Department of Sustainability and Environment

Native Vegetation

Revegetation Planting Standards – Guidelines for establishing native vegetation for net gain accounting

Victoria
The Place To Be

Native Vegetation

Revegetation Planting Standards - Guidelines for establishing

This manual should be cited as:

Department of Sustainability and Environment (2006) *Native Vegetation Revegetation planting standards – Guidelines for establishing native vegetation for net gain accounting.* Victorian Government, Department of Sustainability and Environment, East Melbourne.

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Published by Biodiversity and Natural Resources Division,

Department of Sustainability and Environment, East Melbourne, Victoria

ISBN 1 74152 358 3

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native vegetation for net gain accounting

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1 Glossary

Benchmark	A standard vegetation-quality reference point relevant to the vegetation type that is applied in habitat hectare assessments. Represents the average characteristics of a mature and apparently long-undisturbed state of the same vegetation type. EVC benchmarks are available from www.dse.vic.gov.au
Bioregion	A landscape based approach to classifying the land surface using a range of environmental attributes such as climate, geomorphology, lithology and vegetation.
Ecological Vegetation Class (EVC)	A type of native vegetation classification that is described through a combination of its floristics, life form and ecological characteristics, and through an inferred fidelity to particular environment attributes. Each EVC includes a collection of floristic communities (i.e. lower level in the classification that is based solely on groups in the same species) that occur across a biogeographic range, and although differing in species, have similar habitat and ecological processes operating.
Large Old Tree	A tree with a DBH equal to or greater than the large tree diameter as specified in the relevant EVC benchmark.
Relevant Authority	Organisation with the authority to enter into a revegetation management agreement with a landholder / land manager.
Revegetation	Establishment of native vegetation to a minimum standard in formerly cleared areas, outside a remnant patch.
Supplementary Planting	Establishment of overstorey and/or understorey plants within a remnant patch. Typically includes the planting or direct-seeding of understorey life forms.

2 Introduction

Land managers or landholders proposing to revegetate a cleared area or supplementary plant within a remnant patch of native vegetation, will be required to meet minimum standards in order for those actions to qualify as a native vegetation gain. These standards include a requirement to plant suitable locally indigenous species and to achieve 10-year plant density targets[2], based on the relevant EVC benchmark through an appropriate establishment and management approach.

These guidelines have been developed primarily for revegetation of formerly *cleared* areas[3]. For supplementary planting within a native vegetation patch, numbers of plants required should be based on the current cover of native understorey life forms at the site and the area available for planting (i.e. outside the tree canopy drip line). As a general rule, plant numbers per hectare required for supplementary planting will be less than the number of plants required for revegetation purposes. This is due to the generally greater regenerative capacity of remnant vegetation in comparison to non-vegetated areas where there is usually a higher risk of planting failure from increased biotic and abiotic threats and where ecological processes are generally more disrupted.

These guidelines also outline the approach for determining the required area for replanting to offset the loss of scattered trees in circumstances where replanting is required as part of permitted clearing (see Section 4: Scattered tree offsets – replanting requirements).

It should be noted that these guidelines do not set out how the vegetation should be established. Rather, the guidelines outline the process for determining an appropriate 10-year revegetation survival target relevant to the vegetation type of the site and identify the minimum planting requirements in order for the proposed revegetation to qualify under Victoria's net gain accounting approach (see *Victoria's Native Vegetation Management Framework: A Framework for Action*, NRE 2002 for a discussion of net gain).

Contact a regional Department of Sustainability and Environment (DSE) or Catchment Management Authority (CMA) office for advice on appropriate establishment techniques. Many regions also have published revegetation guides that may assist with revegetation design and establishment.

3 Species selection and plant numbers

The recommended range of species and target densities should be chosen with reference to the appropriate bioregional EVC benchmark[4] for the site. In order to develop an appropriate revegetation species list for the site consideration should also be given to the relevant floristic community, local environmental and site conditions, ease of propagation and likely availability of species from regional nurseries.

The type of revegetation method adopted to achieve the target outcomes should consider the site characteristics, the landholder/land manager capacity and current regional practice for establishing vegetation in similar environments[5]. In general, a staged process that results in more than one age class (e.g. 5 to 10 years apart) on the site and that can take advantage of natural recruitment and adaptive management is encouraged.

