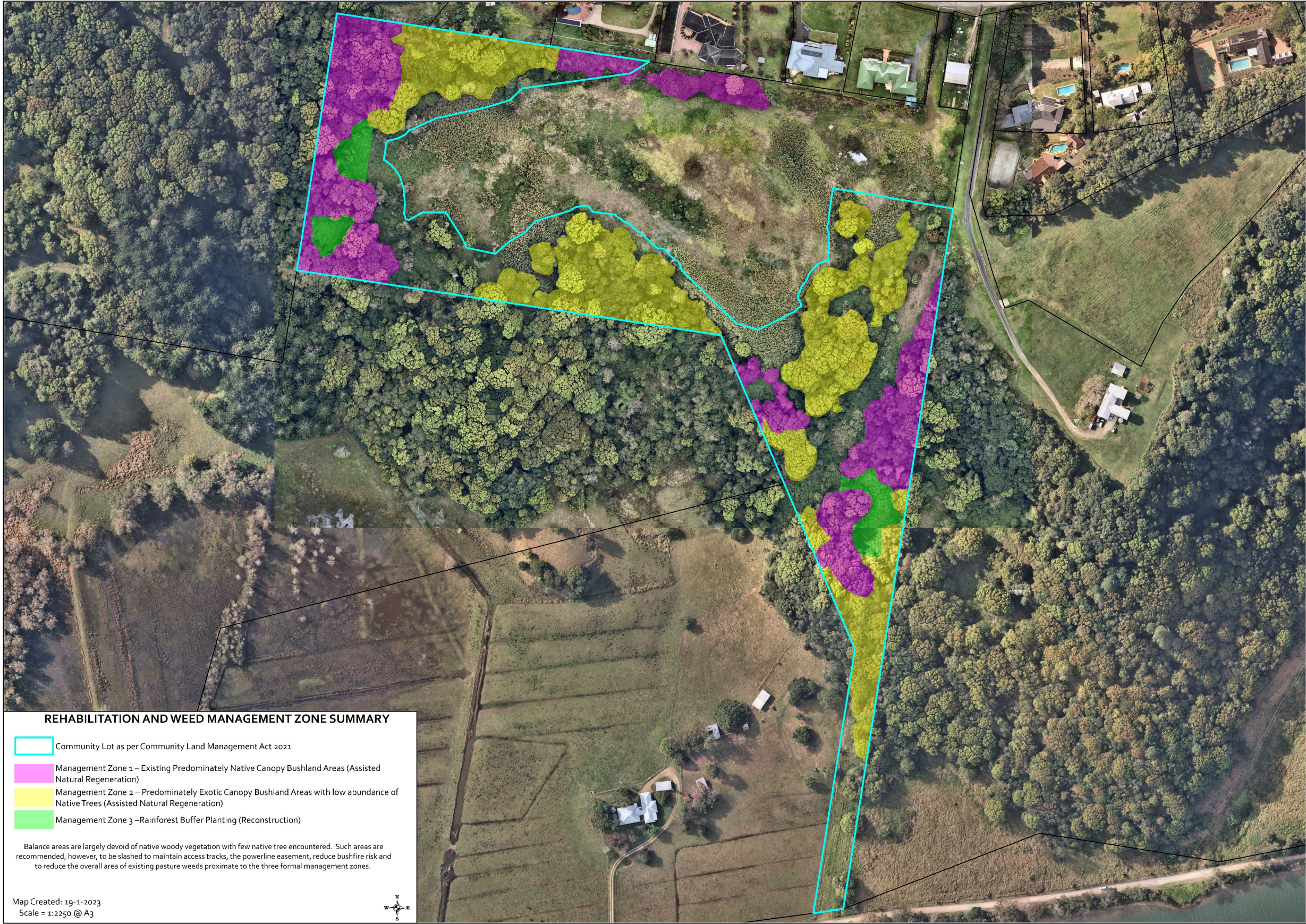


225 TERRANORA ROAD, BANORA POINT DRAFT ENVIRONMENTAL MANAGEMENT PLAN



PROJECT:  
225 TERRANORA ROAD, BANORA POINT

DRAWING TITLE:  
DRAFT ENVIRONMENTAL MANAGEMENT PLAN

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MZ1-LOWLAND RAINFOREST WEST



MZ1-LOWLAND RAINFOREST WEST



MZ1-LOWLAND RAINFOREST WEST



MZ1-LOWLAND RAINFOREST WEST



MZ1-REGENERATNG LOWLAND RAINFOREST EAST



MZ1-REGENERATNG LOWLAND RAINFOREST EAST



MZ1-REGENERATNG LOWLAND RAINFOREST EAST



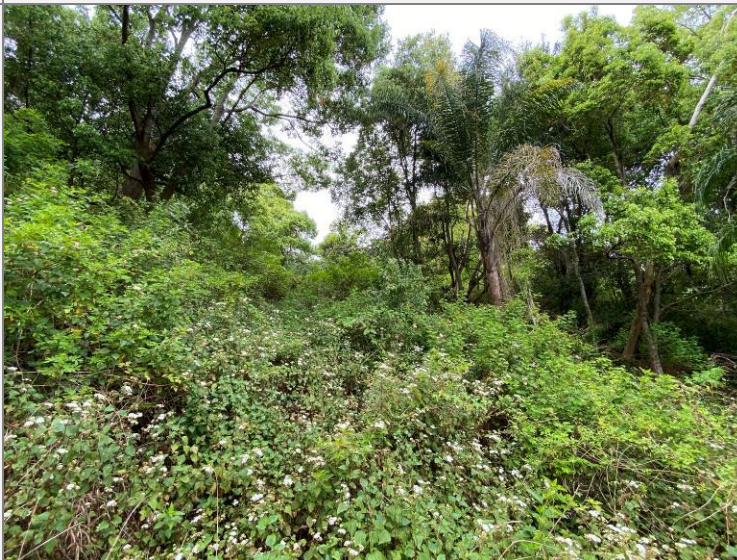
MZ1-REGENERATNG LOWLAND RAINFOREST EAST



MZ1-DISTURBED MACARANGA REGROWTH ON NORTHERN BATTER



MZ1-DISTURBED MACARANGA REGROWTH ON NORTHERN BATTER



MZ2-CAMPHOR LAUREL HIGHLY WEED INFESTED AREAS



MZ2-CAMPHOR LAUREL HIGHLY WEED INFESTED AREAS

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WEED MANAGEMENT AND REHABILITATION INTRODUCTION

A substantial amount of rehabilitation research has been conducted and compiled in association with the below reference documents and have been subsequently endorsed by the majority of South East Queensland and/or Northern NSW councils:

- *Subtropical Rainforest Restoration: A Practical Manual and Data Source for Landcare Groups, Land Managers and Rainforest Regenerators*. BSRLG, Bangalow.
- South East Queensland Ecological Restoration Framework (SEQERF)

Given this, information provided within this Rehabilitation document will largely utilise information derived from these frameworks. The primary objectives associated with bushland rehabilitation include:

- Retain and protect retained native bushland;
- Retain and enhance existing native fauna habitat;
- Increase the extent of native vegetation cover over time (i.e. across weeded and/or sparsely covered areas).
- Restore native vegetation and fauna habitat to areas which have been degraded/simplified by historic farming/grazing uses

There are four commonly recognised ecological restoration approaches as identified within the SEQERF and following a review of the habitat and condition of habitat contained within bushland retention zones it is considered that the overarching rehabilitation approach should be a combination of ‘assisted natural regeneration’ and ‘reconstruction’ (GCCC, 2007; TSC, 2009; Greening Australia, 1999, SEQERF, 2012). The applicable circumstances of these types of rehabilitation are provided below:

ASSISTED NATURAL REGENERATION

Applies:	<ul style="list-style-type: none"><li>• To natural areas where the native plant community is largely healthy and functioning.</li><li>• When native plant seed is still stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.</li><li>• Where the natural regeneration processes (seedling germination, root suckering, etc.) are being inhibited by external factors, such as weed invasion, soil compaction, cattle grazing, mechanical slashing, etc.</li><li>• When limited human intervention, such as weed control, minor amelioration of soil conditions, erection of fencing, cessation of slashing, etc. will be enough to trigger the recovery processes through natural regeneration.</li><li>• When the main management issue is weed infestation and/or current land use practices.</li></ul>
Role of planting:	<ul style="list-style-type: none"><li>• Planting in such areas can work against the aims of restoration by interfering with natural regeneration except where species cannot return to site without direct intervention.</li></ul>
Goal vegetation community:	<ul style="list-style-type: none"><li>• The re-establishing plant community will be substantially similar in structure, composition and diversity to the original vegetation.</li></ul>

