Environmental
993 Waitakere Road, Po Box 332, Kumeu 0841, New Zealand

ARBORICULTURAL REPORT

Title:	**Tree Removal Methodologies**
For:	**Liz Parkin – Auckland Council** **Antony Yates – Antony Yates Planning Limited**
Site:	**Maungarei (Mount Wellington domain)** **32-66 Mountain Road** **Mount Wellington** **Auckland**
Prepared By:	**Matthew Priestley – Treescape Environmental** **matthewp@treescape.co.nz**
Reviewed By:	**Erika Commers – Treescape Environmental**
Brief:	**A method statement of different tree removal methodologies**
Date:	**15 September 2017**

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1. General Method Statement

Treescape Ltd. undertakes a broad range of tree work for municipalities, power line network owners, commercial and private clients. The work involves all aspects of vegetation management across Australasia.

Work is carried out in a wide variety of locations including but not limited to parks, reserves, domestic gardens, public carriageways, public walkways, commercial and industrial sites.

The work will be carried out by skilled, trained and competent individuals working together in teams. The risk assessment will dictate the number of staff required for the task.

Treescape Ltd. is an approved contractor of the New Zealand Arboriculture Association and member of the ISA (International Society of Arboriculture)

All work procedures are focused on safe work systems that are based on industry best practice standards and guidelines. These include Forest operations – Approved Code of Practice (ACOP) and Best Practice Guide for Arboriculture (BPG).

Treescape Ltd. expects all clients to comply with statutory requirements of Health and Safety legislation to inform us of all known hazards and risks that may affect health and safety of staff while on their premises.

2. Health and Safety

All Treescape Ltd. employees have received basic health and safety training applicable to their responsibilities. Training records are held onsite at offices of Treescape Ltd. within each employees personnel file. The health and safety policy indicates how Treescape Ltd. manages health and safety. All employees are empowered to take any action they deem appropriate to ensure the safety of themselves, their work colleagues, and any other persons that may be affected by the course of their actions, or the actions of others.

3. Associated Documents

This method statement should be read together with the following documents:

1. Treescape Safety Policy (SQE-P-01 Safety Policy 2017)
2. Treescape Environmental Policy (SQE-P-02 Environmental Policy 2017)
3. Treescape Quality Policy (SQE-P-03 Quality Policy 2017)
4. Treescape Charter (SQE-P-05 Charter 2017)
5. Treescape Training policy (SQE-P-NZ-09)

4. Management Structure

Operations of Treescape Ltd. are under the control of acting CEO Murray Matheson based at 21 Huia Road, Otahuhu. All field staff are under direct control of the site Foreman. All staff are trained and skilled in their respective roles. Work instructions provide specific details on the staff requirements for each task.

5. Training

All Treescape Ltd.'s employees receive training appropriate to the tasks they are required to perform. The training policy details the training requirements and objectives. All employees are supervised to ensure correct procedures and methods are used during site operations. Regular work site safety audits are conducted to monitor the systems in place. Staff reviews are regularly undertaken to identify further training requirements. Standard field staff training typically includes:

- First Aid training and basic life support
- Use of equipment including chainsaws and brushwood chippers
- Basic climbing, felling and rescue techniques
- Electrical awareness

6. Communications

Continuous communication between site operations, Treescape Ltd.'s office, and the client is crucial. Each supervisor is equipped with a mobile phone and iPad to ensure constant communication is maintained. Work instructions can be delivered in various ways including, verbal, written, and electronic formats. The foreman is required to communicate with the landowner and site occupiers where necessary. Mobile phones are used for emergency contact. Where there is no mobile reception, a risk assessment will be undertaken to provide alternative means of communication.

7. Site Access

Treescape Ltd. expects all clients to provide any necessary information and supervision required to ensure the safety of their employees during all site works. Work is typically carried out between 07h00-17h00, Monday-Friday (weather and daylight hours permitting). Alternative work patterns will be discussed and arranged with the clients, landowners, occupiers and others, as required. Due to the nature of the work and site locations, health and safety arrangements for safe access will be assessed for each work site in conjunction with clients, owners and occupiers.