The minimum revegetation standards do not generally require the planting of ground covers and native grasses due largely to the high risk of failure associated with establishing such life forms, largely because of competition from high threat herbaceous weeds. In some circumstances, the planting of more robust ground covers (e.g. large tussock grasses) in particular EVCs may be considered current regional practice. In such cases, the minimum revegetation standard will require establishment of selected ground cover life forms at the required density in line with the approach outlined in Section 3.1. Typically the planting of ground cover life forms will be restricted to riparian and creekline EVCs although planting within other EVCs may also be relevant in some regions.

2 Target numbers will typically be between 500 and 2500 plants per hectare depending on the EVC.

3 Areas that are not considered a remnant patch (refer to remnant patch definition in: *Native Vegetation – Guide for assessment of referred planning permit applications.* Victorian Government. Department of Sustainability and Environment, 2006a).

4 Current bioregional EVC benchmarks for Victoria can be obtained from the DSE website [www.dse.vic.gov.au/].

5 Contact DSE or regional CMA for advice on appropriate establishment techniques. Many regions also have published revegetation guides that may assist with species selection.

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It should also be noted that the planting of additional understorey life forms may also be included as part of an approved supplementary planting proposal that could qualify for a higher gain score[6]. Such proposals will typically require an assessment by DSE of the site conditions and the capacity of the land manager to establish the identified life forms/species. The required species and target densities will need to be selected on a case-by-case basis.

This document should be used to establish target survival numbers of plants 10 years after commencement of an agreed management period and are to be applied wherever revegetation is being accounted for under Victoria's net gain policy (NRE 2002). Examples of such net gain accounting may include offsets for permitted vegetation clearance (see DSE 2006a, DSE 2006b), the creation of a native vegetation credit registered on BushBroker and Government-funded investment programs (e.g. CarbonTender). It may also include accounting for gains achieved through the voluntary efforts of private landholders and the Victorian public.

By inference, the number of plants that need to be established at any one site may need to be greater than the target survival number. Failure to meet expected germination rates or attrition of planted species within a life form category within the management period will require establishment of the requisite number of plants within that life form to ensure that target survival numbers are met.

3.1 Steps involved for developing a 10-year revegetation survival target based on a bioregional EVC benchmark

The process outlined below can be followed to determine a 10-year revegetation survival target for a site based on the appropriate EVC bioregional benchmark.

1 Determine the EVC that formerly occupied the site by reference to the pre-1750 EVC mapping layer[7], surrounding vegetation, EVC keys, historic information and/or local knowledge.

2 Refer to the relevant EVC benchmark for the bioregion[8].

3 Base the target number of **overstorey (trees) plants/ha** according to:
⇒ 50 plants/ha for woodlands
⇒ 100 plants/ha for dry forests
⇒ 150 plants/ha for riverine/lowland/foothill forests
⇒ 200 plants/ha for damp/wet forests.

4 Determine the benchmark % cover for each appropriate understorey life form.

5 Determine whether other non-woody life forms/species require establishment based on current regional practice[9] / benchmark cover (see Table 1 below).

6 Base the target number and diversity of **understorey plants/ha** for each life form according to Table 1 on the following page.

6 Refer to DSE Vegetation Gain Approach (DSE 2006b) for how gains are calculated through revegetation.

7 Go to the DSE website [www.dse.vic.gov.au/] and click on *Interactive Maps > Biodiversity Interactive Map* to view extant and pre-1750 EVC maps for Victoria.

8 Current bioregional EVC benchmarks for Victoria can be obtained from the DSE website [www.dse.vic.gov.au/].

9 Seek advice from DSE where appropriate on what constitutes current regional practice.

Table 1: The approach used to calculate a 10-year revegetation survival target for understorey life forms based on the bioregional EVC benchmark

Understorey life form	Target no. of plants / ha (for each 5% cover in EVC benchmark)	Target diversity*	Notes
Understorey Tree or Large Shrub > 5 m tall (T)	50 plants	Based on Current Regional Practice#	Assume 10 plants / ha where benchmark cover is 1%
Medium Shrub 1-5 m tall (MS)	200 plants	Based on Current Regional Practice#	Assume 40 plants / ha where benchmark cover is 1%
Small Shrub < 1 m tall (SS)	500 plants	Based on Current Regional Practice#	Assume 100 plants / ha where benchmark cover is 1%
Large Tufted Graminoid (LTG)+ (grasses and grass-like tussocks > 1 m tall)	500 plants	Based on Current Regional Practice#	Apply only where benchmark cover for LTG life form is 10% or greater

* Species selection will be subject to site characteristics, ease of propagation and/or likely availability from regional nurseries.

