deadwood failure onto track	1/500,000	$8.68	Tolerable; dead wood tree.
	Whole tree failure onto power lines	<1/1,000,000	< $4.34	No work recommended based on risk
S8	Risk Assessment 1. Whole tree failure of pines on bank onto property. Limited access to trees bases due to bank. PoF to reflect lack of access	<1/1,000,000	< $4.34	No work recommended based on risk
	Whole tree failure onto power line along track	<1/1,000,000	< $4.34	No work recommended based on risk
	Branch failure onto 1885 Military Road	<1/1,000,000	< $4.34	No work recommended based on risk
	Whole tree failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
S9	Whole tree failure onto road. PoF increased to 5 to reflect difficulty access some trees on cliff top	1/400,000	$10.85	Tolerable; Monitor group for decline in tree health.
S14	RA1 - limb failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
	RA1 - whole tree failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
S17	Whole tree failure onto road	<1/1,000,000	< $4.34	No work recommended based on risk
	Limb failure onto road	<1/1,000,000	< $4.34	Prune limb.

ID	Description of Assessed Risk	Annual Risk Of Harm	ALARP* Cost Benefit	Management Recommendation
	Deadwood failure onto Memorial Walkway West	<1/1,000,000	< $4.34	Prune dead wood
S18	Stem failure onto road	<1/1,000,000	< $4.34	No work recommended based on risk
S19	Whole tree pine failure onto road	<1/1,000,000	< $4.34	No work recommended based on risk
S20	Whole pine failure onto road	1/1,000,000	< $4.34	No work recommended based on risk
S21	Branch failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
	Whole tree failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
S23	Whole tree failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
	Limb failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
	Deadwood failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
S24	Tree failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
	Branch failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
S25	Whole tree failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
	Branch failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
S26	Whole tree failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
	Branch failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
	Deadwood failure onto track	<1/1,000,000	< $4.34	No work recommended based on risk
S27	Whole tree failure onto road	<1/1,000,000	< $4.34	No work recommended based on risk

*ALARP – As Low as Reasonably Practicable, is a cost benefit analysis base on the Value of a Statistical Life (VOSL)(2018) multiplied by the Annual Risk of Harm (ARoH). If the cost of risk mitigation exceeds the ALARP value the work is not considered justified solely to mitigate risk.

Table 5: QTRA Single Tree Risk Analysis

ID	Description Of Assessed Risk	Annual Risk Of Harm	ALARP* Cost Benefit	Management Recommendation
T2.1	Whole tree failure due to bank erosion onto track	1/1,000,000	$4.34	Proactive removal as part of the stand management & erosion concerns.
T6.1	Whole tree failure due to bank erosion onto track	<1/1,000,000	< $4.34	No work recommended based on risk
	Whole tree failure due to bank erosion onto power lines	<1/1,000,000	< $4.34	No work recommended based on risk
T6.2	Whole tree failure due to bank erosion onto track	<1/1,000,000	< $4.34	No work recommended based on risk
	Whole tree failure due to bank erosion onto power lines	1/300,000	$14.47	Tolerable; Remove or Monitor group for decline in tree health & erosion.
T6.4	Stem failure at union on to track	<1/1,000,000	< $4.34	No work recommended based on risk
T6.5	Standing dead stem failure on to track	<1/1,000,000	< $4.34	No work recommended based on risk
T8.1	Stem failure at poor union onto power lines.	1/300,000	$14.47	Proactive tree removal. Powerline encroachment & low retention value.
T8.2	Stem failure at poor union onto power line	1/300,000	$14.47	Proactive tree removal. Powerline encroachment & low retention value.
	Stem failure at poor union onto track	<1/1,000,000	< $4.34	No work recommended based on risk
T14.1	Hanging broken branch failure onto track	1/500,000	$8.68	Tolerable; remove hanger & deadwood.
T15.1	Tree failure due to eroding bank onto track pof4	1/1,000,000	$4.34	Proactive tree removal as part of the stand management.
T17.1	Whole tree failure onto track due to bank erosion	<1/1,000,000	< $4.34	No work recommended based on risk
T21.2	Whole tree failure onto track due to eroding bank	<1/1,000,000	< $4.34	No work recommended based on risk
T21.3	Hanging broken branch failure onto track	1/1,000,000	$4.34	Remove hanging branch & deadwood.

ID	Description Of Assessed Risk	Annual Risk Of Harm	ALARP* Cost Benefit	Management Recommendation
T21.4	Stem failure at poor union onto track	1/1,000,000	$4.34	Proactive tree removal as part of the stand management.
T21.5	Stem failure at poor union onto track	1/1,000,000	$4.34	Proactive tree removal as part of the stand management.
T23.1	Hung up deadwood failure onto track	1/500,000	$8.68	Remove hanger & dead wood.
T23.2	Hung up deadwood failure onto track	1/500,000	$8.68	Remove hanger & dead wood.
T24.1	Whole tree failure onto track. Fire damaged stems with decay evident	1/400,000	$10.85	Low retention value. Proactive removal.
T26.1	Hung up tree over track	<1/1,000,000	< $4.34	Remove hanger
T26.2	Hanging broken branch failure onto track	1/500,000	$8.68	Remove hanger & dead wood.

*ALARP – As Low as Reasonably Practicable, is a cost benefit analysis base on the Value of a Statistical Life (VOSL)(2018) multiplied by the Annual Risk of Harm (ARoH). If the cost of risk mitigation exceeds the ALARP value the work is not considered justified solely to mitigate risk.

6.7 The findings have been used to calculate the greatest annual risk of harm posed by the trees in each area to users of the road, tracks, footpaths and property. Any lower risks to property or people have not been included, as they are within broadly acceptable or tolerable limits.

6.8 An ALARP (As Low as Reasonably Practicable) value has been provided for each assessment. ALARP is a cost benefit analysis base on the Value of a Statistical Life (VOSL) multiplied by the Annual Risk of Harm (ARoH). The New Zealand Transport Authority 2018 has calculated the VOSL to currently be $4,340,000. If the cost of risk mitigation exceeds the ALARP value the work is not considered justified solely to mitigate risk. However, work may be recommended in the wider context of managing the trees on site.

6.9 For ease of interpretation the table has been colour coded using the colours in the QTRA Advisory Risk Thresholds.

6.10 Visitor number rates were estimates following onsite observations and discussions with locals.

The estimates were as following; Foot traffic in low use areas was estimated to be 1 pedestrian per hour when averaged across an entire year. Foot traffic in high use areas was estimated to be up to 7 pedestrians per hour when averaged across an entire year.

6.11 The section below provides a brief summary of any Annual Risk of Harm (ARoH) which is elevated above the Broadly Acceptable classification for each group assessed.

6.12 The section below provides a brief summary of any Annual Risk of Harm (ARoH) which is elevated above the Broadly Acceptable classification for each individual tree assessed.

7 Findings

7.1 Group: Stand Area Assessments

The section below provides a brief summary of any Annual Risk of Harm (ARoH) which is elevated above the Broadly Acceptable classification for each group assessed. (Please refer to the appended Photo sets).

7.1.1 **Group: Stand Area S2** – The group of *Pinus radiata* has an ARoH of 1/1,000.000. The Pines are growing on an eroding bank over 1885 Military Road. Whole tree failure onto the track due to embankment erosion is foreseeable. Due to the groups low retention value it is recommended that they be removed. This level of risk is generally considered tolerable.

7.1.2 **Group: Stand Area S6** – The group of *Pinus radiata* has an ARoH of 1/500,000. There is major deadwood visible over the walking track at 1885 Military Road. As this dead wood poses a foreseeable risk it is recommended that the trees be dead-wooded by a suitably qualified arborist. (Please refer to Section 12; Pruning Guidelines below). This level of risk is generally considered tolerable.

7.1.3 **Group: Stand Area S9** – The group of *Pinus radiata* has an ARoH of 1/400,000. There is embankment erosion visible. Therefore it is recommended that both the tree health and the embankment be regularly inspected. The trees maybe suitable for harvest which may provide an alternative management solution. This level of risk is generally considered tolerable.

7.2 Individual Tree Assessments

The section below provides a brief summary of any Annual Risk of Harm (ARoH) which is elevated above the Broadly Acceptable classification for each individual tree assessed. (Please refer to the appended Photo sets).

7.2.1 **Single Tree T2.1** - Pinus radiata has an ARoH of 1/1,000,000. There is visible embankment erosion. As the tree has a low retention value it is recommended that the tree is removed as part of the stand management. This is a proactive option. Alternatively, as this level of risk is generally considered tolerable regular inspections of both the embankment and the trees vitality is an option.

7.2.2 **Single Tree T6.2** – *Pinus radiata* has an ARoH of 1/300,000. There is visible embankment

erosion. Therefore it is recommended that both the tree vitality and the embankment be regularly inspected. This level of risk is generally considered tolerable.

