



University of Wollongong

Landscaping Design Guidelines and Standards
4 November 2015
Version 6

VERSION CONTROL SYSTEM

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1 CONTENTS

- 1.0 INTRODUCTION4
- 2.0 THE LANDSCAPE DESIGN PROCESS5
- 3.0 LANDSCAPE DESIGN GUIDE LINES7
 - 3.1 General7
 - 3.2 Safety and Accessibility7
 - 3.3 Existing Environment.....7
 - 3.3.1 Trees and Vegetation7
 - 3.3.2 Damage8
 - 3.3.3 Soil Compaction and Tree Protection.....9
 - 3.3.4 Existing Services9
 - 3.3.5 Earthworks.....10
 - 3.4 Soft Landscape12
 - 3.4.1 Soils12
 - 3.4.2 Grasses.....13
 - 3.4.3 Plants14
 - 3.4.4 Mass Planting Beds (Shrub Beds)16
 - 3.4.5 Mulching.....17
 - 3.4.6 Staking and Tying.....17
 - 3.5 Hard Landscape17
 - 3.5.1 Paving17
 - 3.5.2 Edging.....18
 - 3.5.3 Retaining Walls18
 - 3.5.4 Fences and Screens18
 - 3.5.5 Decking.....18
 - 3.5.6 Steps19
 - 3.5.7 Balustrades / Handrails.....19
 - 3.5.8 Tactile19
 - 3.5.9 Tree Guards and Tree Grates.....19
 - 3.5.10 Lighting19
 - 3.6 Irrigation.....20
 - 3.7 Furniture20
 - 3.8 Carparks and Roundabouts.....20
 - 3.9 Watercourses and Waterbodies21
 - 3.10 Child Care and Children’s Play.....21
 - 3.11 Podium and Rooftop Landscape.....21
 - 3.12 Green Walls22
 - 3.13 Public Art22
- 4.0 MAINTENANCE22
 - 4.1 Effective Maintenance Design22
 - 4.2 Landscape Maintenance Periods23
- 5.0 AUSTRALIAN STANDARDS23
- 6.0 WORKS AS EXECUTED DOCUMENTATION.....24
- 7.0 LANDSCAPE DOCUMENTATION24
 - 7.1 Landscape Drawing Standards24
 - 7.2 Landscape Construction Details.....24
- 8.0 LANDSCAPE CONSTRUCTION DETAILS25

1.0 INTRODUCTION

The University of Wollongong (UOW) is recognised nationally and internationally for the quality of its landscape and external environment. The landscape enables the campus users to study, recreate, meet and relax in a stimulating, natural surrounding that fosters inspiration and contemplation.

The Campus' landscape success is due in no small part to its strong and consistent relationship with its immediate and local surrounds being the Illawarra escarpment with its natural geology and diverse plant communities and the coastal plain with its urban development and rugged coastline.

This document has been prepared to assist designers, UOW staff, builders and landscape contractors to design, document, construct and maintain the landscape (new and existing) to the highest of standards in keeping with the vision of UOW.

The design and construction of the landscape should be carefully considered to ensure that it serves UOW's intended purposes and shall consider as a minimum:

- Amenity and distinct landscape character for recreational areas.
- Solar screening and access.
- Direct the flow of pedestrian and vehicular traffic along paths and roadways.
- Safe and accessible areas for all users of UOW grounds.
- Habitat for wildlife.
- Noise reduction and privacy.
- Visual stimulation and creation of interest.
- Definition of boundaries between two or more facilities.
- Screening of undesirable objects from view and reinforcement/retaining of designable views.
- Maintain predominant plantings of local Australian native plant species.
- Personal and property safety.
- Maintain existing themes and ambience of the Wollongong Campus.

This design standard outlines the design requirements for landscaping at UOW. The landscape designer shall use these standards as a basis for the design. However, it is incumbent upon the landscape designer to ensure that the design is suitable for the purpose of the area, is cost efficient and complies with all relevant building codes, regulations and Australian Standards.