8. Work Procedures

All work is undertaken in accordance with procedures are contained within internally developed Safe Work Method Statements (SWMS) and Safe Operating Procedures (SOPs). The procedures are monitored and reviewed to incorporate up to date knowledge and experience where necessary. Client health and safety standards and procedures can take precedence if they are to an equal or higher standard.

9. Tools and Personal Protective Equipment (PPE)

All tools and personal equipment are inspected by field staff on a regular basis and are subject to regular audits. All employees are under instruction to report and replace any faulty equipment immediately.

10. Depot

Treescape Ltd.'s main office and depot are located at 21 Huia Road, Otahuhu. The site includes the head office, workshop, vehicle parking, log and mulch storage, dangerous goods storage and storage areas for other materials associated with vegetation management.

11. Plant and Machinery

Operating instructions for plant and machinery are kept with the machinery. Operating procedures are incorporated within the SOPs for the specific machinery operations. Procedures include daily inspections and operational testing before use. Plant and machinery are subject to regular audits. Faulty equipment is taken out of service, repaired and checked before returning to field use.

12. Transport

Treescape Ltd. provides vehicles that are fit for purpose. Vehicles are equipped with first aid kit, spill kit, and fire extinguisher. Specialist vehicles are fitted with customised storage solutions tailored to their use. Most vehicles have towing capabilities for transporting wood chippers or purpose built trailers. Vehicles are regularly inspected and are subject to regular audits. Vehicles are regularly serviced and maintained to meet the road traffic legislative requirements. Vehicle weight limits and towing capacities of any vehicle combination are the driver's responsibility. Only operators with a full and current license with appropriate class are allowed to drive company vehicles on the road.

13. Environmental Policy

Treescape Ltd. is dedicated to helping create a more sustainable world. Treescape Ltd. strives to implement environmentally friendly practices into the business. The company's objective is to improve environmental performance through the implementation of the following:

- Assessing the environmental effects of the business activities
- Operating in accordance with environmental laws
- Training employees in environmental issues
- Minimising the production of waste
- Minimising material wastage
- Minimising energy wastage
- Measuring and mitigating Treescape's carbon footprint
- Promoting the use of recyclable and renewable products and materials
- Limiting the production of pollutants to water, land and air
- Controlling noise emissions from operations
- Seeking to ensure that contractors and suppliers conform to the environmental requirements
- Setting and using environmental objectives and targets.
- Continually improving environmental performance by periodically reviewing procedures

14. Method Statement

Site address	Maungarei (Mount Wellington domain) 32-66 Mountain Road Mount Wellington Auckland
Description of works	Removal of selected trees
Site Personnel	TBC
Date/s and time of works	TBC
Duration (approx.)	Ten working days for removals along entry road and summit area – limited public access. Fifteen to twenty working days for removals along the quarry face area- minimal disturbance to public access. Significant disruption to City Parks service area. Ten working days for removals in Memorial grove and flat area to the right of entry road. Minimal disruption to public access.
Emergencies	Appropriate staff are trained in emergency procedures including aerial rescue. Rescue climbing equipment and competent climbing rescue trained staff are provided at all work sites where required. Staff on site will have at least one dedicated emergency mobile phone. Designated aerial rescuers TBC
First Aid	A team first aid kit will be carried in all the vehicles used for these works. If staff are working more than 30m from a vehicle they will have a personal first aid kit. If a team is working more than 30m from the vehicle, the first aid kit will be positioned at an appropriate nearby location. Tree climbers often carry personal first aid kits.