7.2.3 **Single Tree T8.1** - Pinus radiata has an ARoH of 1/300,000. The tree has poor structure and branch unions and if the tree is to fail it could foreseeably cause damage to the nearby powerlines. Therefore it is recommended that the tree be removed as the trees retention value is low. Alternatively, as this level of risk is generally considered tolerable regular inspections of trees vitality is an option.

7.2.4 **Single Tree T8.2** - *Pinus radiata* has an ARoH of 1/300,000. The tree has poor structure and branch unions and if the tree is to fail it could foreseeably cause damage to the nearby powerlines. Therefore it is recommended that the tree be removed as the trees retention value is low. Alternatively, as this level of risk is generally considered tolerable regular inspections of trees vitality is an option.

7.2.5 **Single Tree T14.1** - *Pinus radiata* has an ARoH of 1/300,000. There is a hanging broken branch over the walking track. As this hanger poses a foreseeable risk it should be removed and the rest of the dead wooded by a suitably qualified arborist. (Please refer to Section 12; Pruning Guidelines below). This level of risk is generally considered tolerable.

7.2.6 **Single Tree T15.1** - *Pinus radiata* has an ARoH of 1/1,000,000. There is visible embankment erosion. As the tree has a low retention value it is recommended that the tree is removed as part of the stand management. This is a proactive option. Alternatively, as this level of risk is generally considered tolerable regular inspections of both the embankment and the trees vitality is an option.

7.2.7 **Single Tree T21.3** - *Pinus radiata* has an ARoH of 1/1,000,000. There is a hanging broken branch over the walking track. As this hanger poses a foreseeable risk it will need to be removed and the rest of the dead wooded by a suitably qualified arborist. (Please refer to Section 12; Pruning Guidelines below). This level of risk is generally considered tolerable.

7.2.8 **Single Tree T21.4** - *Pinus radiata* has an ARoH of 1/1,000,000. The tree has poor structure with flawed branch unions. As the tree has a low retention value it is recommended that the tree is removed as part of the stand management. This is a proactive option. Alternatively, as this level of risk is generally considered tolerable regular inspections of trees vitality is an option.

7.2.9 **Single Tree T21.5** - *Pinus radiata* has an ARoH of 1/1,000,000. The tree has poor structure

with flawed branch unions. As the tree has a low retention value it is recommended that the tree is removed as part of the stand management. This is a proactive option. Alternatively, as this level of risk is generally considered tolerable regular inspections of trees vitality is an option.

7.2.10 **Single Tree T23.1** - *Pinus radiata* has an ARoH of 1/1,000,000. There is a hanging broken branch over the walking track. As this hanger poses a foreseeable risk it will need to be removed and the rest of the dead wooded by a suitably qualified arborist. (Please refer to Section 12; Pruning Guidelines below). This level of risk is generally considered tolerable.

7.2.11 **Single Tree T23.2** - *Pinus radiata* has an ARoH of 1/1,000,000. There is hanging dead wood over the walking track. As this dead wood poses a foreseeable risk it will need to be removed and the rest of the dead wooded by a suitably qualified arborist. (Please refer to Section 12; Pruning Guidelines below). This level of risk is generally considered tolerable.

7.2.12 **Singe Tree T24.1** - *Pinus radiata* has an ARoH of 1/400,000. The trees main stem has been damaged due to fire and decay is visible. As the tree has a low retention value it is recommended that the tree is removed as part of the stand management. This is a proactive option. Alternatively, as this level of risk is generally considered tolerable regular inspections of trees vitality is an option.

7.2.13 **Single Tree T26.2** - *Pinus radiata* has an ARoH of 1/500,000. There is hanging dead wood over the walking track. As this dead wood poses a foreseeable risk it will need to be removed and the rest of the dead wooded by a suitably qualified arborist. (Please refer to Section 12; Pruning Guidelines below). This level of risk is generally considered tolerable.

7.3 Pest Plants

The sections below provide a summary of the pest plant species identified within each vegetation unit.

7.3.1 **Western Pine Forest** – pest plants within the western pine forest area were most abundant along the western edge. The area of previously felled pines in particular contained a very high proportion of pest plant species. Pest plant abundance was notable lower beneath the pine forest interior, where native species formed a greater proportion of the forest understory.

Table 6: Western Pine Forest pest plants

Species	Common name	Abundance	Age class/Size			Location						
			Seedling/small	Sapling/medium	Mature/large	Edges	Cliffs	Light gaps	Ground cover	Understory	Sub-canopy	Canopy
Brugmansia candida	Angels trumpet	R			x	x						
Calystegia sp.	Bindweed	R			x	x						
Chamaecytisus palmensis	Tree lucerne	F	x	x	x	x	x	x		x		
Chrysanthemoides monilifera	Boneseed	A	x	x	x	x	x	x		x		
Corynocarpus laevigatus	Karaka	O	x		x					x	x	
Cotoneaster sp.	Cotoneaster	R		x	x	x						
Crocosmia x crocrosmiiflora	Montbretia	R			x	x						
Cytisus scoparius	Wild broom	F	x	x	x	x	x					
Delairea odorata	German ivy	F	x	x	x	x	x		x			
Elaeagnus x reflexa	Elaeagnus	O			x	x						
Fatsia japonica	Fatsia	R	x		x	x				x		
Hedera helix	English ivy	R	x			x	x		x			
Hoheria populnea	lacebark	R	x			x						
Iris foetidissima	Stinking iris	R	x	x	x	x						
Ligustrum lucidum	Tree privet	R	x			x						
Lonicera japonica	Japanese honeysuckle	O	x	x	x	x						
Lupinus arboreus	Tree lupin	R	x	x	x	x				x		
Metrosideros excelsa	Pohutukawa	O	x			x	x					
Paraserianthes lophantha	Brush wattle	R	x	x	x	x						
Passiflora tripartita	Banana passionfruit	O	x	x	x	x						
Phytolacca octandra	Inkweed	F	x	x	x	x						
Pinus spp.	Pine (not mature)	F	x			x	x	x				
Pittosporum crassifolium	Karo	O	x	x		x						
Pseudosasa japonica	Arrow bamboo	R		x		x						
Rubus fruticosus agg.	Blackberry	R			x	x						
Rumex sagittatus	Climbing dock	O	x	x		x						
Senecio angulatus	Cape ivy	F	x	x	x	x						
Solanum linnaeanum	Apple of sodom	R	x	x	x	x						
Trachycarpus fortuneii	Chinese windmill palm	R			x	x						
Tradescantia fluminensis	Tradescantia	F	x	x	x	x						
Tropaeolum majus	Nasturtium	R		x		x						
Ulex europaeus	Gorse	F	x	x		x	x					
Vibernum sp.	Vibernum	R			x	x						
Zantedeschia aethiopica	Arum lily	R	x	x	x	x						

7.3.2 **Northern Point** – pest plants within the northern point area are most abundant along the coastal edges and walking tracks. Pohutukawa forms the majority of the canopy along the northern and western areas of the vegetation unit. Karo are commonly found growing underneath the Pohutukawa canopy and within light gaps.

Table 7: Northern Point pest plants

Species	Common name	Abundance	Age class/Size			Location						
			Seedling/small	Sapling/medium	Mature/large	Edges	Cliffs	Light gaps	Ground cover	Understory	Sub-canopy	Canopy
Aeonium sp.	Pinwheel	R	x	x	x		x					
Agapanthus praecox	Agapanthus	O	x	x	x	x						
Chamaecytisus palmensis	Tree lucerne	O	x	x	x	x	x			x		
Chrysanthemoides monilifera	Boneseed	O	x	x		x	x	x				
Cotyledon orbiculata	Pig's ear	O	x	x	x		x					
Iris foetidissima	Stinking iris	O	x	x	x	x						
Lupinus arboreus	Tree lupin	A	x	x	x	x	x					
Metrosideros excelsa	Pohutukawa	D	x	x	x	x	x	x			x	x
Passiflora tripartita	Banana passionfruit	F	x	x	x	x		x			x	x
Pinus spp.	Pine (not mature)	R	x			x	x	x				
Pittosporum crassifolium	Karo	O	x	x	x	x	x	x		x	x	
Sedum sp.	Stonecrop	R	x	x	x		x		x			
Senecio angulatus	Cape ivy	O	x	x	x	x	x					
Tradescantia fluminensis	Tradescantia	O	x	x	x	x			x			
Tropaeolum majus	Nasturtium	R	x	x		x						
Ulex europaeus	Gorse	F	x	x	x	x	x					

7.3.3 **Summit Farmland** – pest plants within the summit farmland fall into one of two groups: either remnant planted vegetation or pastural pests. A number of large hedgerows of Elaeagnus are present, which has all by smothered the previous vegetation beneath. Broom and gorse are found throughout the grazed farmland areas where they form the dominant vegetation.