RECONSTRUCTION

Applies:	<ul style="list-style-type: none"><li>• Where the site is highly degraded or altered.</li><li>• When the degree of disturbance has been so great and long-standing that the pre- existing native plant community cannot recover by natural means.</li><li>• To sites such as areas of fill, sites affected by stormwater flow, areas that have been drastically cleared, even though there may be a few remaining native trees or shrubs.</li><li>• When a greater degree of human intervention is required, such as weed control, cessation of grazing and/or slashing, amelioration of soil conditions such as importation of soils, drainage works or re-shaping of the landscape</li></ul>
Role of planting:	<ul style="list-style-type: none"><li>• Importation of native species to the area is required, either through planting or direct seeding (in some situations). natural regeneration and recruitment is insufficient to initially re-establish the original vegetation. Depending on the prevailing circumstances, the planting of a broad diversity of species from the target ecosystem may be unnecessary and the use of pioneers may be sufficient to re-establish ecological processes.</li></ul>
Goal vegetation community:	<ul style="list-style-type: none"><li>• The re-establishing planted community should be similar to the original vegetation in structure, composition and diversity.</li></ul>

REHABILITATION ZONES

Three rehabilitation zones have been proposed according to the existing bushland conditions, as verified by site inspection, and the rehabilitation approaches required:

Management Zone 1 – Existing Predominately Native Canopy Bushland Areas (Assisted Natural Regeneration) [~1.58ha]

These areas of predominately native vegetation are to be protected and weed management should be performed to the entire zone to encourage natural regeneration by reducing competition. Due to the existing seed bank likely being intact (as evidenced by existing natural regeneration) it is recommended that no revegetation works are undertaken allowing for natural regeneration to occur throughout the area. These areas are to be reviewed and monitored over time for regeneration success. Supplementary planting maybe required where there is a lack of natural regeneration over the medium term. This MZ includes patches of remnant and regenerating Lowland Rainforest and a linear patch of mostly regrowth Macaranga on the northern batter.

Management Zone 2 – Predominately Exotic Canopy Bushland Areas with low abundance of Native Trees (Assisted Natural Regeneration) [~2.1ha]

These are areas of Camphor Laurel Bushland which are dominated by non-native flora on southern sloping land. To minimise potential erosion woody weeds are to be progressively stem injected and left standing to provide habitat for fauna. Weed management of the lower strata also to be progressively performed to the entire zone to encourage natural regeneration by reducing competition. Progressive management will allow the seasonal visitation by frugivorous birds which may introduce additional native flora species into the management zone.

These areas are to be reviewed and monitored over time for regeneration success. Supplementary planting maybe required where there is a lack of natural regeneration over the medium term.

Management Zone 3 –Rainforest Buffer Planting (Reconstruction) [~2400m²]

Weed management to entire zone to encourage natural regeneration by reducing competition of the disused paddocks which are currently fragmenting a patch of rainforest along the western boundary and a patch of regrowth rainforest along the eastern boundary. Initially this shall occur by slashing and brush-cutting the existing weed thickets and over-spraying/spot-spraying regrowth of weeds to provide a manageable revegetation zone. Any existing/ occurring regrowth of native trees, shrubs and groundcovers to be protected and retained. Reconstruction of natural environment to be undertaken via tubestock installation including a diversity of tree, shrub and groundcover species to match the adjoining Lowland Rainforest.

Balance areas external to the community lot/rehabilitation footprint are largely devoid of native woody vegetation with few native trees encountered. Such areas are recommended, however, to be slashed to maintain access tracks, the powerline easement, reduce bushfire risk and to reduce the overall area of existing pasture weeds proximate to the three formal management zones.

REHABILITATION SITE WORKS

Prior to rehabilitation works commencing, the rehabilitation zones should be secured from degrading impacts such as grazing by stock, unauthorised access and rubbish dumping. Some factors may require immediate attention due to the potential for adverse effects. These situations may include:

- Uncontrolled stock access
- The presence of highly invasive weed species which may disperse further prior to substantial rehabilitation works commencing.
- Flammable vegetative materials accumulating in areas which could spread into retained bushland (including weed thickets, overgrown grasses).
- Damaging and easy access by 4WD, motorbikes and pedestrians into rehabilitation zones. This may require installation of temporary fencing if deemed appropriate.

The carrying out of effective and comprehensive restoration works in a natural area requires that the site be revisited regularly, preferably over a period of at least two to five years, to achieve the best possible ecological outcomes. Ongoing works may be broken down into the following categories:

Primary Works

Primary works or initial works within the site or a section of the site involves a sequence of activities such as the control of all groundcover weeds, woody weeds in the understorey and exotic vines prior to the control of weed trees. Primary work has the effect of creating a large degree of disturbance which will stimulate the germination of native and exotic species. Therefore, continuing works should be scheduled shortly after the initial visit to allow for timely control of the newly regenerating weeds. Highly invasive weeds should be treated as a priority during primary work in order to avoid invasion of newly disturbed areas. Some weeds will need to be treated in steps e.g. where areas of weed is being used by nesting birds or where the staged removal of canopy weed trees is required. Techniques used during primary work commonly involve spot spray, cut-scrape-paint, cut-paint, scrape-paint, roll-hang and over spraying (SEQERF, 2012: 84). Weed control methods and herbicide control techniques are discussed further below.

Follow-up Works

At intervals, which will vary according to the type of weed impacting the site and growing conditions, follow-up work will be necessary. This generally involves the spot-spraying of newly germinating weeds and resprouting sections of woody weeds and vines. It is at this stage that observational visits should be made to the site to determine what progress the vegetation is making, and decide when to implement further follow-up work. A site that receives badly-timed, too frequent or too little follow-up will rapidly experience setbacks, as weed propagules will quickly become established in the newly disturbed areas. Germinating native seedlings may be swamped by weeds or damaged by inexperienced operators thereby exhausting the seedbank. Unless adequate follow-up can be ensured when planning restoration works, there is little point in commencing primary work, as time and resources are consumed with no substantial gain achieved (SEQERF, 2012: 84).

Maintenance Works


By the maintenance stage, the vegetation community is at a point where native plant species are germinating and establishing, and canopy formation is occurring. Weed density is starting to decrease as the native plants which have been encouraged during the previous restoration works are able to out-compete the weeds. One of the fundamental principles of ecological restoration is that it attempts to create or re-establish an ecosystem that is self-sustaining. Therefore, it is the underlying goal that maintenance will eventually be decreased to a minimum. While this is not always possible, due to factors such as the continual reintroduction of weed propagules to the site from nearby residential areas; unfavourable seasons or weather event; persistent weed species; or global influences such as the enhanced greenhouse effect, it should always be strived for (source: SEQERF). Maintenance works over time are intended to be limited to minor ongoing weed management and infill planting in areas of failure.

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GENERAL METHODS FOR WEED CONTROL

The methods and herbicide use rates provided below are current best practice methods. It is the responsibility of the operator to ensure methods used are current best practice and are suitable for the site and any environmental constraints experienced at the site. The rates outlined below are general rates with specifications for site identified individual species contained in the following table.

Cut-scrape-paint

This weed control method applies to all woody shrubs, trees and some vines.

- Cut plant low to the ground at an angle.
- Apply Glyphosate immediately at the rate of 1-part Glyphosate to 1.5 parts water, with a paintbrush approximately 1.5 centimetres wide.
- Scrape sides lightly to reveal green tissue and apply the herbicide to the scraped area.
- Take care that the brush is not contaminated with soil.

Note - all seed that has high viability and longevity, e.g. *Senna spp.* and other members of the Fabaceae family, or plants with a high invasive potential, such as Umbrella Tree *Schefflera actinophylla*, must be removed from the parent and either composted on site or removed from the site.

Control of Woody Weeds

Examples of woody weeds include: 

- lantana, bitou bush, cotoneaster, privet (cut and paint)
- camphor laurel, Mickey Mouse bush (oxchn) and cassia/senna (stem scrape)

METHODS OF REMOVAL

1 CUT AND PAINT

Useful for small to medium sized woody weeds up to 10cm basal diameter

Make a horizontal cut as close to the ground as possible with secateurs, loppers or a bush saw.