	At least two members of staff on site will have completed a course as a nominated First Aider.
Vehicles	• Utility vehicle (ute) x 4 • 50ft MEWP • 5,8,10t Tipper Trucks • Fuel tanker
Plant	• 9", 12", 18" trailer mounted wood chippers • 12" Track mounted wood chipper • 12-30t Mobile Crane • Eurocopter AS 350B3 helicopter • 5-12t Excavator • Winch bucket
Hand tools	Chainsaws, handsaws, lowering devices, pull ropes, rigging equipment
Site specific equipment	Additional impact prevention measures can be implemented for sensitive sites such as the use of padding or impact resistant materials for crash pads. Track mats can also be utilised to avoid ground disturbance from tracked or wheeled vehicles or foot traffic.
Staff	These works will be carried out by staff experienced in this type of work. All employees will have been deemed competent to carry out allocated tasks or will be working under supervision.
Risk management	• All field staff are experienced, trained and competent or under the direct supervision of team leader. • Adequate signage and organisation of the works to notify those at risk in advance and during the works, and/or organise works to avoid busy times of the day. • Daily hazard management processes to identify any health and safety risks, i.e. weather affecting the visibility of the works and awareness of third persons. • Equipment will be well maintained and in safe working order. • Keys will be removed from unattended wood chippers and other plant. • Fuel stored onsite to be kept to a minimum. Designated safe storage and refuelling areas.

	• Fire extinguishers, first aid kits and spill kits on all vehicles. • Emergency management plan for evacuation and emergency response. • Direct and constant communication between all parties at all stages of operation. • Company policies and procedures to be adhered to at all times. • Thorough planning. • Clear and complete work instructions. • A clear understanding of roles and responsibilities. • Reporting of all incidents and near misses. • Regular work site and equipment audits and inspections.
PPE:	Staff will have the following personal protective equipment: When using chainsaws: • Chainsaw protective trousers. • Helmets with hearing protection. • Eye protection • Steel toe cap boots. • Gloves (optional for climbing) • Wrist to ankle clothing with reflective tops. • Other PPE may be necessary dependent on risk assessment

Description of tree removal methods	
1. Ringbarking, spraying, drill and fill methods	Where trees can be left to die and decay in situ, various techniques can be employed to kill a standing tree. Removing a complete ring of bark near the base of the tree can effectively kill the upward portion of many types of tree that exhibit secondary growth. Other alternative methods involve the application of herbicide via holes drilled in the base of the stem or direct spraying of the foliage or basal bark. The trees will die after a period and will slowly decay and fall apart in sections or fail at the root plate or base.
2. Manual felling	The tree is cut at the base using approved felling techniques. A pre-installed pull rope can be hand pulled by ground staff or attached to a hand winch to assist with directional felling. The cutting arborist (herein after referred to as the cutter) may use other tools such as hammer and wedges, felling lever, or jack to push open the back cut to assist with directional felling. Once the final cut (the back cut) has been completed, and the tree begins to fall, the cutter retreats from the base of the tree via pre planned escape route. If pull assisted felling is being employed, the cutter may have the opportunity to retreat via the escape route before the tree is pulled over. A felled tree is typically dismantled using approved snedding or delimbing techniques to remove side branches. Logs can be cut to required lengths.
3. Machine assisted manual felling	The excavator operator positions the excavator in an appropriate position to push the tree in the intended direction of fell or is attached to a pull line and positioned to pull the tree in the intended felling direction. The cutter makes felling cuts at the base of the tree. Once the final cut (the back cut) has been completed, the cutting arborist retreats from the base of the tree via pre planned escape route. The excavator then pushes or pulls the tree over. A felled tree is typically dismantled using approved snedding or delimbing techniques to remove side branches. Logs can be cut to required lengths.
4. Manual dismantling	The tree may be accessed using a mobile elevated work platform (MEWP or by a climber with a rope and harness. Approved cutting techniques can be used to cut the tree in sections. Sections can be cut and allowed to free fall to the ground or can be cut and snapped off by hand and then thrown to the ground. Cut sections can be pushed by the climber or pulled by ground staff using a pull line to assist cut sections to fall in a particular direction.

