

Preliminary Landscape Management Plan

SSD 10365 – ST FRANCIS CATHOLIC COLLEGE, 130-160 Jardine Dr, Edmondson Park

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1 Introduction

This report has been prepared to support the future ongoing maintenance of the college campus and set specific guidelines for the site considering most of the site will be establishing newly planted vegetation.

The Landscape Management Plan (LMP) describes the landscape management activities to be undertaken by the grounds person/ maintenance personnel at St Francis Catholic College.

This Preliminary Landscape Management Report (PLMP) has been prepared by JDH Architects, on behalf of CEDoW, for inclusion in the Plans and Documents noted in the NSW Department of Planning and Environment (DPE) Secretary's Environmental Assessment Requirements (SEARs) for Application Number SSD 10365.

2 Specific Landscape Types

2.1 Specimen Trees

Existing trees on Campus have been surveyed.

Avoid whipper-snipping grass at the base of trees because this can cause ring-barking and tree death. Clip around tree bases by hand or instead plant low groundcovers or mulch at the base of trees. Where trees are planted in paved areas, adjacent to the trunk use:

1. Gravel
2. resin-bonded gravel
3. permeable paving surrounds
4. proprietary tree grate or
5. a combination of the above

2.2 Soil Management for Trees

Wherever trees are to be planted it is important to understand whether the existing in situ topsoil can be used as backfill, whether new topsoil, soil mix, soil conditioner or amendments needs to be imported, or if a mix of the above is best.

In general, the greater the soil/subsoil depth (the effective root depth) - the larger the tree that can be supported with minimal maintenance. The ideal soil profile for trees will have at least 3 horizons where the "A" horizon is the topsoil, the "B" horizon is Subsoil and the "C" horizon is the Subgrade. The minimum recommended topsoil depth for trees is 250mm with a minimum subsoil depth of 200mm. This will provide the tree with the minimum moisture/nutrient reserve and anchorage capacity.

In addition to a physical inspection of the soil to be used to assess field texture and structure and drainage capability, soils should also be analysed by a soil laboratory for the following properties at a minimum:

- pH
- Salinity (electrical conductivity)
- Cation exchange properties and exchangeable cations
- Major and minor nutrients
- Organic matter (%)

Where tree specimens in container sizes 25 litres or larger are to be planted, the subsoil should also be tested for:

- pH
- Salinity (electrical conductivity)
- Cation exchange properties and exchangeable cations
- Aggregate stability.

The most common amendments used to bring soils up to a standard suitable for plant growth are:

- Lime or dolomite to make acid pH soils more alkaline.
- Lime or Gypsum to enhance exchangeable calcium and eliminate sodicity
- Gypsum to make clay soils more friable
- Composts and/or manures to improve organic matter and nutrients levels
- Single or complete fertilisers often with trace elements to correct a particular deficiency or multiple deficiencies.

2.3 Fertilising, composting and mulching

To ensure the health and vigour of trees are maintained.

All trees will perform better when the soil conditions are healthy. Building healthy soils is the key to achieving the long term maintenance goals of mass-planted landscape areas. Soil health is primarily achieved with regular applications of organic soil conditioners such as animal manures, decomposed green waste or proprietary blends of compost.

Fertilising and composting are not critical maintenance activities except where there are obvious deficiencies but should be assessed on an annual basis by observation and leaf analysis.

Maintain an adequate level of mulch maintained in planter beds in order to maximise water conservations and to supress weeds.

2.4 Pruning

Carry out all tree pruning in accordance with AS 4373 Pruning of amenity trees. Prune trees to maintain driver sight lines; to remove dead wood from over hanging paths, to maintain vegetation health and to remove branches or trees that are likely to pose a risk to public safety. Prune to an extent where this will not re-occur as a problem in the period to next routine maintenance without compromising overall form and growth potential of the tree.

Suitable timing for pruning should be determined by the arborist so as to maintain vegetation health, however all trees should be inspected regularly and especially after high winds to determine any action required.

Suitable timing for pruning should be determined by the arborist so as to maintain vegetation health.

Dead limbs containing hollows should not be removed unless there is a risk to public safety; limbs with hollows that are trimmed from trees should be left in a suitable location on the ground to provide habitat.

The installation of nest boxes should be considered if tree hollows are removed.