2.0 THE LANDSCAPE DESIGN PROCESS

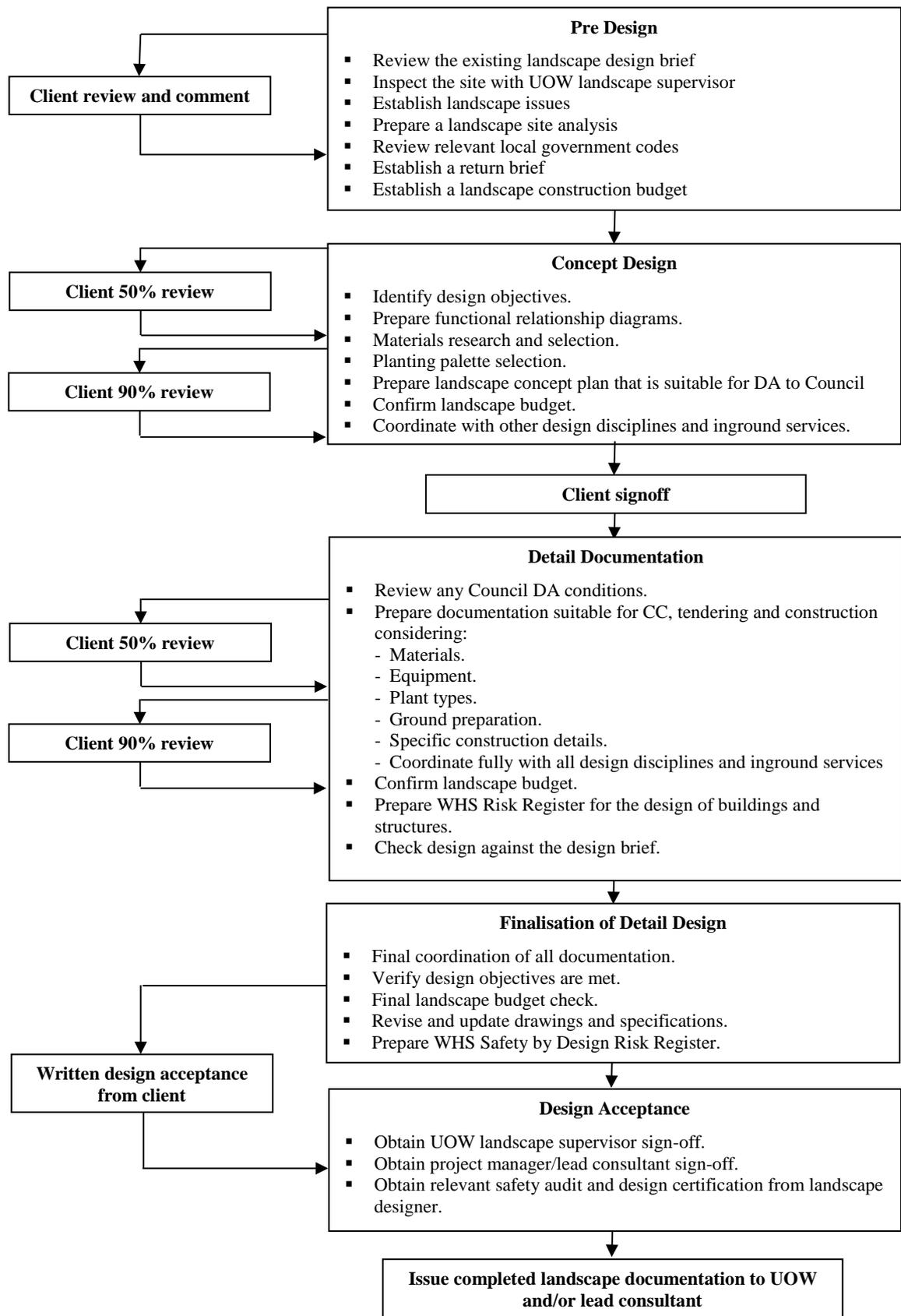
This section provides a general overview of the landscape design process. Each project will be slightly different depending on the design team and specific UOW requirements.

Please refer to the UOW Documentation Standards available on the UOW website.

It is essential that the landscape design process be completed in collaboration with the UOW and design team. The landscape designer is to ensure that all the landscape documentation is fully coordinated with all other design disciplines involved with the particular project – the landscape designer must be proactive in this regard.

The flow diagram on the following page sets out the various stages of the landscape design process and the relationship to the client being UOW.

Design Process Flow



3.0 LANDSCAPE DESIGN GUIDE LINES

3.1 General

The landscape designer shall adopt a holistic approach to designing new landscaped areas. This will ensure consistent aesthetics and quality of the landscape throughout the UOW campus. The landscape design shall be in accordance with all relevant building codes, regulations, government approvals, regulations and standards (UOW, Australian and international).