Table 8: Summit Farmland pest plants

Species	Common name	Abundance	Age class/Size			Location						
			Seedling/small	Sapling/medium	Mature/large	Edges	Cliffs	Light gaps	Ground cover	Understory	Sub-canopy	Canopy
Agapanthus praecox	Agapanthus	R	x	x	x	x						
Chrysanthemoides monilifera	Boneseed	O	x	x		x						x
Cytisus scoparius	Wild broom	D	x	x	x					x	x	x
Elaeagnus x reflexa	Elaeagnus	F			x							x
Iris foetidissima	Stinking iris	R	x	x	x	x						
Ligustrum lucidum	Tree privet	R			x							x
Phytolacca octandra	Inkweed	F	x	x	x	x						
Pinus sp.	Pine (not mature)	R	x			x						x
Pittosporum crassifolium	Karo	R	x	x		x						x
Rubus fruticosus agg.	Blackberry	O	x	x	x	x		x	x			
Ulex europaeus	Gorse	A	x	x	x					x	x	x
Zantedeschia aethiopica	Arum lily	R	x	x	x	x						

7.3.4 **Eastern Pine Forest** – pest plants within the eastern pine forest are predominantly found around the forest edges. The canopy of the eastern pine forest is less dense than that of the western pine forest, allowing more sunlight to reach the forest floor. As a result, pest plants are present throughout the understory of the vegetation unit. Pine saplings and karo are frequently found growing in the understory and sub-canopy.

Table 9: Eastern Pine Forest pest plants

Species	Common name	Abundance	Age class/Size			Location						
			Seedling/small	Sapling/medium	Mature/large	Edges	Cliffs	Light gaps	Ground cover	Understory	Sub-canopy	Canopy
Acacia sp.	Wattle	O	x	x	x	x					x	x
Acanthus mollis	Bear's breeches	R	x	x		x						
Chamaecytisus palmensis	Tree lucerne	O	x	x	x	x						
Chrysanthemoides monilifera	Boneseed	O	x	x	x	x	x	x				
Cotyledon orbiculata	Pig's ear	R	x	x	x		x					
Cytisus scoparius	Wild broom	O	x	x	x	x						
Lupinus arboreus	Tree lupin	F	x	x	x	x						
Passiflora tripartita	Banana passionfruit	R	x	x		x	x					
Pinus spp.	Pine (not mature)	F	x	x		x	x	x		x	x	
Pittosporum crassifolium	Karo	F	x	x	x	x		x		x		
Senecio angulatus	Cape ivy	A	x	x	x	x	x					
Ulex europaeus	Gorse	R	x	x		x						

7.3.5 **Eastern Coastal Scrub** – The eastern coastal scrub contains a high proportion of pest plants growing amongst and, in some areas, over the native canopy. Pest plant abundance is highest along the roadside edges. Climbing pests, notably cape ivy and German ivy, are particularly abundant within this vegetation unit.

Table 10: Eastern Coastal Scrub pest plants

Species	Common name	Abundance	Age class/Size			Location						
			Seedling/small	Sapling/medium	Mature/large	Edges	Cliffs	Light gaps	Ground cover	Understory	Sub-canopy	Canopy
Acacia longifolia	Sydney golden wattle	R	x	x		x						
Buddleia davidii	Butterfly bush	R			x	x						
Chamaecytisus palmensis	Tree lucerne	R	x	x	x	x						
Chrysanthemoides monilifera	Boneseed	A	x	x	x	x	x				x	x
Cortaderia selloana	Pampas	R	x	x	x	x	x					
Corynocarpus laevigatus	Karaka	R	x	x		x						
Cotyledon orbiculata	Pig's ear	O	x	x	x		x					
Crocosmia x crocrosmiiflora	Montbretia	R	x	x	x	x						
Cytisus scoparius	Wild broom	F	x	x	x	x		x				
Delairea odorata	German ivy	A	x	x	x	x	x		x			x
Elaeagnus x reflexa	Elaeagnus	O	x	x	x							x
Hedera helix	English ivy	O	x	x		x			x			
Lupinus arboreus	Tree lupin	R	x	x	x	x		x				
Malva arborea	Tree mallow	O	x	x	x	x		x				
Metrosideros excelsa	Pohutukawa	R	x				x					
Passiflora tripartita	Banana passionfruit	F	x	x	x	x						x
Pinus spp.	Pine (not mature)	O	x	x		x						x
Pittosporum crassifolium	Karo	F	x	x	x	x	x		x	x	x	
Rumex sagittatus	Climbing dock	R	x	x	x	x						x
Senecio angulatus	Cape ivy	A	x	x	x	x	x		x	x	x	
Tradescantia fluminensis	Tradescantia	R	x	x		x			x			
Tropaeolum majus	Nasturtium	R	x	x	x	x						
Ulex europaeus	Gorse	O	x	x	x	x						
Zantedeschia aethiopica	Arum lily	R	x	x	x	x						

8 Arboricultural Discussion and Comments

8.1 The highest Annual Risk of Harm (ARoH) posed by any tree(s) on site are Trees T6.2, T.8.1, and Tree T8.2 which are all mature *Pinus radiata.* These three (3) trees have poor structure and are all in the vicinity of overhead powerlines which elevates the ARoH to 1/30,000. This level of risk can be considered tolerable. However; as the subject trees have a low retention levels (Barrell, J.D., 2009). It is recommended that they be removed. The ALARP cost benefit analysis does not justify the removal of these trees. However, proactive removal, or alternative risk reduction methods should be considered dependent upon the tree owner's priorities. An alternative management option to tree removal could be a crown reduction, or "monolithing". Monolithing is the practice of reducing a tree back to a standing stem so it can be retained for its habitat value. Both options reduce the Probability of Failure and consequently the Annual Risk of Harm by reducing the trees wind loading.

8.2 The second highest Annual Risk of Harm (ARoH) posed by any tree on site has been identified as Tree T24.1 – a *Pinus radiata* with a fire damaged main stem and visible decay. Its ARoH was assessed as being tolerable (1/400,000). The ALARP cost benefit analysis does not justify the removal of the subject tree. However, proactive removal should be considered dependent upon the tree owner's priorities.

8.3 Across many areas of the site there has been significant root disturbance and root loss due to erosion. A decline in tree vitality has been noted in areas where root disturbance has occurred. It is likely further tree decline will occur, and in some instances a possible occurrence of tree failure. These eroded areas will need to be inspected on a regular basis, concurrent with the tree vitality.

8.4 The scaffold branches of some of the larger trees are covered by epiphytic growth and pest plants which limit the scope of the crown inspection. The Probability of Failure (PoF) of branch failure for these trees has been increased accordingly to reflect this uncertainty.

8.5 The QTRA cost benefit analysis does not justify the associate cost of removing the dead trees identified, as the cost of risk management exceeds the ALARP cost benefit value. However, removal is still recommended as the Annual Risk of Harm (ARoH) associated with the dead trees will only increase and the dead trees are not of high value within the context of the site. In addition, the risk and cost associated with removing these trees is likely to increase the longer they are retained.

9 Pest plant discussion and comments

9.1 A total of 45 species of pest plants were identified within the site. Pest plants were found throughout each of the five vegetation units, with varied patterns of diversity, abundance and distribution. Management of the site will need to consider the effects on the pest plant population and how to reduce the abundance of pest plant species and avoid increases in abundance.

9.2 Overall, with the exception of the eastern coastal scrub vegetation unit, much of the vegetation within the site is comprised of exotic species or species not native to the Wellington region. This provides a challenge for pest plant control as reinvasion risk is high without undertaking significant replacement planting and follow-up control. The eastern coastal scrub may provide the best opportunity for creating an area where pest species are brought to a maintenance control level due to the proportion of native species present.

9.3 The area of felled pines within the western pine forest area provides a case study of what may result following large-scale tree removal within the site. Management of the tree stock will require consideration of how the area will be utilised following removal and what actions may reduce the invasion, establishment and long-term growth of pest plants within the area.

9.4 Species which are native to New Zealand but not to the Wellington region pose a notable threat to the native ecology of the site. Pohutukawa and karo are abundant along the coastal margins of the site and karaka and lacebark are establishing beneath areas of pine canopy.

10 Conclusions

10.1 The Annual Risk of Harm for all the trees on site falls into the category of either Tolerable or Broadly Acceptable under the QTRA framework.

10.2 Retained trees that have experienced erosion within their root plate are likely to experience further decline.

10.3 The greatest risk to tree health and ultimately tree safety on site is uncontrolled development in close proximity to retained trees. If development and/or maintenance is planned in close proximity to any of the trees on site an appropriate tree protection methodology should be employed to minimise the adverse effects on the trees, and reduce the likelihood of tree failure and associated Annual Risk of Harm.

10.4 Proactive removal of the following trees should be considered: T6.2, T15.1, T2.1, T21.4, T21.5, T24.1, T8.2 and S2.

10.5 Remedial Pruning and Deadwood Removal is recommended for: T.14.1, T21.3, T23.1, T23.2, T26.2 and S6.

10.6 Embankments/slopes with erosion concerns and trees classified as tolerable should be regularly inspected and/or monitored.