Removed timber and native vegetation, unless diseased, should be considered for reuse on-site either as habitat logs in bushland areas where appropriate, or mulched in garden beds.

Prune to reduce continuous canopy within the APZ.

Remove dead or dying trees from the campus as required. This may be necessary when trees mature, after damage or adverse environmental conditions.

Pruning - Work Required	Frequency
Prune to remove split leaders, remove dead and heavily damaged limbs. As maturity permits prune lower branches to collar to 2.5 metres min. above ground level. (note; this is a general rule only as some trees have low branches which are essential to the form of the tree, and some trees will be sued for screening purpose where low foliage is required.)	As required
Prune all trees when limbs and branches hang lower than 4 metres over a roadway or parking	

space and 3 m over a walkways, path or cycleway

2.5 Replacement Plantings

To ensure that the density, species and design intent of established tree plantings is maintained any trees damaged or dead are to be replaced.

2.6 Tree Guards, surrounds and Stakes

Replace tree guards/stakes when damaged and/or remove them when no longer required.

Remove tree surrounds where there is the danger that trunks will outgrow the diameter of the surround. Refer to figure 14.

Work Required	Frequency of Work
- Replace tree guards or stakes for trees and shrubs if they are damaged or removed prior to the establishment of the plant. Replace with the same or equivalent guard/stake.	As required until final removal at 12 months
- Remove tree guards and stakes	after planting

2.7 Soil Management for Mass Planted Areas

Areas of native mass planting require a sandy loam to clay loam topsoil mix which is suitable for the planting of grasses, woody and herbaceous perennials and occasionally trees. The following mix is suitable for plants that do not have high nutrient requirements and are not susceptible to compaction.

Sandy loam or site won topsoil mixed with;	70-100% by volume	<i>Eg. 8 parts washed sand/2 parts sandy loam/1 part compost.</i>
Composted soil conditioner conforming with AS 4454	0-30% by volume	
		<i>Amendments as reported by the soil test results.</i>

2.8 Fertilising, Composting and Mulching

To ensure the health and vigour of mass plantings are maintained.

All mass planted areas will perform better when the soil conditions are healthy. Building healthy soils is the key to achieving the long term maintenance goals of mass- planted landscape areas. Soil health is primarily achieved with regular applications of organic soil conditioners such as animal manures, decomposed green waste or proprietary blends of compost.

Fertilising and composting are not critical maintenance activities except where there are obvious deficiencies but should be assessed on an annual basis by observation and leaf analysis.

Note: NPK ratios listed are for native plants. Increase P above >=5 for exotic mass planting beds.

Maintenance Action Required	Frequency
50-100 grams per square metre of Organic fertiliser such as Dynamic Lifter Composted chicken manure, Blood and Bone, fish meal and seaweed NPK ratio – 3.7:2:1.8	Annually. Applied late Spring and again in autumn (higher rate for fast-growing plants).
Where obvious deficiencies are evident use 10 grams/plant (groundcovers), 20 grams/plant (shrubs) and 60 grams/plant (trees) Controlled Release fertiliser such as Nutricote Total TE 360 Day - 17.6: 2.9:6.9 per plant. N:P:K ratio– 18:3:10	Annually. Applied late Spring
Where soils are dry, hydrophobic and as a regular maintenance procedure, top up all garden beds with 30-50mm depth of Soil conditioner as composted animal manure, decomposed green waste or proprietary blends such as “Botany Humus” as available from Australian Native Landscapes. For extreme cases use a proprietary soil-wetting agent.	Bi-annually
All currently mulched areas should gradually be converted to groundcover where possible. Mulch should continue to be applied to a depth of 75mm to retain moisture and minimise weeds until groundcover is established. Mulch applied should be weed-free.	As required, however should not be necessary more than once per year.

2.9 Pruning Mass Planted Areas

Ground cover and shrubs should be maintained at a maximum height of 0.5 m along path edges for personal security. Appropriate species selection in these areas will reduce the need for ongoing maintenance.

Remove dead or dying plant material from mass planted areas on the campus as required. This may become necessary as plantings mature, after damage or adverse environmental conditions.

Pruning Mass Planted Areas - Work Required	Frequency
For low shrub species as per appropriate type: Tip prune to encourage density to 50-100mm	As required after flowering
For low shrub species as per appropriate type: Prune evenly to a height of 500mm above ground along path edges. Prune away from paths where required	Every 4 years after flowering

2.10 Replacement Plantings in Mass Planted Areas

To ensure that the density and species of established plant material within mass planted areas is maintained.