\# Contact DSE or regional CMA for advice on current regional practice with respect to species diversity within different EVC life forms.

\+ Revegetation standards will generally require the use of *woody species only* although other non-woody life forms such as large, robust tussock-forming grasses/sedges/rushes may also be applicable in certain environments (e.g. creeklines, riparian areas).

7 Select potential suitable revegetation species in life form categories according to the EVC benchmark, local environment, ease of propagation, likely availability from regional nurseries and species robustness. It should be noted that the EVC benchmarks contain a subset of "typical" but not comprehensive list of species for each EVC in a bioregion. It should also be noted that not all species listed in the benchmark will be appropriate to all sites across the range of an EVC in a bioregion nor readily available through local nurseries.

8 Revegetation will need to be established according to defined standards (current regional practice) which set out the minimum requirements for site protection, planting design, site preparation, source of planting stock and post-planting management – see Section 5 following for a guide to typical minimum management standards likely to be required.

9 In general, revegetation will need to be undertaken in accordance with a management agreement between the land manager / landholder and a relevant authority. A typical management agreement will include a management plan for establishing and managing the revegetation site over this period – see Appendix 1 for an example of a revegetation management plan.

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4 Scattered tree offsets – determining the area for replanting

4.1 Introduction

The *Native Vegetation Management Framework* (NRE 2002) sets out the requirement for recruitment (through either facilitated regeneration or active revegetation) of new trees to offset permitted clearing of scattered trees in some circumstances.

This section sets out the process for determining the "recruit or replanting" area required to offset the loss of scattered trees for parcels of land greater than 4 ha with less than 8 scattered old trees / ha, or for parcels of land less than 4 ha with any number of scattered old trees / ha. Permitted clearing of scattered trees within these density/parcel classes will require the recruitment of new trees (*or protection of other trees and supplementary recruitment*) as specified in regional Native Vegetation Plans and may be graded according to conservation significance – see NRE 2002 for further explanation of scattered tree assessment and required offsets for permitted clearing.

This section does not address the "protection & recruitment" offset requirements for permitted scattered tree clearing where this is required. However, the recommended areas proposed in Section 4.2 for the "recruit only" options are based on comparable "protection & recruitment" scenarios for woodland and forest EVCs.

For "protection & recruitment" offsets, the area required should be calculated on a case-by-case basis in consideration of the number and form of the scattered trees (i.e. forest, woodland type) and applying the "protection (of a tree)" definition provided in DSE (2006a).

In some circumstances, the relevant Regional Native Vegetation Plan may also identify the opportunity to offset scattered tree clearing via revegetation that establishes the same specified number of plants across a range of life forms including understorey. Such revegetation proposals will generally require a smaller area than an equivalent tree establishment *only* proposal.

4.2 Area required for "recruit only" or revegetation options to offset permitted clearing of scattered trees

Table 2 on the following page identifies the typical area range required to offset scattered tree clearing with either the recruitment of new trees or revegetation of the number of plants specified in the relevant Regional Native Vegetation Plan. Recruitment can include active replanting and/or facilitated regeneration of trees. Revegetation includes a range of life forms.

Table 2: A guide to calculating the area required for offsetting the loss of scattered trees through either "recruitment" of new trees or revegetation of the required plant numbers as specified in the relevant Regional Native Vegetation Plan.