Immediately apply herbicide to the exposed flat stump surface.

2 SAFETY CONSIDERATIONS

The following general precautions should be made when using herbicides:

- Read the label before opening the container and follow the instructions.
- Wear protective clothing as directed on the label.
- Wash hands after use and before eating or smoking.

3 considerations

- Cuts should be horizontal to prevent herbicide from running off the stump. Sharp angle cuts are hazardous.
- Herbicide must be applied immediately before the plant cells close and translocation of herbicide ceases.
- If plants resprout, cut and paint the shoots after sufficient regrowth has occurred.
- Stem scraping can be more effective on some woody weeds.

Illustration of cutting and painting a tree stump.

Illustration of applying herbicide to a stump.

Stem Injection

This weed control method applies to all woody trees and shrubs with a diameter of about six to ten centimetres or greater.

- Drill a hole at an angle into the sap wood using an 8-10mm drill bit angle, Holes to be no >than 10cm apart.
- Apply herbicide (approx 4ml) immediately into the hole using a tree-injecting device (if using Glyphosate, apply undiluted or at the rate of 1 part Glyphosate to 1.5 parts water). Repeat this procedure at intervals around the circumference of the tree, as close to the ground as possible. Where the presence of a crotch angle makes this difficult, drill a hole above it. Note – one row of drill holes will be sufficient for trees with trunks of six to ten centimetres; larger trunk diameters will need correspondingly more.
- Treat all visible lateral roots as per dot point 1.

Control of Woody Weeds cont..

Examples of woody weeds include: 

- lantana, bitou bush, cotoneaster, privet (cut and paint)
- camphor laurel, Mickey Mouse bush (oxchn) and cassia/senna (stem scrape)

METHODS OF REMOVAL

1 STEM INJECTION

For use on larger shrubs or trees above 10cm basal diameter and in inaccessible sites where removal is a problem.

INJECTION:

At the base of the tree drill holes at a 45 degree angle into the sapwood at 5 cm intervals.

OR

FRILL/CHIP

Make a cut into the sapwood with a chisel or axe.

Fill each hole/cut with herbicide immediately.

Repeat the process at 5 cm intervals around the tree.

2 SAFETY CONSIDERATIONS

The following general precautions should be made when using herbicides:

- Read the label before opening the container and follow the instructions.
- Wear protective clothing as directed on the label.
- Wash hands after use and before eating or smoking.

3 considerations

- Plants should be healthy and actively growing. Deciduous plants should be treated in spring and autumn when leaves are fully formed.
- For multi-stemmed plants, inject or chip below the lowest branch or treat each stem individually.
- Herbicide must be injected immediately before the plant cells close (within 30 seconds) and translocation of herbicide ceases.

Illustration of injecting herbicide into a tree trunk.

Illustration of frilling or chipping a tree trunk.

Scrape-paint

This weed control method is applicable to many species of vines where it is desirable to treat the vines intact, particularly those with aerial tubers such as Madeira Vine *Anredera cordifolia* or those which will propagate from segments, e.g. Cape Ivy *Delairia odorata*.

- Scrape the stem tissue on one side of the stem only for at least 20-30 centimetres if possible. Note on Madeira vine it is necessary to scrape heavily. Scrape as many sections of the stem as possible.
- Apply undiluted Glyphosate with a paintbrush.
- On stems that are thicker or horizontal, make a ditch into the stem with a knife and apply herbicide. Tubers and side roots should be treated the same way. Note - care must be taken not to sever the stem.

Control of Vines and Scramblers

Examples of vines include: 

- balloon vine, morning glory, honeysuckle, cape ivy, jasmine, madeira vine, blackberry

METHODS OF REMOVAL

1 HAND REMOVAL

Take hold of one runner and gently pull it along the ground towards you.

Check points of resistance where fibrous roots grow from the nodes. Cut roots with a knife or dig out with a trowel and continue to follow the runner.

The major root systems need to be removed manually or scraped/cut and painted with herbicide.

Bag any reproductive parts.

2 STEM SCRAPING

With a knife, scrape 15 to 30 cm of the stem to reach the layer below the bark/outer layer.

Immediately apply herbicide along the length of the scrape.

2 considerations

- A maximum of half the stem diameter should be scraped. Do not ring bark.
- Larger stems (>1cm) should have two scrapes opposite each other.
- Aerial tubers on madeira vine should die with the plant where stem scraping is used. Those that fall from the plant in the scraping process need to be bagged.
- Vines can be left hanging in trees after treatment.

Illustration of hand removal of a vine.

Illustration of stem scraping a vine.

(SOURCE: NPWS, UNDATED)

Spot Spraying

This weed control method is carried out using a 10-15 litre backpack spray unit with a modified spray nozzle that gives a solid spray pattern. Glyphosate is the main herbicide used with the addition of a marker dye. For plants that show some resistance (e.g. Madeira Vine) or where growing conditions are not optimal, an acidifying agent, L1700®, is added. Metsulfuron methyl can also be used for resistant species and grasses. It should be used with a surfactant, such as Agral® or Pulse®.

- Where both Glyphosate and Metsulfuron methyl it is important to mix the chemicals as recommended e.g. MM must be well mixed with water prior to adding to backpack.
- Dilution rates for Glyphosate and Metsulfuron methyl are in accordance with the manufacturer's recommendations and any variation requires a permit from the National Registration Authority.
- Dilution rates for Glyphosate to water for treatment of some weed species are provided below:
- Plants with more or less succulent leaves, e.g. Wandering Jew Tradescantia fluminensis, Madeira Vine Anredera cordifolia (autumn to winter is the suggested time for spraying these plants), Spider/Ribbon Plants Chlorophytum spp. etc - 1 part Glyphosate to 50 parts water plus 1.5g Metsulfuron methyl to 10 litres water + 2 ml Agral® or 20ml Pulse® to 10 litres water
- Lantana Lantana camara - 1 part Glyphosate to 100 parts water
- Other soft-leaved plants, annuals and grasses - 1 part Glyphosate to 100 parts water
- Bitou Bush Chrysanthemoides monilifera subsp. rotundata - 1 part Glyphosate to 150 parts water to 1 part Glyphosate to 400 parts water
- Typical dilution rates for Metsulfuron methyl to water are - 1.5g Metsulfuron methyl to 10 litres water + 2 ml Agral® or 20ml Pulse® to 10 litres water.

SPOT-SPRAYING IMAGE

SOURCE: CHENOWETH EPLA AND BUSHLAND RESTORATION SERVICES, 2012

Overspray

This weed control method is applicable to large, dense infestations of such plants as *Lantana camara*, where it is desirable to leave the dead plants intact to prevent erosion and runoff impacts and over-exposure of large areas, protect native seedlings from predators such as wallabies, and avoid trampling by humans.

- Spray over the top of the infestation, using a weak solution of Glyphosate.
- Any native plants that may be under the weed will be protected by the foliage cover of the weed.
- Leave the sprayed plants intact so that native seedlings can establish under the shelter provided.
- The rate for overspraying of Lantana is 1 part Glyphosate to 100 parts water.
- Alternatively, weeds can be cut and flattened with bush-hooks or loppers and the subsequent regrowth sprayed with Glyphosate. In many cases it is preferable to overspray wherever practicable as this will cause less erosion (via increased runoff across exposed soils) and trampling of suppressed native plants, such as ferns and seedlings. However, handwork will be necessary to cut-scrape-paint any unsprayed Bitou Bush or Lantana that surrounds native plants.

OVERSPRAYING IMAGE SOURCE: CHENOWETH EPLA AND BUSHLAND RESTORATION SERVICES, 2012

Gouge-paint

This weed control method applies to those plant species that have a fleshy root system, such as rhizomes or large bulbs. It is particularly appropriate for the treatment of *Asparagus spp.*

- Gouge out sections of the fleshy base with a knife (if using on Asparagus, first cut the stems at shoulder height and also at the base).
- Apply 1 part Glyphosate to 1.5 parts water immediately, with a paint brush approximately 1-5 centimetres wide.

Crowning

This weed control method is applicable to weeds which have their growing points below the surface of the ground (corms, bulbs, rhizomes, clumped or fibrous root systems, etc. e.g. *Asparagus spp.*, and introduced grasses).