10.7 The decision to undertake works is ultimately dependent upon the tree owner's tolerance of risk.

11 Recommendations and Management Options

11.1 Trees with an ARoH greater than 1/1,000,000 should be regularly inspected for any change in vitality.

11.2 Any tree removal and tree pruning should be undertaken by a suitably qualified arborist and in a manner that avoids any unnecessary damage or disturbance to any retained vegetation and their root zones.

11.3 Eroded and erosion prone areas with regards to trees should be monitored for any material changes in their vitality and disposition.

11.4 It is foreseeable that pedestrian numbers both work related and recreational will increase. Therefore it is recommended that Visual Tree Assessments and Quantified Tree Risk Assessments be undertaken annually. Ideally on an offset cycle that would allow the assessment to capture seasonal changes to the condition of the trees on the site.

11.5 If further development is planned in close proximity to any of the trees on site a tree protection methodology should be developed and applied by a suitably qualified and experienced arborist. Both recent research and experience has shown that healthy trees usually remain in good health when best management practice guidelines and standards are adhered on development sites under the direct supervision/guidance of a suitably qualified arborist. Therefore a suitably qualified arborist should be appointed prior to the commencement of any works.

12 Tree Management: Tree Maintenance

12.1 Walking Track Pruning

Recreation tracks are for people who have widely varying perspectives and expectations. A well planned, designed and constructed track will meet the needs of the users, look unobtrusive, and be environmentally sensitive.

Vegetation Maintenance; Vegetation maintenance can be broken down into a number of groups, each requiring different skills and tasks including vegetation clearance, windfall removal, vista maintenance and the felling and removal of hazardous trees. *(Refer to the NZSHB 8630:2004 for standards on vegetation clearance).*

- **Minor Vegetative Clearance**

Pruning back the biomass in and around the walking tracks will be ongoing. Pruning should be minimal where possible as 'heavy pruning' can have an immediate impact for the visitor; they want to interact with the environment, not be removed from it. Major pruning can have a profound effect on this interaction and should be avoided where possible. There are a few guiding principles that should be followed:

- Short Walk Maximum of one metre either side of the track centre line 2.5 metres.
- Walking Track Maximum of one metre either side of the track centre line 2.5 metres.
- Great Walk/ Easy Tramping Track Maximum of 0.5 metres either side of the track centre line. Ensure clear passage and clear view of markers.

- **Windfalls**

Large trees or limbs that fall across the track should be:

- Cut back 300 mm from each side of the track edge and be cut parallel to the track.
- Large trees with trunks should have the cut made at a sloping angle; this helps to reduce the visual impact of clearing fallen trees.
- When large trees require pruning on scenic vista points a suitably qualified arborist should be employed to undertake this specialist work.
- Large limbs should be removed so they are out of sight from the track. The cut end should face away from track so it is not visible by users.

➢ **Vista Maintenance**

An important and often overlooked walking track consideration is the long term management of the scenic view. There are a number of important aspects to consider both pre and post planning;

- All plant species must be in character with the site.
- Plants must be capable of growing in an often exposed location.
- Rather than maintaining a clear view consider framing the view.
- Plant species that grow to their maximum height and will not obstruct the view.
- Remove a percentage of self-germinating seedlings annually that will eventually obstruct the view.
- For particularly difficult terrain and/or vegetation engage a suitably qualified arborist.

12.2 Pruning Guidelines

12.2.1 It is foreseeable that the trees in and around the aforementioned historical structures and walking tracks will require both reactive and proactive pruning. Both remedial and formative pruning will need to be carried out where deemed necessary to maintain trees, vistas and mitigate foreseeable risk.

12.2.2 Trees are sophisticated organisms, with complex biology, effective integrative systems and efficient biological defence mechanisms. The tree's defence mechanisms are usually the strongest and most effective defences available. Therefore a non or minimal interventionist approach should be followed. Intervention in the natural growth of a tree should only occur where the biology and the physiology of the organism are understood to such a level that intervention will have clear and predictably beneficial outcomes.

12.2.3 Trees are living and all arboricultural practices should accord with basic biological principles. Therefore it is strongly recommended that any pruning must be carried out by a suitably qualified arborist and in accordance with currently accepted arboricultural best practice pursuant to New Zealand Arboriculture Association Best Practice Guidelines for Amenity Tree Pruning.

12.2.4 These abovementioned guidelines recognise the uniqueness of the individual amenity tree in its location whilst addressing both asset and risk management. It sees trees as community assets worth managing and protecting and is consistent with the funding arrangements for local

government agencies, which demand proper risk and asset management systems. These standards describe the current best practices for the planning, pruning and protection of trees on development sites.

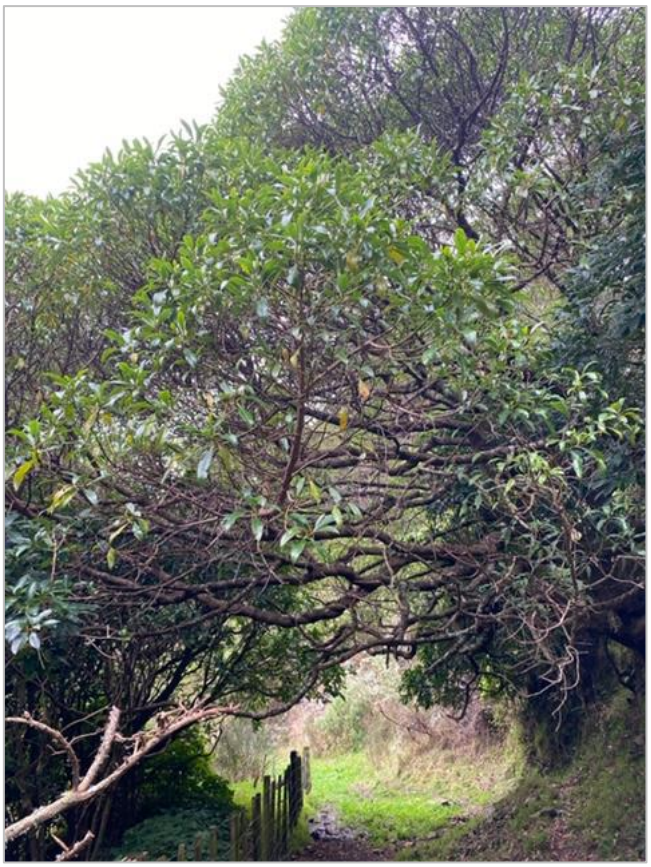


Photo Image 2: Maintain walking track clearance levels.

Photo Image 3: Maintain walking track clearances.

Photo Image 4: Walking Tracks

12.3 Tree Management Strategy

The following short term / long term tree management strategy should be adopted:

- ***PRIORITY 1*** - Reactive Tree Works & Public Safety
- ***PRIORITY 2*** - Remedial & Proactive Tree Works
- ***PRIORITY 3*** - Major Tree Nuisance Works
- ***PRIORITY 4*** - Management of Significant Trees
- ***PRIORITY 5*** - Young Tree Maintenance
- ***PRIORITY 6*** - Minor Tree Nuisance Management

"A society grows great when old people plant trees whose shade they know they shall never sit in."