Conservation significance	Vegetation type	Very high	High	Medium	Low
		For each VLOT, LOT or MOT removed as part of permitted clearing the following offset planting area range could be applied			
Very Large Old Tree (VLOT)	Woodland EVC	Offset area range = 0.4-0.75 ha	0.25-0.5 ha	0.13-0.25 ha	0.07-0.13 ha
	Forest EVC	0.3-0.55 ha	0.18-0.3 ha	0.1-0.18 ha	0.05-0.1 ha
Large Old Tree (LOT)	Woodland EVC	0.14-0.28 ha	0.07-0.14 ha	0.04-0.07 ha	0.01-0.02 ha
	Forest EVC	0.1-0.21 ha	0.05-0.1 ha	0.03-0.05 ha	0.01-0.02 ha
Medium Old Tree (MOT)	Woodland EVC	0.03-0.06 ha	0.02-0.03 ha	0.01-0.02 ha	0.01 ha
	Forest EVC	0.02-0.04 ha	0.01-0.02 ha	0.01-0.02 ha	0.01 ha

Notes:

1 A Very Large Old Tree (VLOT) is defined as 1.5 x the Large Tree diameter at breast height (DBH) as specified in the relevant EVC bioregional benchmark (DBH is measured at 1.3 m above ground level).

2 A Large Old Tree (LOT) is defined as the Large Tree DBH as specified in the relevant EVC bioregional benchmark.

3 A Medium Old Tree (MOT) is defined as 0.75 x the Large Tree DBH as specified in the relevant EVC bioregional benchmark.

4 Requires a target number of plants (as specified in the relevant Regional Native Vegetation Plan) to be established within the offset area within a specified time frame. The design of the planting would be decided on a case-by-case basis after negotiation and in consideration of the vegetation type, site characteristics, follow up management requirement.

5 0.01 ha (10 m x 10 m) is set as a minimum area.

6 Offset area range reflects the flexibility for the proponent to establish scattered tree offsets via revegetation (lower end of range) where this is an option under the relevant Regional Native Vegetation Plan or "tree recruitment" only (upper end of range).

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5 Establishment options

Land managers and landholders committing to revegetation and/or supplementary planting on their site will be required to meet minimum site protection, site preparation and plant stock standards, as well as agree to establish the plants according to a defined planting design and schedule. Follow-up weed control and grazing control will also be required on most sites. Landholders should seek advice from DSE or relevant authority on the most suitable approach for any given site.

The agreed approach should be set out in a management agreement signed between the land manager / landholder and the relevant authority (e.g. DSE, local government). Appendix 1 is an example of a revegetation management agreement that sets out how the vegetation is to be established and how performance will be assessed against the 10-year survival target.

5.1 Seed collection / sourcing plant stock

Seed/cutting material should be collected from within or as close to the site as possible unless otherwise advised by DSE or relevant authority. Land managers or landholders may choose to collect propagating material and on-grow their own plants, purchase seed from a regional seedbank and / or contract a nursery to undertake this work. Note that in the case of revegetation offsets for permitted clearing of native vegetation, seed/stock will not generally be available through not-for-profit operations (e.g. Landcare or 'environment' group).

In all cases, land managers or landholders will be required to keep accurate records of the planting stock for reporting purposes. For guidelines on seed collection for revegetation and record keeping see *FloraBank Guidelines 4 & 5*[10]. The minimum standard for reporting includes the plant species, and the collection date and location and these should able to be provided to DSE or relevant authority upon request. Additional information about the collection site that would also be useful for reporting purposes includes the vegetation type (if known), position in landscape (creek, valley, hilltop etc.), soils, rainfall and aspect.

It should be noted that seed collection from private or public land will require landholder or land manager permission and a permit will be required to collect seed/cutting material from public land. Refer to Landcare Note LC0110 on the Department of Primary Industries website[11] for further information on permit requirements for seed collection. A copy of the collection permit should also be retained by the land manager / landholder for reporting purposes. In some cases, plant material could be purchased direct from the nursery floor as long as supporting evidence can be produced to demonstrate that the stock meets the minimum requirements.

5.2 Site protection

If the adjoining area is grazed or there is a risk of future grazing from adjoining areas, then the site will need to be fenced according to minimum fencing standards to exclude stock (see Appendix 2 for a guide to minimum stock-proof fencing standards).

5.3 Planting design

The planting design will be determined on a case-by-case basis, however in general land managers or landholders should plant understorey life forms in dense patches[12] to create a mosaic effect and to provide some competitive advantage against weeds, while ensuring that disturbance to any native ground cover areas is minimised. DSE or the relevant authority may be able to identify suitable planting areas on the site.