- Grasp the leaves or stems and hold them tightly so that the base of the plant is visible. Plants with sharp leaves or stems should be cut back first.
- Insert the knife close to the base of the plant at a slight angle, with the tip well under the root system.
- Cut through the roots close to the base. Depending on the size of the plant, two or more cuts may be needed to sever all the roots.
- Remove the plant. Make sure that the base of the plant where the roots begin is completely removed.

Control of Weeds with Underground Reproductive Structures

Examples: Weeds with 

- Top roots - catenae, dandelion
- Rhizomes - asparagus fern, ginger plant
- Bulbs and corms - scalps, onion weed, woottonia, freesia, mouthwillie
- Tubers - mallota vine, arrow head vine

METHODS OF REMOVAL

1 HAND REMOVAL OF PLANTS WITH A TAPROOT

Example: Paddy's lucerne, dandelion

Gently remove and bag seeds or fruit.

Push a narrow trowel or knife into the ground next to the taproot. Carefully loosen soil. Repeat the step around the taproot.

Grasp stem at ground level, rock plant back wards and forwards and pull gently.

Gently tap the roots to dislodge soil. Replace disturbed soil and lightly pat down.

2 CROWNING

Many grasses can be crowned

Example: asparagus fern

Gently remove and bag stems with seed or fruit.

Grasp the leaves or stems together so that the base of the plant is visible.

Insert, at an angle, a knife or lever, close to the "crown".

Cut through all the roots around the crown.

Remove and bag the crown.

Illustration of hand removal of a plant with a taproot.

Illustration of crowning a plant.

(SOURCE: NPWS, UNDATED)

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Scientific Name	Common Name	Recommended Treatment
<i>Ageratina adenophora</i>	crofton weed	Plants: spot spray (G 100 mL/10 L + S or O).  NOTE: No slashing or whipper snipping of seeding crofton weed is to occur.
<i>Ageratina riparia</i>	Mistflower	Plants: hand-pull and hang to dry or spot spray (G 100 mL/10L +S or O, or MM 1-2 g/10L + W or O).  NOTE: No slashing or whipper snipping of seeding mistweed is to occur.
<i>Ageratum houstonianum</i>	Blue Billygoat Weed	Isolated individuals spot spray or hand removal Plants: spot spray (G 100 mL/10 L + S or O).
<i>Ambrosia artemisiifolia</i>	Annual Ragweed	Plants: hand-pull or spray (G 100 mL/10 L + S or O).
<i>Asparagus aethiopicus</i> cv. <i>Sprengeri</i>  <i>Asparagus africanus</i>	Asparagus Ferns	Initial treatment via hand removal using crowning technique and hanging off ground to dry. For successful weed control it is vital to cut out the entire central growing point. Plants: spot spray (G 100 mL/10 L + MM1.5g/10L + W or O).
<i>Andropogon virginicus</i> <i>Chloris gayana</i> <i>Megathyrsus maximus</i> <i>Melinis repens</i> <i>Paspalum dilatatum</i> <i>Pennisetum clandestinum</i> <i>Pennisetum purpureum</i> <i>Setaria sphacelata</i> <i>Sporobolus africans</i>	Exotic/ pasture grasses	In areas which are comprised solely of pasture grasses whipper-snipping/brush cutting is permitted followed up by spot spraying of grass tussock bases. No whipper snipping of native species is permitted.   Spot spraying or overspray of clumps and scattered individuals. Plants: spot spray (G 100 mL/10 L).
<i>Bidens pilosa</i>	Cobblers Pegs	Plants: spot spray (G 100 mL/10 L + S or O).
<i>Cestrum parqui</i>	Green Cestrum	Plants: spot spray (G 100 mL/10 L + S or O).
<i>Cinnamomum camphora</i>	Camphor Laurel	Hand pull seedlings or spot spray (G 200 mL/10 L + S or O). Saplings CS&P G:1.5 Trees: F/I G 1: 1.5.
<i>Commelina/ Tradescantia</i>	Wandering jew	Plants: spot spray (G 100 mL/10 L + S or O).
<i>Conyza spp</i>	Fleabane	Plants: spot spray (G 100 mL/10 L + S or O).
<i>Crassocephalum crepidioides</i>	Thickhead	Plants: spot spray (G 100mL/10 L + S or O).
<i>Desmodium intortum</i>	Greenleaf desmodium	Plants: spot spray (G 100 mL/10 L + S or O).
<i>Desmodium uncinatum</i>	Silverleaf Desmodium	Plants: hand-pull or crown, CS&P tuberous roots (G 1:1.5). Spray (G 200 mL/10L +S or O, or G 200 mL/10L + MM 1.5 g/10L + W or O, or MM 1-2 g/10L + W or o). Collect and bag seeds.
<i>Gomphocarpus physocarpus</i>	Cotton Bushes	Shrubs: CS&P (G1:1.5) Plants: hand-pull or spray (G 100 mL/10 L + S or O).
<i>Lantana camara</i>	Lantana	Lopper, then CS&P base 1:1.5 G or Overspray large infestations and spot spray regrowth (G200mL/10L G + S or O) Brushcutting followed by followup spot spraying is only permitted in areas where thickets are comprised of Lantana (and other weeds) only.

Scientific Name	Common Name	Recommended Treatment
<i>Macroptilium atropurpureum</i>	Siratro	Vines: hand-pull or CS&P (1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spot spray: (G 100 mL/10 L + S or O, or G 200 mL/10 L + MM 1.5 g/10 L + W or O).
<i>Murraya paniculata</i>	Mock orange	Shrubs: CS&P (G1:1.5) Plants: hand-pull or spray (G 200 mL/10 L + S or O).
<i>Ochna serrulata</i>	micky mouse bush	Shrubs: CS&P (G1:1.5) Plants: hand-pull or spray (G 200 mL/10 L + S or O).
<i>Passiflora suberosa, P. edulis, P. subpeltata</i>	Passionflowers	Vines: hand-pull or CS&P (G1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spot spray: (G 200 mL/10 L + S or O, or G 100 mL/10 L + MM 1.5 g/10 L + W or O).
<i>Pennisetum purpureum</i>	Barner grass	Brush-cut, lopper or machete clumps and then spot-spray or overspray. Plants: spot spray (G 100 mL/10 L + S or O).
<i>Pinus elliottii</i>	Slash Pine	Hand pull seedlings or spot spray (G 200 mL/10 L + S or O). Saplings CS&P G:1.5 Trees: F/I G 1: 1.5.
<i>Schefflera actinophylla</i>	Umbrella Tree	Hand pull seedlings or spot spray (G 100 mL/10 L + S or O). Saplings CS&P G:1.5 Trees: F/I G 1: 1.5.
<i>Senna pendula</i>	Easter Cassia	Lopper, then CS&P base 1:1.5 G or Overspray large infestations and spot spray regrowth (G200mL/10L G + S or O)
<i>Sida cordifolia</i>	Flannel Weed	Lopper, then CS&P base 1:1.5 G or Overspray large infestations and spot spray regrowth (G100mL/10L G + S or O) Plants: spot spray (G 100 mL/10 L + S or O, or MM 1-2 g/10L + W or O).
<i>Sida rhombifolia</i>	Paddy's Lucerne	Plants: spot spray (G 100 mL/10 L + S or O, or MM 1-2 g/10L + W or O).
<i>Solanum nigrum</i>	Blackberry nightshade	Plants: hand-pull or spray (G 100 mL/10L + A).
<i>Solanum chrysotrichum</i>	Devil's Fig	Isolated small individuals spot spray or hand removal [gloves needed] Shrubs: C&P (G 1:1.5). Regrowth/small plants: spot spray (G 150 mL/10 L + A). Large Shrubs: F/I (G 1:1.5).
<i>Solanum mauritianum</i>	Wild Tobacco	Stems: C&P (G 1:1.5). Regrowth: spot spray (G 200 mL/10 L + S or O). Seedlings: Handpull or spot spray (G 200 mL/10 L + S or O); Saplings: CS&P (G 1:1.5). Trees: F/I (G 1:1.5)
<i>Solanum seaforthium</i>	Climbing Nightshade	Vines: hand-pull or CS&P (1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spot spray: (G 200 mL/10 L + S or O, or G 100 mL/10 L + MM 1.5 g/10 L + W or O)
<i>Sphagneticola trilobata</i>	Singapore Daisy	Plants: spot spray (G 200 mL/10 L + MM 1.5 mL/10 L + W or O).
<i>Urena lobata</i>	Hibiscus burr	Lopper, then CS&P base 1:1.5 G or Overspray large infestations and spot spray regrowth (G200mL/10L G + S or O). Ensure burrs are not transported into other areas.