5. Manual dismantling using rigging techniques	The tree can be accessed using a MEWP or by a climber with a rope and harness. The tree can be dismantled in sections using approved cutting techniques. Where there are targets below and/or debris needs to be lowered or relocated in a controlled manner, rigging techniques can be employed. Rigging typically involves the use of a system of ropes, pulleys/rings, and a ground based friction device, and other hardware. Rigging techniques can be used to lift or lower cut sections, or more advanced techniques such as sky/speed line or compound rigging can be used to transport cut material to another location. Using appropriate rigging techniques can reduce or avoid the impact of falling debris. Additional impact prevention measures can be implemented for sensitive sites such as the use of padding or impact resistant materials for crash pads.
6. MEWP assisted dismantling	The MEWP operator will position the truck and set it up in an appropriate place. The work platform is used to access the tree. From the platform, the tree can be dismantled using proper cutting and rigging procedures. If the work is near overhead power lines, an insulated boom, insulated tools and other specialist equipment can be utilised by competent and suitably qualified staff to clear vegetation from the power lines. Specific procedures need to be followed for work around overhead power lines. The voltage, weather and proximity of vegetation, vehicles, tools, and staff all need to be considered. When working near overhead power lines, a dedicated safety observer is positioned to watch the MEWP operator to ensure no part accidentally comes in contact with the overhead lines. When working on network lines the network operator's control centre needs to be notified about timing and location of work. A MEWP may also be utilised to dismantle trees that are unsafe to climb or difficult for a climber to access. The MEWP operator can cut small sections that can be snapped off by hand. The MEWP can be used to fly the held piece over to an appropriate position where they can be safely dropped.
7. Crane assisted dismantling	The crane will be setup in an appropriate location. A climber will access the tree using a rope and harness or via the crane. The lifting dogman will direct the crane operator to manoeuvre the hook to the climber. The climber will attach the crane hook using chains or sling to the section to be cut. The dogman will direct the crane operator to apply appropriate tension and position the hook over the section's centre of gravity. The climber will descend to a position agreed with the dogman to perform the cut sequence. Once directed by the dogman, the climber will proceed to cut the section to release it in a controlled manner. As the piece is released, the dogman will direct the crane operator to lift the section smoothly up and away from the climber. The crane operator will fly the load to the processing site where he will be directed by the landing dogman to lower and settle the section. Once the section has been stabilised, the

	sling/chains can be released by ground staff. The crane operator then directs the hook back to the climber for the next lift and the sequence is repeated.
8. Helicopter assisted dismantling	A suitably qualified climbing arborist (herein after referred to as the climber) will access the tree using a rope and harness. The tree may be pre-stropped (long choker slings/strops attached prior, to minimise flying time). The climber will check and adjust if necessary sling. The lifting dogman will direct the helicopter pilot to manoeuvre the helicopter hook to the climber. The hook is attached to the helicopter via a long line. The climber will attach the sling to the hook and signal the dogman. The lifting dogman will direct the pilot to take up the slack and position the helicopter over the load's centre of gravity. The lifting dogman will communicate with the climber to place the cuts at an appropriate point to ensure the load is within the helicopter's lifting capabilities and so the loaded can be lifted smoothly away from the climber. Once the climber has completed the cut procedure, the lifting dogman will direct the pilot to lift the load away from the climber and transport it to the processing site, via planned extraction zones. The landing dogman will direct the pilot to lower and release the load at the processing site. All machinery, vehicles and staff are kept clear of the flight path and suspended load. Once the load has been released, the pilot will return for the next lift, and the procedure will be repeated. During flying operations, only work that is strictly necessary is to be carried out within the landing zone, e.g. releasing slings and safe placement of loads. Loads are only to be approached once they have been safely landed and stabilised.
Processing and removal of cut materials and debris	Cut and leave: material can be left as it lies or stacked into eco piles that will provide habitat and decay over time returning nutrients to the soil. Mulch on site: Where mulch can be utilised on site, the chipped material can be chipped directly into a pile or chipped into a truck and tipped at an accessible location. If the cut material is to be chipped directly onto the site, a track mounted chipper can be used for less accessible sites. Mulch off site: chip-able material can be fed manually or by an excavator into a wood chipper that sprays the chip into the back of a tipper truck. Two 10t trucks will operate in rotation to remove mulch from site when processing higher volumes with an excavator. Truck movements can be up to 8-10 movements to and from site per day. Logs on site: Logs can be left in length or cut into manageable sizes for the public to remove for firewood.