3.2 Safety and Accessibility

The designer shall consider safety aspects when developing all landscape designs. The designer shall implement the following:

- Position trees to ensure minimum clearance requirements for services and sight lines are maintained.
- Position trees to ensure they do not conflict with existing or proposed buildings.
- Choose appropriate plants with consideration given to the purpose of the area (e.g. do not place shrubs with sharp or spiky foliage in areas such as pathways and playgrounds where they may cause injuries).
- Ensure that the design does not restrict or interfere with access and egress.
- Ensure that the design considers disabled access requirements.
- Ensure that the design does not form a complete screen or enclosure where pedestrians may feel vulnerable and hiding spots are removed.
- Position trees and plants to ensure that they do not conflict with existing or proposed security measures (particularly CCTV security).
- Incorporate CEPTED design principles as part of the design process.
- Prepare a [WHS Risk Register for the Design of Buildings and Structures](#).
- All pedestrian pathways and travel routes shall comply with all sections of AS1428 Design for Access and Mobility.

3.3 Existing Environment

It is important that the designer considers the impact on the existing environment of the new landscape and building work.

3.3.1 Trees and Vegetation

UOW has an Arborplan Treescap database that identifies the majority of trees across the UOW campus. The designer is to liaise with the UOW Landscape Supervisor during the early design process to assess which trees / vegetation may have to be removed or disturbed.

During the design process, the designer shall assess and record information for all existing trees showing: species type, size (height, canopy spread and trunk circumference) and location. When established trees are designated for retention in development areas the canopy, trunk and roots shall be protected from damage to the satisfaction of the UOW Landscape Supervisor.

A decision to retain, prune or remove plants shall be made in the initial design stage with full recognition of their value, potential costs, advantages and disadvantages, and alternative design strategies available to retain the plants. All tree removal and/or retention is to be approved by the UOW Landscape Supervisor.

If damage to the roots is likely to eventually kill a tree then removing the tree before work starts will avoid the difficulty and expense of later removal.

All trees that are agreed to be of poor quality are to be identified and shown to be removed as part of the design process.

The designer shall carefully consider retention of large trees in confined areas such as courtyards in view of future safety and ongoing maintenance implications.

In planning new landscaped areas, the appeal and value of the area can be greatly enhanced by retaining existing vegetation (both mature and semi-mature specimens). Techniques for achieving this include:

- **Road and Footpath Alignment** – where good stands of trees occur, vary the alignment of roads and services to avoid the trees;
- **Traffic Islands** – dense stands of medium sized trees may be retained in adequately sized islands between carriageways or on roundabouts;
- **Laneways** – design laneways wide enough to accommodate services, existing vegetation, paths and overland stormwater requirements;
- **Landmarks** – design landscape layouts to use landmark trees for orientation and aesthetic effect, for example at the top of a hill or in a roundabout.
- Consider the use of root control barrier between trees and newly constructed services, roads or footpaths.

Retained vegetation often requires remedial action for drainage, aeration and irrigation. It is generally preferable to retain trees in a group in a large island rather than a single tree in a small island as long as the quality of the trees is of a consistently high standard.

3.3.2 Damage

Damage may occur to vegetation during the landscaping works. Damage generally occurs through physical disturbance of the area, incorrect chemical applications or through changes to existing drainage systems.

Typical damage to vegetation may involve:

- Severed roots caused by excavation and trenching for underground services, kerbs and gutters and footings.
- Suffocated feeder roots caused by filling.
- Drought or water logging of the root zone caused by changes in the drainage system.

- Physical damage to roots, suffocation and drought of the root zone caused by compaction.
- Chemical damage caused by engine oil leaks, hydraulic fluid and other chemicals that are taken up by roots.
- Physical damage to trunks and branches can facilitate the entry of disease and decay.

3.3.3 Soil Compaction and Tree Protection

The simplest and most effective protection for trees during landscaping works is fencing out construction activity. The fences shall be maintained for the duration of the project and shall only be removed when essential activity such as final landscape shaping is being undertaken.

Maintenance access to each tree shall be considered at the design stage. As a general rule, feeder roots grow in the top 150–300 mm of the soil. This feeder zone can extend two to seven times the diameter of the canopy drip line (the drip zone).