-Greek Proverb

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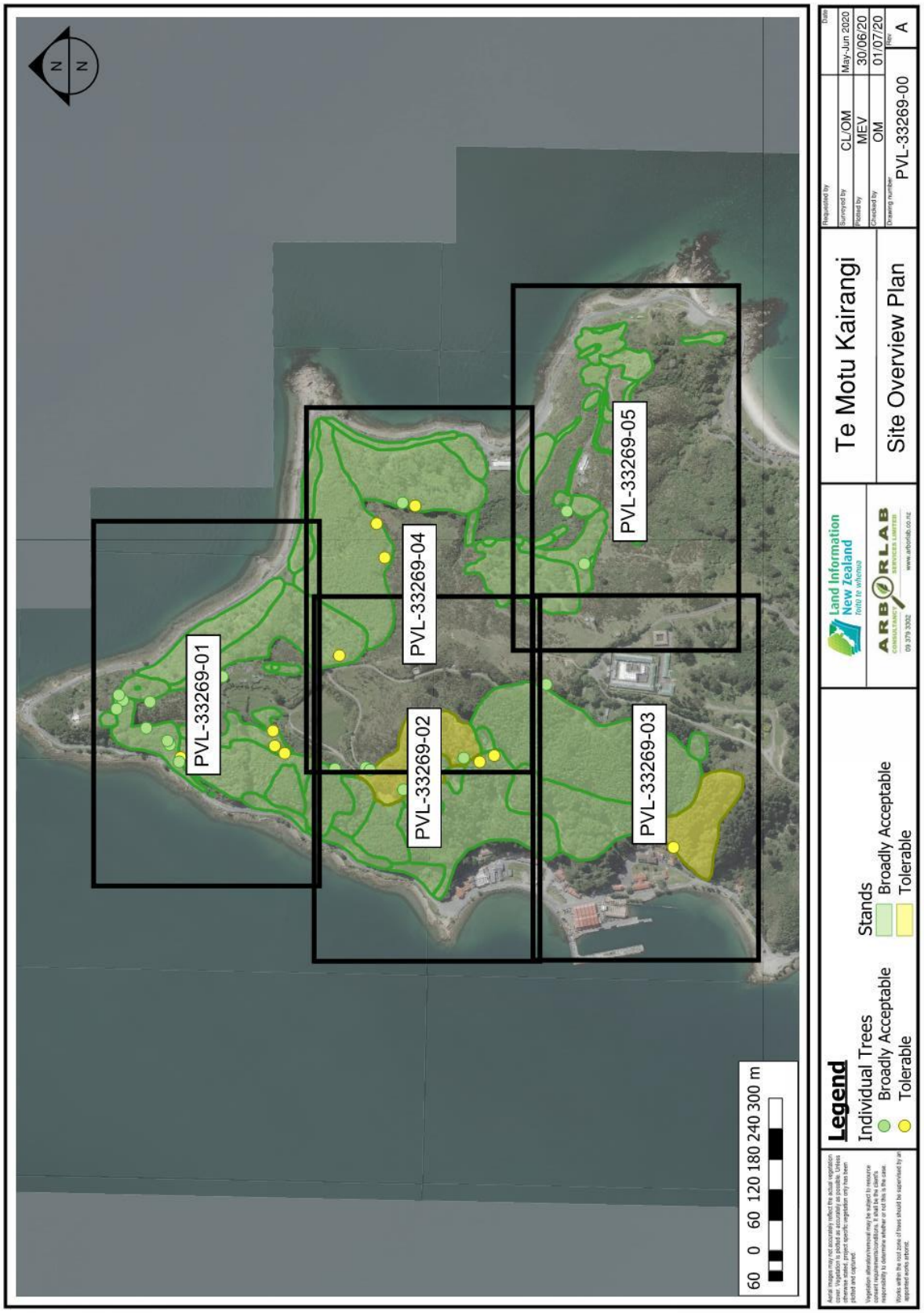
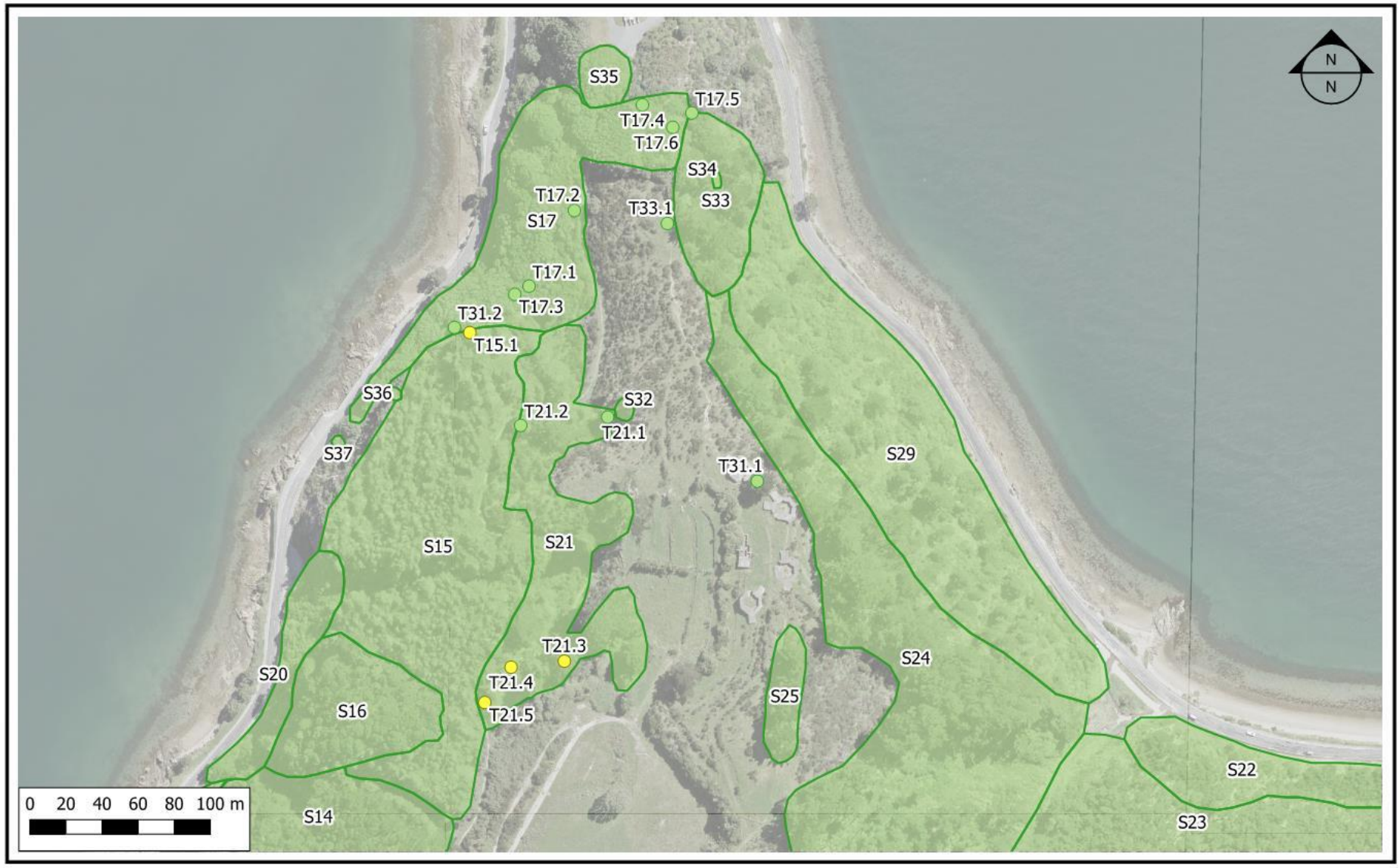
14 Appendix

14.1 Aerial Maps





Aerial images may not accurately reflect the actual vegetation cover. Vegetation is plotted as accurately as possible. Unless otherwise stated, project specific vegetation only has been plotted and captured.

Vegetation alteration/removal may be subject to resource consent requirements/conditions. It shall be the client's responsibility to determine whether or not this is the case.

Works within the root zone of trees should be supervised by an appointed works arborist.

Legend

Individual Trees
- Broadly Acceptable
- Tolerable

Stands
- Broadly Acceptable
- Tolerable

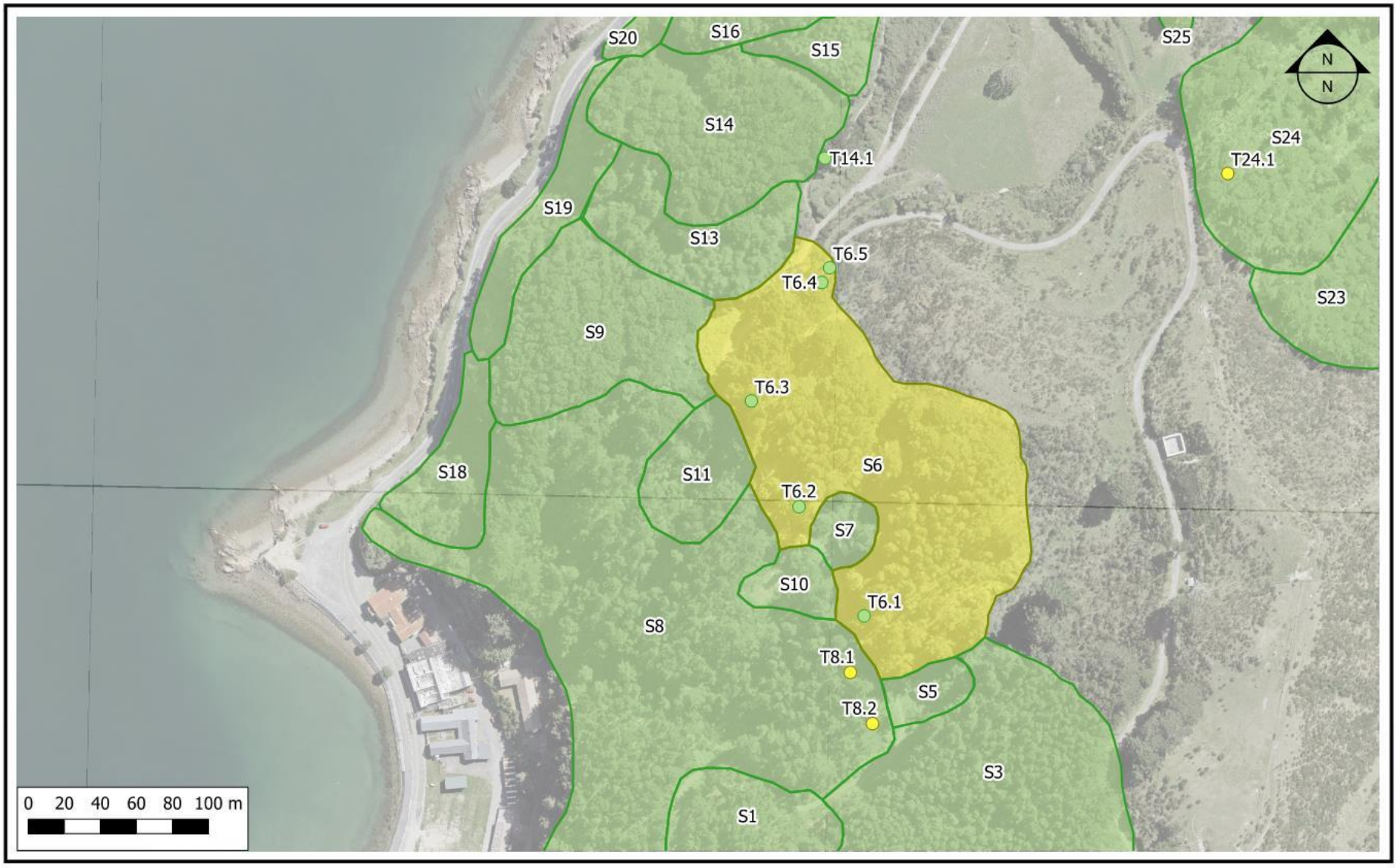
Land Information New Zealand
Toitū te whenua