Scientific Name	Common Name	Recommended Treatment
<i>Verbena bonariensis</i>	Purple top	Plants: hand-pull or spray (G 100 mL/10 L + S or O). Careful application required due to low leaf surface area
<i>Ipomoea cairica</i>	Mile a minute Morning Glory	Vines: hand-pull or CS&P (G 1:1.5). Materials above head height to be left insitu where it will die and fall to the ground as natural mulch. Spot spray: (G 100 mL/10 L + S or O, or G 200 mL/10 L + MM 1.5 g/10 L + W or O).

Control Method Abbreviations:

CS&P = cut, scrape and paint  
C&P = cut and paint  
F/I = frill/stem-inject/spear or drill  
S&P = scrape and paint  
G = glyphosate (Roundup Biactive) dilution ratio (i.e. Glyphosate to water)  
MM = metsulfuron-methyl (i.e.Brush-off) dilution ratio  
S = surfactant (e.g. LI 700)  
A = spray adjuvant, (e.g. Agral, Codacide, Protec Plus)  
2, 4-D = 2,4-D 625 glamine (Amicide 625) dilution ratio

\* where herbicide treatment is required the use of Roundup Biactive is primarily recommended. The active ingredient of this herbicide is Glyphosate isopropylamine which has been found to be non-toxic to frog tadpoles and generally does not require the use of additional surfactants.

Recommended Application Technique For Spraying (Knapsack/Handgun Equipment)

The dilution rate is given as a ratio of herbicide volume to water volume. Adjust equipment to achieve an even spray pattern. Apply to ensure complete and uniform wetting of all foliage. For handgun equipment, a D6 spray tip (Spraying Systems Australia P/L) or equivalent, and an operating pressure of 400-700 kPa are recommended.

Additional General Recommendations

- Where areas are spot-sprayed and/or hand weeded, weed material must be left insitu to act as natural site mulch
- Following initial control, spot-spraying should occur from areas that are dominated by native vegetation and extend into more weedy areas.
- Weed control (especially groundcover weed control) must be undertaken in a manner which does not promote erosion, expose soils to excessive runoff or instability of soil, especially in waterways or high velocity flow zones.
- Herbicide dye must be used to reduce the potential for over spraying or re-spraying of previously treated areas. If evidence of excessive spraying exists or if off target damage is evident, rehabilitation will be required to the satisfaction of Council to ensure all areas of the RZ are stable and not at increased risk of erosion or expose runoff related ipmacts due to off target damage.
- Undesirable vine species must be treated by cutting the plant twice. Once at head height and then at ground level. Immediately after cutting at ground level herbicide must be applied using the cut, scrape and paint method.

Referenced Material:

Australian Government Australia Pesticides and VMA Permit to Allow Minor Use of an AGVET Chemical Product for the Control of Environmental Weeds in Non-Crop Areas Permit Number – PER11463 1-7-2009 to 30-6-2023 Biosecurity QLD.  
Department of Agriculture and Fisheries / Biosecurity Queensland (2020) Weeds and Diseases online @ www.biosecurity.qld.gov.au  
Mann, M. (2000) *Toxicological Impact of Agricultural Surfactants on Australian Frogs* (PHD Thesis). Curtin University of Technology, Perth  
Nufarm Australia Limited (undated) Roundup Biactive Herbicide by Monsanto NRA Approval No. 48518/1102  
Big Scrub Rainforest Landcare Group (2005) *Subtropical Rainforest Restoration: A Practical Manual and Data Source for Landcare Groups, Land Managers and Rainforest Regenerators*. BSRLG, Bangalow.  
Chenoweth EPLA and Bushland Restoration Services (2012) *South East Queensland Ecological Restoration Framework: Manual*. Prepared on behalf of SEQ Catchments and South East Queensland Local Governments, Brisbane

PROJECT:  
225 TERRANORA ROAD, BANORA POINT

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DRAFT ENVIRONMENTAL MANAGEMENT PLAN

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## 225 TERRANORA ROAD, BANORA POINT DRAFT ENVIRONMENTAL MANAGEMENT PLAN

### REVEGETATION METHODS

Following primary weed management works nominated areas requiring infill planting (reconstruction areas) is to be performed. The revegetation work comprises:

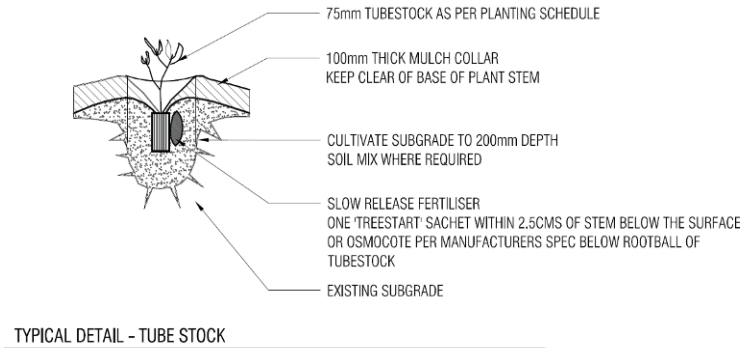
1. Purchase and supply all plants in accordance with approvals
2. Installation and mulching of all plants within revegetation area
3. Ongoing maintenance of revegetation area to ensure survival

### PLANT SUPPLY

- Plants shall be vigorous, well established, of good form, not soft or forced, hardened off, free from disease and pests with large healthy root systems and not pot bound.
- The root system shall be well balanced in relation to the size of the plant.
- Trees shall have a single leading shoot.
- Plant containers shall be of an appropriate size and free from weeds.
- Plants shall not exhibit signs of being stressed at any stage during their development due to inadequate watering, excessive sunlight, physical damage or have restricted growth due to nursery rows.
- Plants species shall be selected from the adjacent revegetation module and substitutions are only permitted where reflective of the preclearing vegetation type (lowland rainforest)

### PLANT INSTALLATION/REVEGETATION

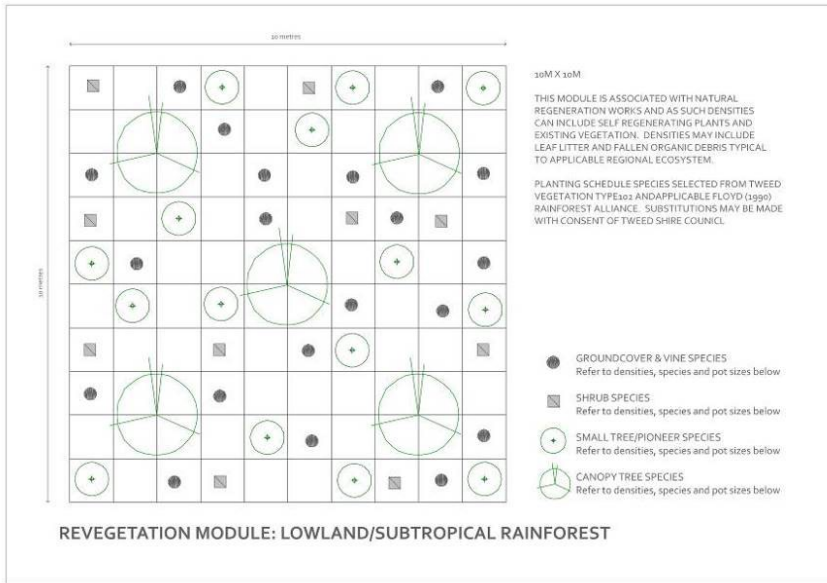
- Planting is to occur as soon as possible after delivery occurs. If this is not possible (i.e. due to weather conditions) plants are to be stored in a shady area and watering maintained.
- If planting is to be executed during council water restriction periods ensure plants can be watered in at time of planting. Do not allow plants to be installed on a day they can't be watered.
- Planting to be executed in accordance with the planting detail below



- Do not plant into dry or muddy soil or in extreme weather conditions.
- Ensure plant root systems are moist when removed from container and not allowed to dry out and planting area has been thoroughly watered.
- Excavate soil at planting site at twice the width of the rootball and over excavate planting depth to allow placement of slow release fertiliser (Osmocote' sustained release fertiliser or equivalent) and water crystals
- Plant out with minimum disturbance to root ball ensuring finished compacted soil levels coincide with the natural soil level of the plant and plant stem is erect
- Thoroughly water entire planting area before applying forest mulch
- Apply and spread mulch evenly to a depth of 100mm to all plants and a minimum distance of 500mm around each plant but ensuring that the mulch is not in contact with the plant stem. Mulch to be 'forest mulch' as detailed, free of weeds, termites and other foreign matter.