	Logs off site: Larger logs can be cut up and loaded into a truck manually, or loaded in larger lengths with a loader, crane, hiab or excavator. Logs can be transported from site in up to 5m lengths using a 10t tip truck or hiab truck with of 5m deck which can tow a trailer with additional 5m deck. Truck movements are estimated to be up to 4-5 movements to and from site per day.

15. Tree List with Removal Methods (Based on Information Provided by Ben Sheeran)

Tree ID	Species	Group	Priority	Authority	Method type and number
1	Radiata Pine - *Pinus radiata*	Yes	1	MA	Crane(7)
2	Radiata Pine - *Pinus radiata*	Yes	1	MA	Crane (7), Helicopter(8), Machine assisted felling(3)
3	Radiata Pine - *Pinus radiata*	Yes	1	MA	MEWP(6)(6), Helicopter(8)
4	Macrocarpa - *Cupressus macrocarpa*	No	1	T; MA	Helicopter(8)
5	Gum - *Eucalyptus* sp.	Yes	2	MA	MEWP(6); Helicopter(8)
8	Gum - *Eucalyptus* sp.	No	1	T; MA	Manual(4)
9	Radiata Pine - *Pinus radiata*	Yes	1	MA	Manual(4)
17	Radiata Pine - *Pinus radiata*	No	1	MA	MEWP(6) + TTM
21	Necklace poplar - *Populus deltoides*	Yes	1	T; TBC	Manual(4), Rigging (5)
23	European Ash - *Fraxinus excelsior*	Yes	1	T; TBC	Manual(4)
24	Radiata Pine - *Pinus radiata*	Yes	2	T; MA	Helicopter(8)
25	Macrocarpa – *Cupressus macrocarpa*	Yes	2	T; MA	Helicopter(8)
27	Macrocarpa – *Cupressus macrocarpa*	Yes	2	T; MA	Helicopter(8)
28	Cypress - *Chamaecyparis lawsoniana*	No	2	T; MA	Helicopter(8)
30	Macrocarpa – *Cupressus macrocarpa*	Yes	2	T; MA	Manual(4)

Key: MA = Removal recommended by Maunga Authority criteria
T = Removal recommended in initial Treescape assessment
TBC = Removal to be confirmed
MEWP = Mobile Elevated Work Platform
TTM = Temporary Traffic Management