ARBORLAB CONSULTANCY SERVICES LIMITED
09 379 3302 www.arborlab.co.nz

Te Motu Kairangi

Vegetation Plan

		Date
Requested by		
Surveyed by	CL/OM	May-Jun 2020
Plotted by	MEV	30/06/20
Checked by	OM	01/07/20
Drawing number	PVL-33269-01	Rev A



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Legend

Individual Trees
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- Tolerable

Stands
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- Tolerable

Land Information New Zealand
Toitū te whenua

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Te Motu Kairangi

Vegetation Plan

		Date
Requested by		
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Plotted by	MEV	30/06/20
Checked by	OM	01/07/20
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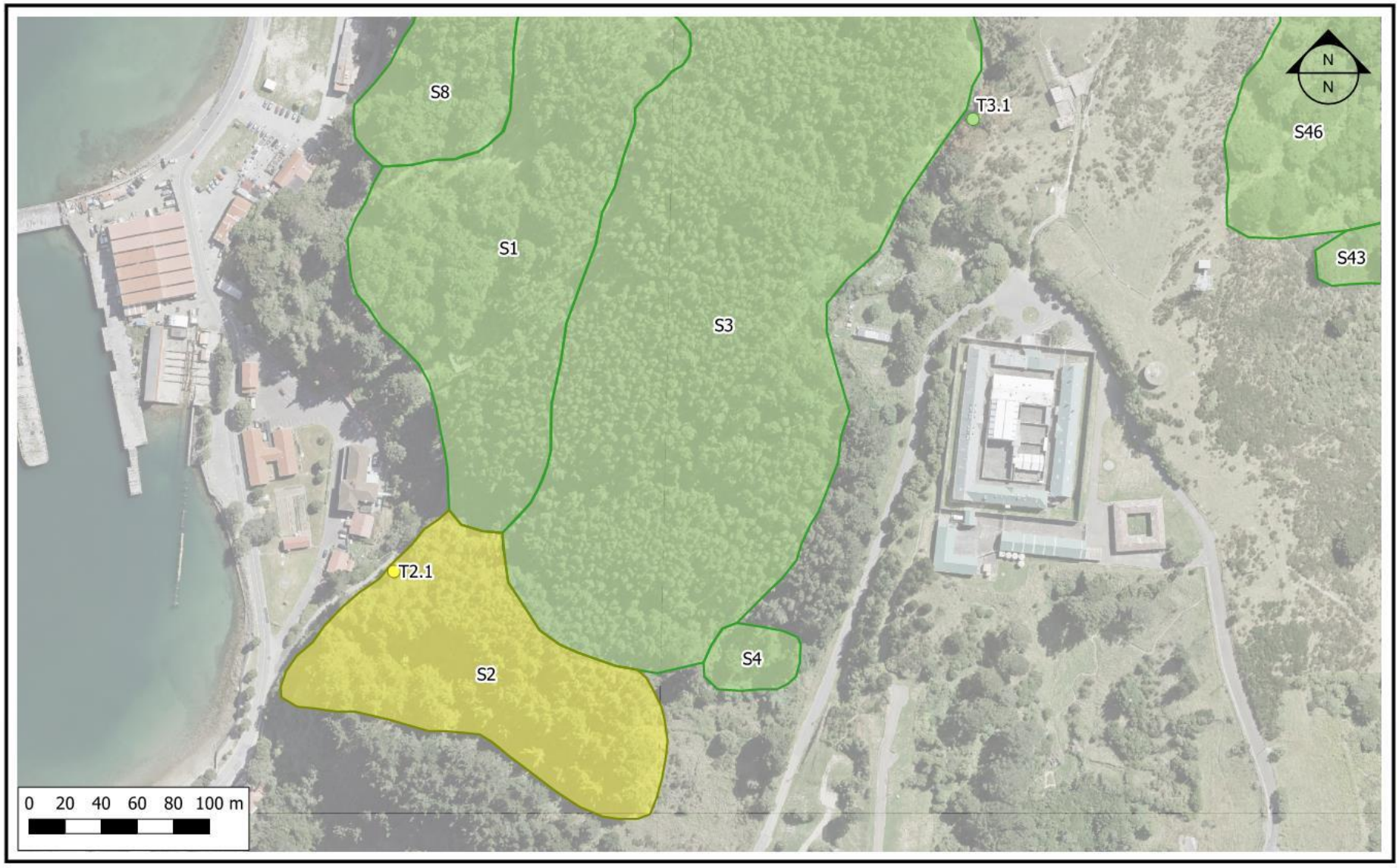

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Legend

Individual Trees
- Broadly Acceptable
- Tolerable

Stands
- Broadly Acceptable
- Tolerable

Land Information New Zealand
Toitū te whenua

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Te Motu Kairangi

Vegetation Plan

		Date
Requested by		
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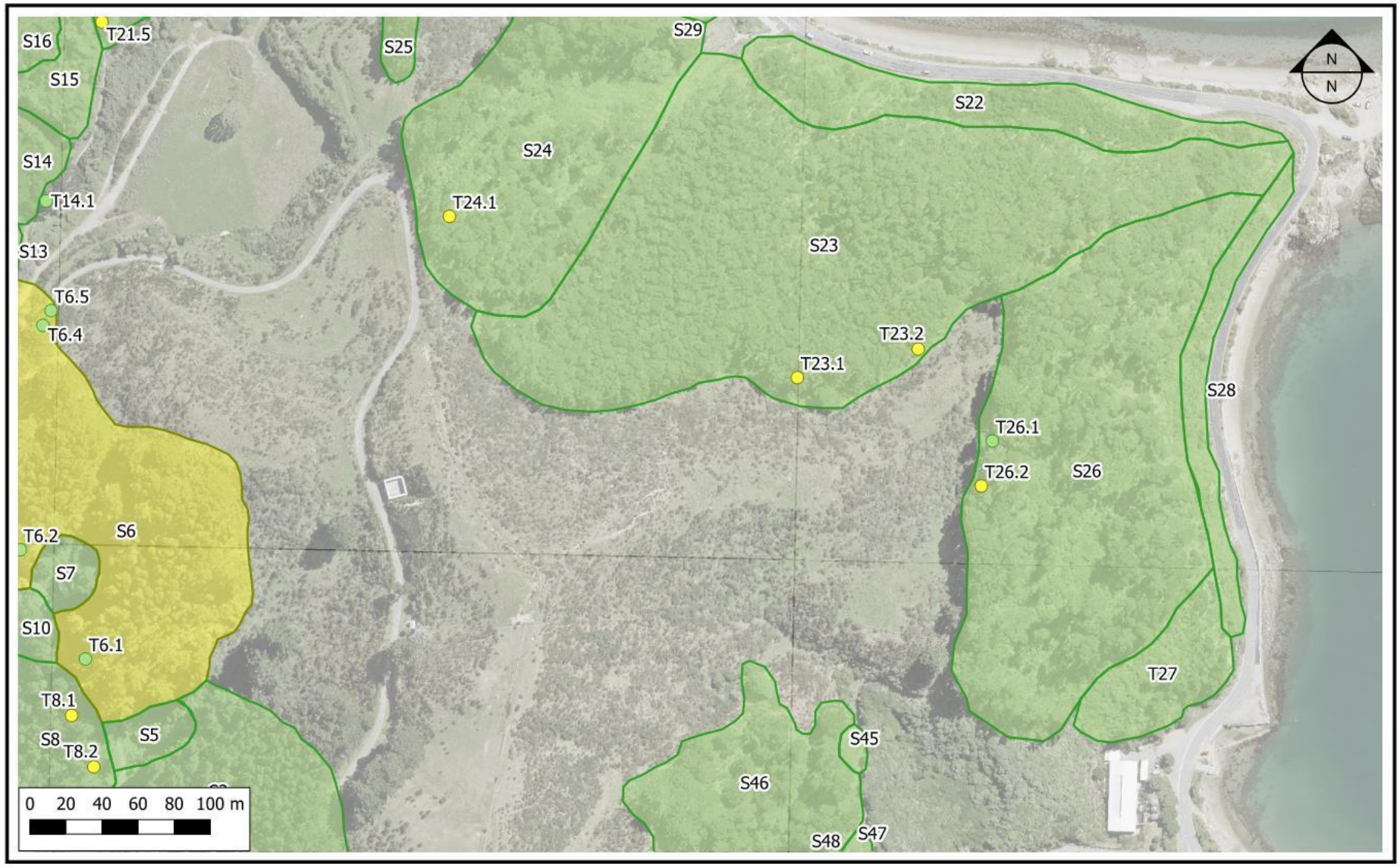