### PLANT MAINTENANCE

- Revegetation areas are to be regularly watered for a period of twelve weeks.
- Weeds within the revegetation area are to be controlled quarterly during winter and autumn and monthly during spring and summer.
- Replacement of planted stock lost to death shall occur as required to achieve a 90% survival rate at 2 years after planting.



SPECIES NAME	COMMON NAME	POT SIZE	QUANTITY PER MODULE	MINIMUM DIVERSITY PER MODULE
LARGE AND EMERGENT CANOPY TREES				
ACMENA INGENS	RED APPLE	75MM TUBE	5	3
ARAUCARIA CUNNINGHAMII	HOOP PINE			
ARGYRODENDRON TRIFOLIOLATUM	BOOYUNG			
CASTANOSPERMUM AUSTRALE	BLACKBEAN			
CRYPTOCARYA OBOVATA	PEPPERBERRY			
ELAEOCARPUS GRANDIS	BLUE QUANDONG			
EUROSCINUS FALCATUS	RIBBONWOOD			
FICUS WATKINSIANA	STRANGLING FIG			
LOPHOSTEMON CONFERTUS	BRUSHBOX			
PSEUDOWEINMANNIA	ROSE MARARA			
LACHNOCARPA				
SLOANEA WOOLLSII	YELLOW CARBEEN			
TOONA CILIATA	RED CEDAR			
CANOPY TREES AND PIONEERS				
ACACIA MELANOXYLON	BLACKWOOD	75MM TUBE	15	7
ACRONYCHIA OCTANDRA	DOUGHWOOD			
ACRONYCHIA WILCOXIANA	SILVER ASPEN			
ARCHONTOPHOENIX CUNNINGHAMIANA	PICCABEEN PALM			
BALOGHIA INOPHYLLA	SCRUB BLOODWOOD			
COMMERSONIA BARTRAMIA	BROWN KURRAJONG			
CRYPTOCARYA MICRONEURA	MURROU			
CUPANIOPSIS ANACARDIOIDES	TUCKEROO			
DYSOXYLUM MOLLISSIMUM	REDBEAN			
ENDIANDRA DISCOLOR	ROSE WALNUT			
FLINDERSIA SCHOTTIANA	BUMPY ASH			
GLOCHIDION SUMATRANUM	CHEESE TREE			
GUIOA SEMIGLAUCA	WILD QUINCE			
HOMALANTHUS POPULIFOLIUS	BLEEDING HEART			
JAGERA PSEUDORHUS	FOAMBARK			
MACARANGA TANARIUS	MACARANGA			
MALLOTUS PHILIPPENSIS	RED KAMALA			
MELICOPE ELLERYANA	PINK DOUGHWOOD			
PLANCHONELLA AUSTRALIS	BLACK APPLE			
POLYSCIAS MURRAYI	PENCIL CEDAR			
RHODOSPERMA RHODANTHEMA	DEEP YELLOWWOOD			
SLOANEA AUSTRALIS	MAINDENS BLUSH			
SYNOUM GLANDULOSUM	SCENTLESS ROSEWOOD			
SYZYGIUM LUEHMANNII	RIBERRY			
SYZYGIUM OLEOSUM	BLUE CHERRY			
WATERHOUSEA FLORIBUNDA	WEeping LILLIPILLI			
SMALLER TREES AND SHRUBS				
ARCHIRHODOMYRTUS BECKLERI	ROSE MYRTLE	75MM TUBE	10	3
ARYTERA DIVARICATA	ROSE TAMARIND			
CINNAMOMUM VIRENS	RED-BARKED SASSAFRAS			
CORDYLINE PETIOLARIS	LARGE-LEAVED PALM LILY			
CORDYLINE RUBRA	RED-FRUITED PALM LILY			
CRYPTOCARYA LAEVIGATA	GLOSSY LAUREL			
ELATTOSTACHYUS NERVOSA	GREEN TAMARIND			
LITSEA AUSTRALIS	BROWN BOLLYGUM			
NEOLITSEA DEALBATA	WHITE BOLLYGUM			
OLEA PANICULATA	NATIVE OLIVE			
PILIDIOSTIGMA GLABRUM	PLUM MYRTLE			
PSYCHOTRIA LONICEROIDES	HAIRY PSYCHOTRIA			
RHODAMNIA MAIDENIANA	SCRUB TURPENTINE			
SARCOPTERYX STIPATA	STEELWOOD			
TOECHIMA DASYRRACHE	BLUNT STEELWOOD			
WILKIEA HUEGELIANA	VEINY WILKEA			
GROUND COVERS AND CREEP VINES				
AUSTROSTEENISIA GLABRISTYLA	GIANT BLOOD VINE	75MM TUBE	20	7
CALLERYA MEGASPERMA	NATIVE WISTERIA			
CISSUS ANTARCTICA	KANGAROO VINE			
CISSUS HYPOGLAUCA	FIVE-LEAVED WATER VINE			
DIANELLA REVOLUTA	FLAX LILLY			
HIBBERTIA DENTATA	GUINEA FLOWER			
LOMANDRA HYSTRIX	CREEK MATRUSH			
LOMANDRA MULTIFLORA	MATRUSH			
PALMERIA FOREMANII	BIG SCRUB ANCHOR VINE			
PANDOREA PANDORANA	WONGA VINE			
TROPHIS SCANDENS	BURNY VINE			

### REHABILITATION ZONE ONGOING MAINTENANCE

The following maintenance actions are necessary to achieve the restoration aim and objectives:

- Maintenance of rehabilitation zones will be undertaken for a period of five (5) years;
- Plantings are to be regularly watered as necessary for a period of twelve (12) weeks following installation.
- Follow up weed control is to occur within the management zones monthly during winter and autumn and fortnightly during spring and summer;
- All fallen natural debris and hollow logs are to be retained in-situ within the management zones to provide habitat for reptiles, amphibians, and ground dwelling mammals.
- Replanting shall occur where installed plants decline during the maintenance period in order to achieve the key performance indicators outlined below
- Mulch is to be replenished as necessary to maintain a depth of 100mm around tubestock during the 5 year maintenance period
- Plantings exhibiting signs of grazing (i.e. rabbits or wallabies) are to be protected with tree guards or exclusion fencing.
- Where construction works are approved within 10 metres of the boundary of a management zone it must be fenced with orange safety mesh (CEP-FENCING-100 Safety Fence Orange, or similar) during the construction phase of the development to reduce the risk of encroachment into the rehabilitation area or damage by machinery etc.



### REHABILITATION ZONE MONITORING

The success of a regeneration project can be assessed by systematic visual monitoring of the zone area. This need not be an overly time consuming process and the information generated can then be used to evaluate the success of various treatments.

A permanent photo point can be set up using a star picket marked with fluorescent yellow safety cap, so that a photograph may be taken of the site at regular intervals as it is being restored. A time series of photographs, from a degraded state prior to the commencement of restoration, through the transition stages, to the minimum maintenance stage, can be a powerful reminder of the changes that have been achieved by restoration.

- Collected site photos should be compiled in a 'master' monitoring report for proper record-keeping.
- Monitoring of the weed management and revegetation works allows for:
- Review of the baseline condition for measuring the success of the weed removal and control.
- Ensure level of protection for existing identified native vegetation inclusive of that which has naturally regenerated
- Review the rate of spread or contraction of weed infestation within the management zones
- Monitor the rate of assisted regeneration and revegetation of desirable native species promoted in areas where weeds have been removed.
- Identification of new weed threats or other factors which may be affecting the rehabilitation zones

It is recommended that at least two photo points be established in each management zone and photographed on a quarterly basis for the five year maintenance period. GPS coordinates of the permanent monitoring points shall also be documented to enable others to find the monitoring points in the field.