In addition to the target density life forms/species, revegetation will need to meet minimum requirements with respect to width and shape to qualify as a native vegetation gain. There may be capacity to score additional gains where the revegetation goes well beyond the minimum standards (e.g. wider, better shape, connected to other native vegetation) and depending on the current landscape context (low to high). Refer to DSE (2006b) for an explanation of gain scoring through revegetation.

10 FloraBank Guidelines – go to www.florabank.org.au.

11 go to www.dpi.vic.gov.au and click on Notes Information Series link.

12 When planting tubestock.

6 References

DSE (2006a). *Native Vegetation – Guide for assessment of referred planning permit applications.* Victorian Government. Department of Sustainability and Environment, East Melbourne.

DSE (2006b). *Native Vegetation – Vegetation Gain Approach – Technical basis for calculating gains through improved native vegetation management and revegetation.* Victorian Government. Department of Sustainability and Environment, East Melbourne.

NRE (2002). Victoria's Native Vegetation Management: A Framework for Action. Department of Natural Resources and Environment, East Melbourne.

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7 Appendices

Appendix 1: Example of a revegetation management plan

(performance standards schedules *only*)

This plan is designed for attachment to an agreement between the landholder and a relevant authority. Such an agreement could be put in place to establish a revegetation gain for offsetting or investment.

Sample only

SCHEDULE A

ESTABLISHMENT AND MANAGEMENT PRINCIPLES

1 Commitments and reporting schedule

Milestone	***Deliverables***	***Reporting***
Commencement	Agreement is executed by both parties	Date of commencement
Establishment	**1. Establishment of vegetation** 1.1 The Landholder must: (a) prepare the Site appropriately to ensure optimal establishment of the vegetation; (b) for each category specified in Column 1 of the relevant Table in Schedule B, sow seeds or plant seedlings and establish either: (i) a reasonable random selection of vegetation from the corresponding suitable species specified in Column 2 of the relevant Table in Schedule B; or (ii) such other suitable species as approved by the Relevant Authority's Representative in writing. **2. Provenance of vegetation** 2.1 Subject to item 2.2, the Landholder must endeavour to ensure that all vegetation is established by indigenous seed or seedlings sourced from at least ten parent plants from within viable populations matched to the Site in terms of soil type, altitude, topography, aspect and climate and located within 25 kilometres of the Site and within the same bioregion. 2.2 If it is not reasonably practicable for the Landholder to comply with item 2.2 in the case of any suitable species specified in Column 2 of the relevant Table in Schedule B, the Landholder must ensure that vegetation of that species is established from available indigenous seed and seedlings sourced from more than one parent plant from a viable population as close as possible to the Site. 2.3 The Landholder must: (a) record the exact provenance of any vegetation established under items 2.2 and 2.3; and (b) give a copy of that record to the Relevant Authority as part of the Report for this Milestone. **3. Site protection – fencing and fire prevention** 3.1 The Landholder must erect and/or maintain adequate fencing around the Site in accordance with defined minimum standards, to ensure that domestic stock are excluded from the Site at all times. 3.2 The Landholder will take all reasonable steps to prevent fire on at the Land, provided that these steps are not inconsistent with this Agreement.	No later than 2 years following *Commencement*
Stewardship	The Landholder must: (a) ensure that non-native animals are excluded from browsing or grazing the Site at all times, except as approved in writing by the Relevant Authority; and (b) only cultivate the Site or prune or thin the vegetation to the extent necessary to achieve the Survival Target; and (c) maintain in good condition: (i) any fencing around the Site; and (ii) any set-back or fire break shown in the attached Site plan.	Minimum of three years following *Establishment*