Replacement Plantings in Mass Planted Areas - Work Required	Frequency
Replace failed, senescent or damaged plantings. Densities, sizes and species used are to be in accordance with those specified in the original landscape plans.	As required
Water replacement plantings for a minimum of 12 weeks after planting.	As required to ensure survival.

2.11 Weeding

Weeding is listed under “Mass Planted Areas” because it is the area of greatest concern for weeds in the fabricated landscape, note however that weed control in bushland and other landscape types is also covered in this section.

A noxious weed is a plant declared to be noxious under the NSW Noxious Weeds Act 1993. Noxious weeds can be agricultural weeds, environmental weeds or have a direct impact on human health.

Environmental weeds are non-local plants that can invade and change natural areas and threaten the survival of native plants and animals. After land clearing, environmental weeds are considered to be the next greatest threat to our indigenous biological diversity.

Environmental weeds have the potential to readily invade garden bed areas and potentially impact on the adjacent areas of bushland and creek reserves.

In addition to the environmental hazard posed by weeds, weeds occurring in mass planted beds, growing from the base of trees and from pavement can be unsightly and presents an untidy appearance.

To ensure that environmental and noxious weeds do not reproduce within or spread into mass planted areas and compete with plantings and spread to other areas or nearby bushland.

Weeding and weed control is considered to be a critical maintenance action.

Maintenance Action Required	Frequency
Prevent reproduction of weeds by destroying seedlings and established weeds before seed set or other propagules form. Remove by hand in the first instance (where infestations are low). Ensure that the entire weed including all roots is removed. Dispose of the weeds offsite.	Monthly

Remove by Herbicide application any weeds which cannot be controlled by hand removal. Herbicide application must occur before weed seed set. Non-target species and areas must be reinstated if damaged by herbicide application.

Herbicide use to be in accordance with regulation rates and manufacturers recommendations. Herbicide use must comply with the requirements of the *Noxious and environmental weed control handbook. a guide to weed control in non-crop, aquatic and bushland situations*. NSW Department of Primary Industry Management Guide, Sixth Edition.

After spraying, lop any dead weeds flush with the ground surface and dispose of the cuttings.

Use of bio-degradable herbicide is mandatory

2.12 Lawn Grasses and Sports Turf Grasses

Significant areas of the Campus are surfaced in turf. These areas are important to open space and passive recreation areas. However, they have high demands for maintenance, and require commitment of significant resources particularly in irrigation, fertilizing and mowing and the maintenance of a thick sward that does not wear readily.

The level of maintenance required for particular lawn areas should be considered within the context of their intensity of use.

The traditional European aesthetic determines that grass should be kept lush and green all year round. This is possible and appropriate for high use areas but this perception is gradually changing and it is now more acceptable that in the Australian climate, lawn areas may be subject to seasonal change and browning off in summer. This aesthetic is appropriate for low-use areas that will not be subject to year-round wear.

Specific issues with the existing lawn and grass on the Campus include:

- A range of grass varieties are used on campus. Has one variety been observed to perform better than others?
- In some high use areas, compaction and wear caused by pedestrian and service vehicle has caused grass to die with bare soil remaining.
- While maintaining a complete grass cover under mature trees is desirable, it can be difficult to maintain. A surface mulch or groundcover planting may be more appropriate.
- Maintenance and access for mowing of grass on steep is a potential occupational health and safety risk. Embankments steeper than 3:1 should be considered for planting treatments so that mowing is not required. Tractor drawn mowers should never mow slopes steeper than 3:1 and it is not advisable to use hand mowers on slopes between 3:1 and 2:1 and never on slopes 2:1 or steeper.
- Restrict the provision of high quality, well maintained lawn to sports fields, high traffic areas and premium passive use areas. Aim to reduce the amount of resources dedicated to maintaining lawn and grass areas. Clippings should remain where they fall under most circumstances and should not be raked up and removed. In high traffic areas this may require more frequent mowing so that the clippings are smaller and fall into the turf more easily.
- Designate 'lawn maintenance zones' for Campus. Within these zones grass may be irrigated, mown, fertilized and otherwise maintained as necessary to provide high quality lawn, suited to its uses. Such is the case with the inner grassed areas of the central campus which is mown with a catcher.
- In low-use areas, irrigation, fertilization, mowing and maintenance should be reduced.
- Good drainage is essential to turf health. Identify prolonged wet spots and rectify with sub-surface drainage installation.
- Outside the lawn maintenance zones, plant deep rooting, drought tolerant grass varieties and planting or seeding of "Mowless" type grasses. A *Microlaena* lawn has recently been sown on University Creek. The use of tufting type native grasses may be more appropriate in some areas.
- More sustainable grass and turf management practices should be explored across the Campus, including limiting the use of fertilizers and developing an irrigation masterplan to determine a strategic and water efficient approach to irrigation on the site.