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Vegetation alteration/removal may be subject to resource consent requirements/conditions. It shall be the client's responsibility to determine whether or not this is the case.

Works within the root zone of trees should be supervised by an appointed works arborist.

Legend

Individual Trees
- Broadly Acceptable
- Tolerable

Stands
- Broadly Acceptable
- Tolerable

Land Information New Zealand
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Te Motu Kairangi

Vegetation Plan

		Date
Requested by		
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Plotted by	MEV	30/06/20
Checked by	OM	01/07/20
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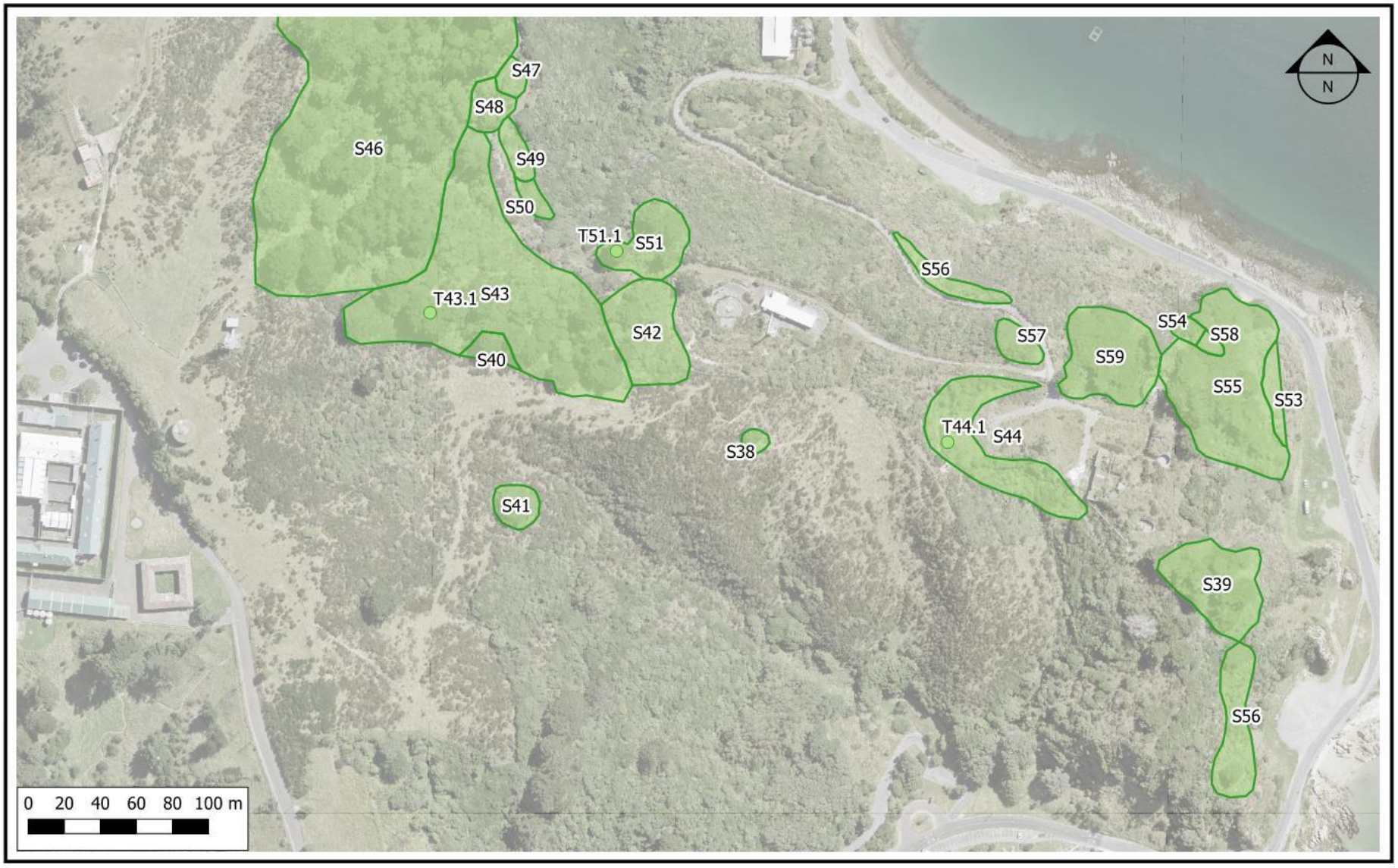

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Works within the root zone of trees should be supervised by an appointed works arborist.

Legend

Individual Trees
- Broadly Acceptable
- Tolerable

Stands
- Broadly Acceptable
- Tolerable

Land Information New Zealand
Toitū te whenua

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Te Motu Kairangi

Vegetation Plan

Requested by		Date
Surveyed by	CL/OM	May-Jun 2020
Plotted by	MEV	30/06/20
Checked by	OM	01/07/20
Drawing number	PVL-33269-05	Rev A

14.2 Tree Removal Photo Set

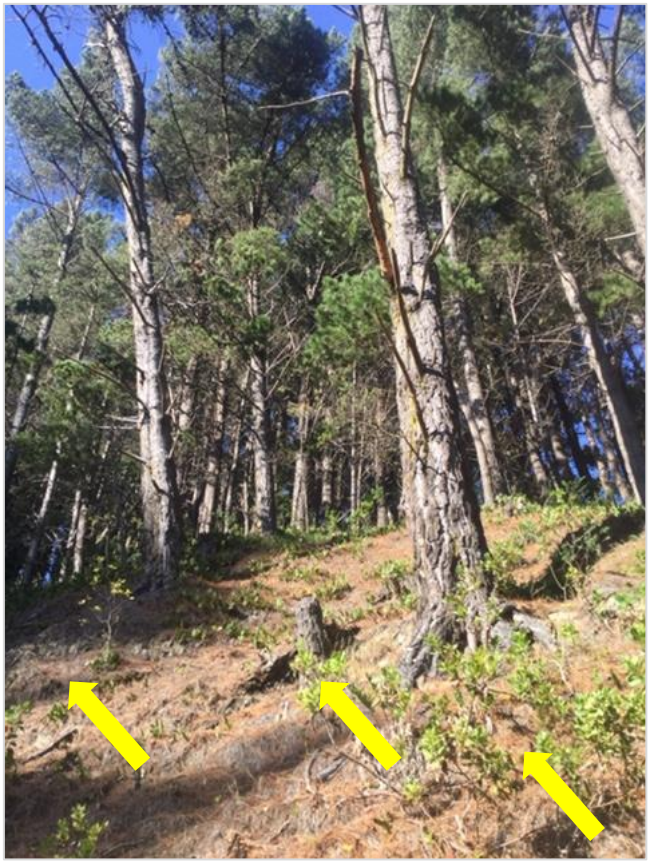

Photo 1: Group S2

Photo 2: Single Tree T8.2

Photo 3: Single Tree T2.1

Photo 4: Single Tree T15.1

Photo 5: Single Tree T6.2

Photo 6: Single Tree T21.5

Photo 7: Single Tree T21.4

Photo 8: Single Tree T24.1

14.3 Pest Plant Vegetation Unit Photo Set

Photo 9: Abundant pest plants within the previously felled area along the western edge of the Western Pine Forest.

Photo 10: Large Tradescantia infestation beneath Pohutukawa canopy in the Northern Point.

Photo11: Large Tradescantia infestation beneath Pohutukawa canopy in the Northern Point.

Photo 12: Pine sapling and karo establishing beneath pine canopy in Eastern Pine Forest.

Photo 13: Mixture of native and exotic species within Eastern Coastal Scrub.