16. Appendix 2: List of Relevant Treescape Ltd.'s Standard Operating Procedures (SOPs)

Category	SOP Code	SOP Name
Arboriculture Ops	SOP-ARB-NZ-05	ArbOps - Debris Collection & Removal
Arboriculture Ops	SOP-ARB-06	ArbOps - Rigging
Electricity	SOP-ELE-NZ-04	Vegetation Management - Trees around Overhead Electrical Lines
Electricity	SOP-ELE-NZ-05	Electrical Safety & Testing of Electrical Equipment
Environment	SOP-ENV-03	Environmental Care and Spillage Response
Machinery	SOP-MAC-02	Machines and Guards
Machinery	SOP-MAC-03	Machinery on Steep Slopes
Machinery	SOP-MAC-NZ-04	Mobile Elevated Platform use
Machinery	SOP-MAC-05	Chainsaw Use
Machinery	SOP-MAC-06	Pole Pruners
Machinery	SOP-MAC-08	Chipper Use
Machinery	SOP-MAC-09	Changing Chipper Knives
Machinery	SOP-MAC-10	Mobile Elevated Work Platform - Aerial Rescue
Machinery	SOP-MAC-11	Use of Chainsaws Aloft
Machinery	SOP-MAC-12	Insulated Tools
Safety	SOP-SAF-01	Working at Heights
Safety	SOP-SAF-02	Public Safety
Safety	SOP-SAF-03	Work Area Safety & Work in Isolated Places
Safety	SOP-SAF-04	Physical Isolation Plant & Machinery
Safety	SOP-SAF-05	Fuel Storage on Field Sites
Safety	SOP-SAF-06	Personal Protective Equipment (PPE)
Safety	SOP-SAF-11	Manual Handling
Safety	SOP-SAF-15	Slips, Trips & Falls
Safety	SOP-SAF-16	Noise Control in the Workplace
Safety	SOP-SAF-17	Dust Control
Safety	SOP-SAF-18	Testing Load Binders, Strops & Chains
Safety	SOP-SAF-NZ-20	Job Risk Assessment
Safety	SOP-SAF-21	Hazard Management & Risk Assessments
Tree work	SOP-TRE-05	Felling Difficult Trees
Tree work	SOP-TRE-06	Treework Climbing
Tree work	SOP-TRE-07	Manual Tree Rescue
Tree work	SOP-TRE-08	Treework Tree Felling
Tree work	SOP-TRE-NZ-14	Log Stacking
Tree work	SOP-TRE-NZ-15	Single Line Technique
Vehicles	SOP-VEH-NZ-02	Road Vehicles & Driver Safety
Vehicles	SOP-VEH-03	Wheel Chocks on Vehicles
Vehicles	SOP-VEH-NZ-06	Road Working & Traffic Management
Arboriculture Ops	SOP-ARB-NZ-01	ArbOps - Cranes & Lifting Equipment
Chemicals	SOP-CHE-01	Chemical Spraying Safety
Chemicals	SOP-CHE-NZ-02	Chemical Spraying Equipment

Category	SOP Code	SOP Name
Chemicals	SOP-CHE-NZ-03	Using Chemicals around Water Courses
Chemicals	SOP-CHE-04	Chemical Container Recycling
Chemicals	SOP-CHE-05	Chemical Control Plan
Chemicals	SOP-CHE-NZ-08	Chemical Spray Drift
Contractors / Suppliers	SOP-CON-01	Management of Contractors
Drug & Alcohol Testing	SOP-DRU-02	Drug and Alcohol Procedure
Drug & Alcohol Testing	SOP-DRU-03	Post-Accident Drug Testing
Electricity	SOP-ELE-NZ-02	Vegetation Management - Aklnd Electrification Area 25kV
Environment	SOP-ENV-01	Emergency Environmental Training
Environment	SOP-ENV-02	Pollution Prevention Plan
Machinery	SOP-MAC-01	Heavy Plant Machinery & Attachments
Machinery	SOP-MAC-15	Mulching Equipment
Machinery	SOP-MAC-19	The Vermeer Mini Loader
Safety	SOP-SAF-07	Fire Prevention in Land Clearance
Safety	SOP-SAF-08	Fire Prevention & Control Measures
Safety	SOP-SAF-22	Emergency Management Plan
Safety	SOP-SAF-25	Incident Investigation
Safety	SOP-SAF-26	Injury Management and Employee Rehabilitation
Security	SOP-SEC-01	Security of Plant, Machines & Buildings
Tree work	SOP-TRE-01	Excavators in Treework
Tree work	SOP-TRE-04	Tree Felling Machine Assisted
Tree work	SOP-TRE-NZ-09	Treework Helicopters
Tree work	SOP-TRE-11	Delimbing
Tree work	SOP-TRE-NZ-13	Abseiling

For further information, please contact the author.

Matthew Priestley BSc.
Consultant Arborist
Treescape Environmental
matthewp@treescape.co.nz