Compaction

On occasion where compaction of turf areas cannot be managed through prevention, and the quality of turf is declining (usually due to poor drainage), special machines that remove cores of soil, make slits or grooves or spike holes must be used. Perform all these operations as often as necessary when turf is in active growth in summer (but not when temperatures are extreme or there are drying winds). Following these procedures, turf may require more frequent watering to offset the increase in evaporation.

Topdressing

Topdressing is a thin layer of growing media applied to turf. Components are usually sand but whatever is used it *must always be more free-draining than the growing media under the turf and should always have the same consistency over consecutive applications*. Topdressing over time and properly applied will fill hollows and provide a smooth finish. The addition of free-draining sand will also improve drainage and infiltration and therefore improve turf health. It is an operation suited to all High Traffic areas and less so to large expanses of passive recreation law.

2.13 Soil management and mowing for Turf in Passive Recreation Areas

Soils in passive areas require the provision of moderate resistance to compaction. In these areas a sandy loam 'turf underlay' topsoil mix is suitable. This soil mix provides a high water holding capacity reducing the requirement for watering during dry periods.

Example components are:

Medium-coarse grade washed sand	30-50% by volume	e.g. 5 parts washed sand/4 part sitesoil or sandy loam/1part compost
Sandy loam soil or site soil	40-60% by volume	
Composted soil conditioner conforming with AS4454	10% by volume	

To ensure that the density of the grass sward and the height of the grass in passive recreation areas are maintained:

Turf in Passive Recreation Areas - Work Required	Frequency
Remove litter before mowing	At each mowing
Cut grass height must not be less than 50mm or greater than 80mm high. Do not remove more than 50% of the grass height at any one time.	Spring – every 6 weeks Summer – every 5 weeks Autumn – every 6 weeks Winter – every 12 weeks
Clippings to remain where they fall except when near drains or footpaths	At each mowing

2.14 Soil management and mowing for Turf in in Sports Fields

Sports turfs require a sandy root zone soil for rapid drainage which contains a minimum amount of silt and clay to

provide a reasonable cohesion and water holding capacity. The main requirement being that the rootzone allows for rapid removal of rain or irrigation water so that play is interrupted for the shortest time. The infiltration rate should vary between 150mm/hr (newly laid sports turf) to 50mm/hr after several years of play. An example of the components to use are:

Medium grade clean sand	80-90% by volume	e.g. 8 parts washed
Sandy loam soil or site soil	5-10% by volume	sand/2 parts
soil	5-10% by volume	sandy loam/1
Composted soil conditioner conforming with AS4454		part compost

Base level requirements for sports turf fertilisers are the same as for High traffic areas. Rolling

In addition to the management techniques listed for Turf in High Traffic Areas, sports field turf and specifically cricket pitches will require rolling during preparation of the pitch for a match. Prior to rolling, the lower part of the rootzone must not be too wet or too dry. Rolling must be undertaken only by experienced greenkeepers. Other sports turf types will require rolling from time to time during renovation.

2.15 Weeds in Turf

Many weeds in turf are controlled by regular mowing and others are encouraged when lawns are cut too low, as is Bindii – the most common and unpleasant weed in turf. Where Bindii (*Soliva pterosperma*) occurs in the lawn raise the mowers cutting height. Bindii also prefers acidic, low- nutrient soil, so apply dolomite at the rate of one handful per square metre in autumn and fertilise turf with a handful of poultry manure per square metre in spring, summer and autumn.