14.4 Felled Pine Removal Estimate

For Area S1 & S7.

Treescape	THIS DOCUMENT IS UNCONTROLLED WHEN PRINTED	Terms and Conditions			
	Doc no: 702.002	Version 2b	Last Updated: 29.06.15	Approved by: M Matheson	Page 1 of 1

TREESCAPE LIMITED | Terms and Conditions of Contract:

Treescape agrees to perform the work in a competent manner and in compliance with the specifications contained in the contract overleaf (page 1).

A. Arbitration
Should any dispute arise as to the interpretation of the contract, it shall be referred to arbitration in accordance with the Arbitration Act 1996 and its amendments. Any decision of the Arbitrator shall be final and binding, upon the parties.

B. Amendments
Amendments to the contract specifications and price must be made in writing and agreed upon by both parties.

C. Expiry of the Contract
Three (3) months after the submission of the contract, Treescape reserves the right to withdraw and re-price work, unless otherwise agreed in writing on acceptance of instructions from the customer.

D. Access
The customer accepts full responsibility for their driveways and paths and understands that to carry out work specified in the contract, it may be necessary to use heavy machinery that could cause damage to their driveways and paths. Treescape will not be liable for any damages caused to driveways or pathways.

E. Private Covenants and Boundaries
Investigation of private covenants and boundaries shall be the responsibility of the customer and no liability shall be attached to Treescape for a breach of any such covenant or boundary. The customer must obtain written permission from all tree owners prior to Treescape commencing work.

F. Underground Services
Unless a plan showing the exact location of underground pipes, wires, or cables has been forwarded to us by the customer prior to the formation of the contract, the Treescape shall be under no liability for any damage caused as a result of work performed under the contract to such pipes, wires, or cables, or any damage to property resulting there from. The customer shall be solely liable for any such damage. Treescape will, if required, call Dial Before U Dig for information relevant to the site before commencing work. Associated Dial Before U Dig costs are to be paid by the customer unless otherwise arranged.

G. Hidden Obstructions
Contracts for felling are based on the assumption that trees are free from metal, stone and other hidden obstructions. In the event of a tree being impossible to fell in the normal manner, Treescape reserves the right to requote accordingly.

H. Stump Grinding
Stump grinding involves the removal of the tree stump to a depth of 150mm, but does not include the removal of lateral roots or stump chippings, unless otherwise specified in the contract.

I. Firewood
Firewood left on site will be tidily stacked, and does not include ringing unless otherwise specified in the contract.

J. Transplanting
While Treescape will carry out best practice methods in relocating trees, Treescape cannot guarantee the survival of the relocated tree/s and will not be liable for any financial reimbursement for the cost of the relocation or for the loss of the tree/s.

K. Tree Preservation Orders, Conservation Areas and Tree Permits
The trees concerned in the contract may be protected by a local or regional authority. Where it is necessary to obtain resource consents and/or permits from the relevant authorities, it will remain the responsibility of the customer unless Treescape is authorised by the customer to carry out this service in the contract.

L. Fire / Rail Permits, Traffic Management, Erosion Control and Rail Clearance
The work concerned in the contract may trigger permits, licences, clearances, or plans from the local or regional authority. Where it is necessary to obtain further paperwork from the relevant authorities, it will remain the responsibility of the customer unless Treescape is authorised by the customer to carry out this service in the contract.

M. Historic Sites and Areas of Archaeological, Scientific, Environmental, Religious or Cultural Significance
It shall be the responsibility of the customer to fully investigate all matters pertaining to historic sites and areas of archaeological, scientific, environmental, religious or cultural significance; to obtain all necessary plans, permits and consents, and to supply Treescape with all supporting documentation arising from their investigations. Treescape accepts no liability for damage to any site or area of significance that was not fully disclosed to us at the time of quoting.

N. Complaints
The customer must raise any complaint or dispute about the Services within seven (7) days of the performance of the Services. If the customer does not do so, it has fully accepted the Services and cannot raise any complaint or dispute connected with them.

O. Payment
The customer must make full payment to Treescape within seven (7) days of the invoice date (time being of the essence). The customer cannot deduct or withhold any amounts for any reason whatsoever. If the customer does not pay Treescape in full by the due date then interest is payable on any unpaid amount at the rate of 1.5% per calendar month (or part thereof) until the calendar month in which actual payment is received (including after any intervening judgment), compounding monthly. Also the customer must pay to Treescape any and all costs charges and expenses suffered or incurred by Treescape connected with enforcing or attempting to enforce Treescape's rights and remedies against, or collecting payment from, the customer (including legal costs on a solicitor/client basis as those costs are incurred).

P. Suspension of Services
Treescape can suspend providing services to the Customer if the customer breaches any of its obligations to Treescape or anything happens that Treescape reasonably considers will cause or may cause delays, hazards, or any danger to the safety of any person. Treescape will have no liability if it suspends providing the services under this clause. This includes (but is not limited to) losses of profits and losses of opportunity. If Treescape is undertaking services for the customer which would be defined as construction work under the Construction Contracts Act, then the provisions of that Act will also apply, in particular section 72, in substitution for the two paragraphs under this section.

Q. Force Majeure
Neither party shall be liable for any default due to any event beyond their reasonable control. This includes (but not limited to) fire, flood, storm, adverse weather conditions, an act of God, war, terrorism, strike, lock-out, industrial action.

R. Severability
If any of these terms and conditions or their application becomes invalid or unenforceable in any way, this does not mean that the remainder of these terms and conditions are affected and they will remain enforceable to the greatest extent permitted by law.

S. Rights Cumulative
Nothing in these terms limits any other rights and remedies available to any party.

T. Cancellation Fee
Treescape reserve the right to charge a cancellation fee to cover lost time and costs associated with the contract if less than 12 hours notice of cancellation is given. The customer must pay that fee in accordance with the payment terms above.

U. Insurance Cover
Treescape holds Third Party and Public Liability Insurance cover.

V. Limitation
Treescape's liability arising from or in connection with providing services to the customer will be limited to:
(a) Reasonable and reasonably foreseeable costs, claims, liabilities, damages or losses directly caused by Treescape's actions or omissions; and
(b) Reasonable and reasonably foreseeable indirect, consequential or special loss, loss of profits, loss of contract, loss of opportunity, loss of goodwill, loss of use, however arising, in each case to the extent that policies of insurance held by Treescape respond to such losses; and
(c) A maximum total limit under (a) and (b) above of [$2,000,000] in the aggregate.
Nothing in this clause affects your rights (if any) under the Consumer Guarantees Act 1993, unless you acquire services from Treescape for the purpose of a business, in which case you agree that the Consumer Guarantees Act 1993 will not apply and acknowledge that it is fair and reasonable that the parties are bound by this provision V. Without limiting any liability or obligation expressly set out above, Treescape shall not be liable in connection with any head contract or variation between the customer and a third party unless Treescape has seen and agreed in writing to those terms. If either party is found liable to the other (whether in contract, tort or otherwise), and the claiming party has contributed to the loss or damage, then the liable party shall only contribute to the extent of its proportionate liability.

Treescape
PO Box 48-182, Silverstream, Fax (04) 569 5721
Phone : 0800 8733 9075

Estimate

924210101

Customer Ref:
Date: 18/06/2020
Your Contact Is : Jeremy Brown
Phone :
email : jeremyb@treescape.co.nz

Invoice Address : ARBORLAB CONSULTANCY SERVICES LTD
PO BOX 35569
BROWNS BAY
AUCKLAND
Attention :- Owen Meekins

Site Address : Shelly Bay Rd
Maupuia
Welington
NZ

Sub Job ID: 924210101 - Shelly Bay Site Clean Up

Description of Work to be carried out

Removal of all the trees that have been previously felled and stacked on site by contractors.
The trees to be removed are all the trees that were felled to remove the risk to the ammunition storage bunkers on the eastern side of the main access road from Shelly bay.
A 20-ton excavator will be on site to create access tracks to the felled trees and tidy the main access road for trucks.
All log wood to be cut to approximately 4 meter lengths and loaded on to logging trucks, they will then be carted off site and processed through a large tub grinder.
All branches/foliage to be loaded into high sided bin trucks and carted to the flat grass area at the top of the site, it will then be processed through an onsite tub grinder with all resulting mulch removed off site.

Establishment $3,500.00+GST

Earthworks / access tracks - Approximately 3-4 days $8,000.00-$10,000.00+GST

Extracting trees, Fleeting to main track 6-8 days $18,200.00 - $22,600.00+GST

Truck cartage logs/slash $27,000.00+GST

Processing of logs and slash $80,000+GST

NOTE: Please read the Terms and Conditions over page

Visa & Mastercard Credit Cards Welcome
(2% surcharge incurred)
Account Inquiries 0800 762 848

Customer Acceptance Signature .....

Sub Job ID:	**924210101**
Sub Total:	$0.00
GST:	$0.00
Total:	**$0.00**