Milestone	*Deliverables*	*Reporting*
Survival 1	The Landholder must: (a) achieve the Stewardship Milestone; and (b) agree to undertake remedial actions proposed by the Relevant Authority's Representative in relation to: (i) the planting of additional vegetation at the Site; or (ii) pruning or thinning vegetation at the Site; or (iii) any other action to be taken by the Landholder to meet the required Survival 2 Milestone.	Minimum of one year following *Establishment*
Survival 2	The Landholder must: (a) achieve the Survival 1 Milestone; and (b) ensure that the number of living plants on the Site for each Category in Column 1 of the relevant Table in Schedule B complies with the requirements in Columns 4 and 5 for that Category.	Minimum of two years following *Establishment*
Completion	The Landholder must: (a) achieve the Survival 2 Milestone; and (b) ensure that the number of living plants on the Site for each Category in Column 1 of the relevant Table in Schedule B complies with the requirements in Columns 4 and 5 for that Category.	Minimum of one year following *Survival 2*

SCHEDULE B

Management Zone ID – EVC *name* (as per site plan)
(approx. xx ha available for supplementary planting)

Plants to be used for planting of EVC

TABLE 1 – MANAGEMENT ZONE ID – EVC *name* (as per site plan)

Column 1	Column 2	Column 3	Column 4	Column 5
Category	**Common name**	**Scientific name**	**Maximum density**	**Minimum density**
Overstorey	name	species	xx/ha (e.g. 125% of 10-year target)	xx/ha (e.g. 75% of 10-year target)
Large Shrubs (> 5m tall)	name	species	n/a	xx/ha
Medium Shrubs (1-5m tall)	name	species	n/a	xx/ha
Small Shrubs (0.2-1m tall)	name	species	n/a	xx/ha
Non Woody Plants	name	species	n/a	n/a
Total Live Woody Plants/hectare	n/a	n/a	n/a	xx/ha

Notes:

1 The plant numbers specified in Column 4 for each category in the table above are the minimum numbers required to fulfil the *Survival 2* and *Completion* Milestones (see Schedule A).

2 The minimum density of plants (Column 5) for each species specified in Column 2 can be achieved by any combination of recommended plant species.

3 Non woody plants may be included as desirable additions to the Site on a case-by-case where this is considered as current regional practice for the EVC.

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SCHEDULE C

SITE PLAN

Map showing at 1:5000 or better showing:

- Property Identification
- Revegetation site(s) with site identification code(s)
- AMG Coordinates & Latitude/Longitude
- Cadastre
- Site Boundary with bearing and distance to cadastre (By Survey or Differentially Corrected GPS)
- Roads
- Streams (where appropriate)

Appendix 2: A guide to fencing standards required to ensure adequate protection of a revegetation site (where stock grazing is an identified current or future threat)

A (not comprehensive) range of fencing options are given below. DSE or the relevant authority can help determine the most appropriate fencing options for a particular site.

Beef cattle

- Standard 6/70/30 or 7/90/30 ring-lock and plain wire **or** a four strand plain wire with at least two electrified strands **or** seven strand plain wire. (Note: *Barbed wire is not recommended because of its adverse impact on native fauna*.)
- Posts: 6′ (1.8 m) treated pine (or other suitable material) at least 10 m apart with two droppers in between.
- Strainers: 7 or 8′ (2.1 m or 2.4 m) at least (6-7″) treated pine (or other suitable material).
- Stays: 10′ (3 m) treated pine (or other suitable material).

Dairy cattle

- Standard 6/70/30 or 7/90/30 ring-lock and plain wire **or** a three strand plain wire with at least two electrified strands **or** seven strand plain wire. (Note: *Barbed wire is not recommended because of its adverse impact on native fauna*.)
- Posts: 6′ (1.8m) treated pine (or other suitable material) at least 10 m apart with two droppers in between.
- Strainers: 7 or 8′ (2.1 m or 2.4 m) at least (6-7″) treated pine (or other suitable material).
- Stays: 10′ (3 m) treated pine (or other suitable material).

Sheep

- Standard 6/70/30 or 7/90/30 ring-lock and plain wire **or** a five strand plain wire with at least three electrified strands ensuring that the bottom wire is earthed **or** seven strand plain wire. (Note: *Barbed wire is not recommended because of its adverse impact on native fauna*.)
- Posts: 6′ (1.8 m) treated pine (or other suitable material) at least 10 m apart with two droppers in between.
- Strainers: 7 or 8′ (2.1 m or 2.4 m) at least (5-6″) treated pine (or other suitable material).
- Stays: 10′ (3 m) treated pine (or other suitable material).

Note that fences may include gates for management access where required.

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