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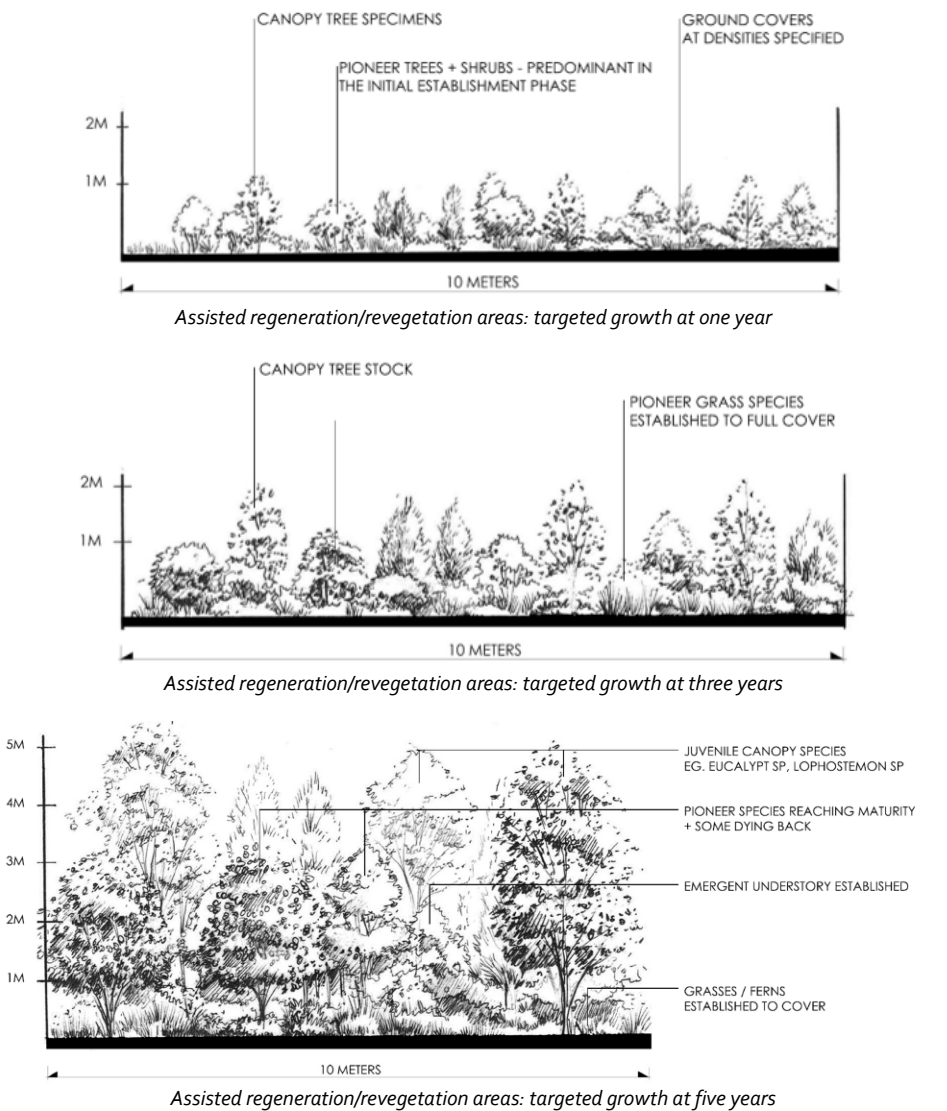
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225 TERRANORA ROAD, BANORA POINT DRAFT ENVIRONMENTAL MANAGEMENT PLAN

REHABILITATION ZONE KEY PERFORMANCE INDICATORS

- The following key performance indicators are to be achieved within the rehabilitation zones:
- Existing native vegetation to be retained where applicable
  - All rubbish and anthropogenic debris is removed
  - Primary treatment of all weeds within the rehabilitation zones is to occur by the end of year 3.
  - All woody weeds, all exotic vines and all invasive plants within each management area are to have initial/primary treatment within three years of commencement of the rehabilitation plan
  - The standard of weed control and management works within each management zone is to be maintained or improved at year 4.
  - Less than 10% of existing environmental weeds are to be present within each management area at the end of year 5.
  - All weed treatment must be performed in a manner which does not promote erosion, uncontrolled runoff or instability of soil. For example, on steep slopes spot spraying of planting locations rather than blanket spraying of the entire management zone.
  - All weeds within the drip zones of native vegetation are to be treated to reduce competition and to increase opportunities for native plant regeneration;
  - >90% survival rate of planted stock is to be achieved over the five (5) year establishment and maintenance period;
  - Planted vegetation and assisted regeneration areas are to achieve average growth of >1m by year three and 1.5m by year five and cumulative cover of 60% by year 3



REHABILITATION ZONE KEY PERFORMANCE INDICATORS (cont.)

- Planted stock to exhibit fair or healthy conditions as follows:

Condition	Descriptor
Healthy	Leaves green, no abnormal leaf loss
Fair	Leaves green, some yellowing of leaves, but <20% of canopy affected
Poor	Many leaves yellow or brown, substantial reduction in canopy extent since last measurement
Dead	Leaves brown or absent, little of the canopy remaining

Additional key performance indicators assisted regeneration management areas:

Nominated Rehabilitation Zones 1 and 2 shall be managed as 'assisted regeneration' areas whereby weed re-establishment will be routinely monitored (and control applied as necessary) and regeneration of native vegetation cover also monitored for a period of four years.

At this stage a review should be performed determine the success of the natural regeneration areas. This shall be determined via the cover of the assisted regeneration zones with native species. In order for assisted natural regeneration to be considered successful the following is to be present over the majority of the areas within the relevant rehabilitation zones:

- generally 1 plant per 2 square metres to the rehabilitation zone (or establishment of leaf litter/natural debris and/or foliage projection cover typical to surrounding areas of the native vegetation community)
- Assisted regeneration areas must exhibit species occurring within surrounding areas of the native vegetation community or typical to similar communities within the locality

During the review to determine the success of the assisted regeneration efforts, substantial areas which are bare or denuded shall be addressed via reconstructive management (i.e. landscaping/revegetation). This landscaping will be implemented and monitored accordingly for an additional 12 months (5 years total in accordance with Tweed Shire Council Site Action Plan Guidelines). The landscaping modules to be planted within 'failed' areas (if deemed necessary after four years) shall be the Lowland Rainforest Module contained in this document.

REHABILITATION ZONE CORRECTIVE ACTIONS/ADAPTIVE MANAGEMENT

The following corrective actions are to be implemented in instances of non-compliance with the above key performance indicators:

- Rubbish or litter remaining within the rehabilitation zones is to be immediately removed.
- Where weed re-establishment occurs, appropriate control measures are to be implemented.
- Where planted specimens fail to strike or plantings do not achieve the required survivorship then supplementary plantings are to be installed to achieve the key performance indicators in this regard. Where it is considered that a particular species has failed due to non-suitability or repeated failure within the planting environment a suitable native plant replacement species is to be discussed with and approved by Council's ecologist.
- If regular increases in height and crown cover extent are not recorded within the monitoring period a horticulturalist/arborist is to be employed to identify likely causes and to recommend measures (i.e. fertiliser application, increased watering etc.) to encourage increased growth. It is to be noted that plant growth rates may be limited by climatic, environmental, natural disaster or genetic reasons during the management period and exhibited growth rates are to be considered in the context of these external factors prior to implementing management measures in this regard.
- In locations where 'assisted regeneration' is failing (at 4 years months post commencement of each rehabilitation zone) then 'reconstruction/revegetation' works are to proceed
- If retained or planted vegetation show signs of ill health (i.e. poor or dead), a horticulturalist/arborist is to be employed to identify likely causes and to recommend mitigation measures to improve regeneration conditions.
- Where damage to vegetation protection fencing or signage is observed the structures are to be repaired to pre-existing condition.
- Any incidences of native tree, shrub or ground cover clearing beyond the approved extent is to be reported to Tweed Shire Council
- If native vegetation has been damaged (either as a result of obvious illegal clearing or dieback) then Tweed Shire Council is to be notified.

N.B. In the event that adaptive management procedures are considered necessary throughout the course of the rehabilitation program, any amendment to the management regime described within this document must be undertaken in consultation with Council's ecologist. Such procedures may include (but are not limited to) watering during drought, amendment of weed removal technique where unsuccessful for a given species, scarification of topsoil to reduce compaction, addition of fertiliser to poorly establishing areas etc. These measures will be considered in the context of plant species suitability on the site, with preference to those adapted and tolerant of the local environmental conditions.