2.16 Native Grasses

Native grasses are a viable alternative to lawn grasses where areas are only used occasionally. Many native grass species are capable of being mown infrequently and just as mowing helps to increase the sward of lawn grasses, it has the same effect on native grasses.

A distinction must be made between native grass areas on campus that are intended to be walked and sat upon (as these may require mowing) and those which are purely ornamental. Where native grasses are for ornamental purposes only, a larger selection of species can be used.

The advantages of native grasses over exotics grasses are that they require less water and fertiliser and less frequent mowing.

To ensure that native grasses are maintained in a way that supports their survival and persistence in the landscape

Native Grasses - Actions Required	Frequency
<p>Mow all areas of native grasses flatter than 3H:1V.</p> <p>Do not mow during flowering and seeding. Where mowing is required at this time, mow in a pattern that allows sections of at least 50% of any given area to persist with flowering seed heads. Maintain length not less than 200mm.</p>	<p>Minimum of once per year to a maximum of two times per year</p>
<p>Native Grass Areas steeper than 3H:1V (and including all other areas where burning may replace mowing as a management tool) may be maintained by controlled / planned fire according to ecological and catchment requirements; in some communities, no planned fire will be applied, but in other areas fire will be applied within a defined fire frequency range and prescription. The action must be co-ordinated with Roads and Maritime, Rural Fire Service and Local Council.</p>	<p>As required during the controlled burn season as established by the Rural Fire Service</p>

3 All Areas of the Campus

3.1 Disease and Insect Control

Always consider biological and non-chemical controls in favour of chemical controls in the first instance because the margin for error is far greater with chemicals. For example most insecticide will also harm beneficial insects as well as the target species.

For a comprehensive reference to the identification, diagnosis and control of pests and diseases refer to *“What Garden Pest or Disease Is That? Organic and Chemical Solutions for Every Garden Problem”* by Judy McMaugh 2000 New Holland

3.2 Irrigation

Water sensitive urban design principles must be applied in order to minimise the use of potable water. This may include:

- Falling pavements to landscape or grass areas or by introducing permeable pavements
- Harvesting stormwater from nearby buildings for storage and later use for the irrigation of the sports fields
- The use of sub-surface irrigation in order to reduce the use of water.
- The use of bio-retention

4 Protective Measures

4.1 Protection of Existing Vegetation

Existing vegetation and newly planted areas need protection during construction and establishment. During construction and establishment periods, temporary fencing should be placed at the extent of area to be protected, preferably beyond the drip-line of trees to be protected.

The fencing methods should include flagging tape, stakes and temporary fencing, clearly identifying the area to be protected and restricting pedestrian and vehicular access to the protected zone.

Following completion of the construction period (including establishment), all temporary works should be removed when they are no longer required.

4.2 Tree Protection

The relevant Australian Standards are:

- *AS 4970 Protection of trees on development sites.*
- *AS 4687 Temporary fencing and hoardings*

4.3 Erosion, Contamination and Sedimentation Control

During construction, all precautions necessary should be undertaken to prevent erosion, contamination, and sedimentation of the site, surrounding areas and drainage systems, including but not limited to the following:

Construction of temporary drains and catch drains

- Diversion and dispersal of concentrated flows to points where the water can pass through the site without detrimental impacts
- Construction and maintenance of silt traps to prevent discharge of scoured material to downstream areas
- Stabilisation of exposed soil surfaces (e.g. through sterile grass seeding, erosion control meshing, or mulching using vegetative material removed from the study area)
- Use of erosion and sediment control measures to collect sediment and to reduce flow velocities
- Construction of temporary fencing
- Regular monitoring and maintenance of all erosion and sediment control structures throughout the construction and operational phases of the development to ensure their effective function.

4.4 Tree Removal and Disposal of Vegetation onSite

Any vegetation, topsoil or other materials not identified for re-use shall be either disposal of off-site or in an area where the material will not wash into existing vegetation.

5 Monitoring and Reporting

Regular inspections of all landscape areas should be undertaken by Campus maintenance team to ensure that maintenance is carried out according to the plan. The inspections should not be less frequent than three (3) monthly (or immediately after high rainfall/wind/heat events) with the objective that all areas are visited at least once within that period and an inspection checklist prepared and filled out during each inspection and a Three Monthly Maintenance Audit Form. As well as open space currently in use, the inspection should include the ongoing protection of all existing vegetation and new revegetation works during its establishment period.