PROTECTION OF THREATENED ECOLOGICAL COMMUNITY (TEC)

Minor areas containing Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions have been previously identified on the boundaries of the site which are retained within the Community Lot. This ecological community will be protected and managed for conservation in association with the following which have been incorporated into the design of the 3 large lot subdivision:

- The TEC will be retained within the delineated environmental/community lot area
- Additional setbacks are provided via the location of the building envelopes of the three large allotments away from allotment boundaries
- A rehabilitation strategy has been prepared which aims to reduce the extent of weeds and promote native flora species within the environmental/community lot area
- By-laws are to be incorporated regarding the control of domestical animals to protect native fauna associated with the TEC

It is therefore considered that mechanisms which demonstrate that the TEC can be protected concurrent with the implementation of the 3 large residential concept have been identified.

RUNOFF MANAGEMENT

All stormwater management required to facilitate development adjoining the Community Management Area is to be contained within their respective lot/s as well as being designed, installed and maintained in accordance with Council and any other applicable standards including but not limited to Development Design Specification D5 Stormwater drainage design and D7 Stormwater Quality. Further detail is to be provided within this EMP as part of its finalisation, alongside any development consent issued.

SEEPAGE MANAGEMENT

No evidence of seepage was observed within the Community Management Area during site inspections undertaken to prepare this draft Environmental Management Plan. Notwithstanding, all primary, follow-up and maintenance works are to include visual monitoring for evidence of seepage. Should evidence of seepage within the Community Management Area be identified, specific advices are to be sought from engineering specialists as soon as practical and rectification actions pursued as suitable to preserve ecological values.

BUSHFIRE MANAGEMENT

The provisions of this draft Environmental Management Plan reflect the findings of the Strategic Bushfire Study, prepared by Bushfire Planning Australia, which locates all asset protections zones within the boundaries of the adjoining large lot residential land. No asset protection zones are to be provided within the Community Management Area for the benefit of development on adjoining land.

POTENTIAL DOMESTIC PET IMPACTS ON NATIVE FAUNA

Mortality of fauna as a result of dog attacks is considered to be a key conservation concern for fauna management with some studies reporting that dog attacks account for between 5% and 40% of total recorded mortalities (McAlpine et al, 2007). Within the 'koala coast' of SEQLD an average of 300 koalas each year die as a result of dog attacks (EPA, 2006). Studies into dispersal patterns of koalas undertaken by Dique et al (2003) indicates that in addition to mortality the presence of dogs within or proximate to habitats is likely to disrupt behaviour and associated dispersal options. The risk of predation can strongly alter the behaviour and activity of potential prey (Lima and Dill 1990). In assessing predation hazards, many species use remote cues of risk because of the dangers of direct encounters with predators, including avoidance of open areas (e.g. Banks et al. 1999) or changing the time that they forage (in Banks et al, 2003; 406).

Cats also have direct impacts on native fauna through predation. 'They can kill vertebrates weighing as much as 3kg (Dickman 1996), but preferentially kill mammals weighing less than 220g and birds less than 200g. They also kill and eat reptiles, amphibians and invertebrates (Dickman 1996). Cats can also have indirect effects on native fauna by carrying and transmitting infectious diseases (DEH 2004). They are thought to have contributed to the extinction of many small to medium-sized mammals and ground-nesting birds in the arid zone, and to have seriously affected populations of bilby, mala and numbat (DEH 2004)' (DEWHA, 2008).

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225 TERRANORA ROAD, BANORA POINT

DRAWING TITLE:  
DRAFT ENVIRONMENTAL MANAGEMENT PLAN

REV	DESCRIPTION	DATE	DRAWN	DESIGN	CHECK	APPROVED
1	SUBMISSION	07/10/2022	GD	GD	JT	JT
2	SUBMISSION	19/01/2022	GD	GD	JT	JT

JOB NO:  
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REVISION:  
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SCALE:  
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ESTATE DOMESTIC PET/ANIMAL MANAGEMENT

To reduce the potential impact of unrestrained domestic animal impact (predation/harassment) on native fauna the following is proposed in association with the 3-large lot residential development:

- Production animals and/or livestock or similar, including but not limited to horses, cattle, sheep and goats, are prohibited from being kept within the community title Environmental Management Areas (i.e. the retained bushland areas)
- No domestic animals may roam free within the Environmental Management Areas
- Domestic animals are prohibited from entering the Environmental Management Area unless restrained at all times (i.e. on leash);
- Domestic animals unrestrained (i.e. free roaming) must be confined to the designated private allotments within:
  - o A native fauna exclusion enclosure (i.e. cat or dog run, a fenced in paddock etc), OR
  - o Anywhere on the private allotment if the boundaries of the allotment are fenced with native fauna exclusion fencing

In association with Tweed Shire Council Comprehensive Koala Plan of Management a Fauna Exclusion Fence should include the following design parameters:

- Fencing is to be 1.8m high
- Fencing placement must consider and integrate with any adjacent infrastructure such that no gaps or access points into the exclusion area (i.e. the private allotment) are created
- If the fence material is chain mesh or other climbable material an opaque sheeting to minimum 600mm height is to be attached to the lower portion of the fence on the habitat side to create a visual barrier to fauna encountering the fence
- Fencing should be positioned such that existing or retained vegetation does not contact the fence
- The fence must be positioned to allow for suitable access to either side of the fence to allow for fence and vegetation maintenance
- Any access gates must be able to be kept closed and designed to prevent fauna access



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REFERENCES AND FURTHER INFORMATION

REHABILITATION RESOURCES DOCUMENTS

Big Scrub Rainforest Landcare Group (2005) *Subtropical Rainforest Restoration: A Practical Manual and Data Source for Landcare Groups, Land Managers and Rainforest Regenerators*. BSRLG, Bangalow.

Bradley, J. (1988) *Bringing back the bush: The Bradley method of bush regeneration*. Lansdowne Publishing Pty. Ltd. The Rocks, NSW;

Buchanan, R. A. (1989) *Bush Regeneration: Recovering Australian Landscapes*. TAFE Student Learning Publications, NSW;

Chenoweth EPLA and Bushland Restoration Services (2012) *South East Queensland Ecological Restoration Framework: Manual*. Prepared on behalf of SEQ Catchments and South East Queensland Local Governments, Brisbane

Robertson, M. (1994) *Stop Bushland Weeds: A guide to successful weeding in South Australia’s bushland*. The Nature Conservation Society of South Australia Inc.

TSC (2009) *Site Action Plan Guidelines To Guide Ecological Restoration Planning and Ongoing Management of Native Vegetation and Fauna Habitat* (Tweed-Byron Futures Protect, 2009).

BUSHLAND REGENERATION & WEED MANAGEMENT AND IDENTIFICATION WEBSITES

*SEQ Ecological Restoration Framework*

<https://hlw.org.au/resources/seqecologicalrestorationframework/>

*Society for Ecological Restoration Australasia*

<https://www.seraustralasia.org/>

*Australian Association of Bushland Regenerators*

<https://www.aabr.org.au/>

*NSW WeedWise*

<https://weeds.dpi.nsw.gov.au/>

*Tweed Shire Council Weeds*

<https://www.tweed.nsw.gov.au/environment/pest-animals-weeds/weeds>

*Big Scrub Landcare Rainforest Regeneration*

<https://www.bigscrubrainforest.org/>

*Weed Id Department of Agriculture and Fisheries Weeds*

<https://www.daf.qld.gov.au/business-priorities/biosecurity/invasive-plants-animals/plants-weeds>

*Weeds of National Significance*

<https://weeds.org.au/weeds-profiles/>

*Gold Coast City Council Weeds*

<https://www.goldcoast.qld.gov.au/Council-region/About-our-city/Environment-sustainability/Protecting-our-environment/Managing-pest-plants-animals/Pest-plants-weeds>

MOBILE PHONE APPS

*Weeds of SE Qld and Northern NSW*

<https://apps.apple.com/au/app/weeds-of-south-east-qld/id935518023>

*Rainforest Plants of Australia*

<https://apps.apple.com/au/app/rainforest-plants-of-australia/id1187065616>

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