Site sheds, building materials or vehicles are not be placed within the drip zone of existing trees. The drip zone shall be fenced off, and all trees must be protected from compaction within the feeder zone. Heavy machinery shall not be allowed in this area.

Where soils have been (or may be) compacted, the designer is to detail how soils are to be ameliorated and consider cultivation, addition of organic matter, clay breaking additives and so on.

3.3.4 Existing Services

Conflict between plants and existing UOW infrastructure such as power lines, water pipes, street lights, paving, kerbs and signs shall be avoided where possible. In developing the landscape design, an awareness of the location of existing services is essential. UOW has a database and plans of service corridors throughout the Campus which the designer is responsible for obtaining and considering as part of the design process.

Conflicts may result in:

- Increased maintenance costs.
- Reduced longevity of the trees and loss of aesthetic value.
- Reduced public safety.

Beneath power lines, plant only trees that will not encroach upon the acceptable safe distance from the power lines when mature. A corridor of 10 metres either side of the power lines should be maintained.

A clear line of sight shall be provided to signs, lights and driveways. Low branching or weeping species shall not be selected for use near these items.

Signage is to be designed and coordinated with the landscape and planting design.

Where possible, trees shall be planted the maximum distance available away from kerbs, driveways and footpaths to reduce root interference. A one metre minimum clearance (for desirable deep or fine rooted smaller trees), and a root barrier shall be installed to reduce the impact of a tree's vigorous root system.

When planting trees near buildings, species selection is important. The designer shall consider the mature size of the tree and its root system. Where possible, planting trees close to buildings (within three metres) shall is to be avoided.

Trees with vigorous root systems are able to penetrate and interfere with underground services such as stormwater and sewer mains, and underground cabling such as telephone and electricity lines. Damage to these services can sometimes be reduced by the installation of root barriers. Root barriers may not be effective where water leaks out of pipes. Careful species selection is therefore essential. The designer shall select trees that do not have vigorous root systems within service easements.

3.3.5 Earthworks

Excavations and level build-up around trees shall be minimised and avoided where possible. Level changes within the feeder zone of a tree will affect tree health. Some species are better able to recover from level changes than others.

Root systems can be given some advance preparation to reduce the impact of a project involving a major change in ground level. A lead-time of at least one (1) year is necessary to make this effective. Up to 50% (depending on species and age of tree) of the roots that will be affected by the project shall be severed and new root growth encouraged within the area that will not be disturbed.

3.3.5.1 Fill or Level Build-up

Where level build-up is necessary, the fill soil should be the same (or a coarser) texture as the original surface soil to ensure that downward capillary water flow is not affected. If the ground is heavily compacted, soil aeration should be performed before the fill soil is added. Methods of decompaction are to be detailed as part of the landscape design.

Where the change in level is no greater than 100 mm and is restricted to one side of the tree, no specific action is required.

Drainage and aeration shall be provided when either of the following situations occurs:

- Fill depth is greater than 150 mm on one side of the tree and within the drip zone.
- Fill depth is greater than 100 mm within the feeder zone on all sides of the tree.

3.3.5.2 Excavation

The following factors should be considered before performing excavation that may interfere with the root system of a tree:

- Species and age of the tree.
- Size and stability of the tree.
- Depth and location of the excavation.
- Percentage of roots being severed.

Excavation occurring on one side of the tree, halfway from the drip line to the trunk will eliminate about 30% of the feeder roots. Healthy trees should be able to recover from such a loss if proper care is taken to nurture the tree after the works have been completed.

When a project requires excavation around a tree, the designer shall implement the following guidelines:

- All works are to be completed by a fully qualified Arborist approved by UOW.
- Make the design documentation adaptable and take into account root locations identified during construction.
- Do not excavate within the feeder zone of mature native tree species except where work is on one side of the tree only and outside the drip zone.
- Do not excavate within 1 metre of the tree trunk. If the entire area around the tree is lowered more than 150 mm the tree may not survive unless soil is returned within an appropriate distance of the trunk (This distance will depend on the species, rooting pattern, and soil and moisture conditions at the site).
- Where possible, the original level shall be maintained. Terracing can be implemented to accomplish this.
- All work within the drip zone shall be performed by hand.
- Do not sever large roots (>30 mm diameter) closer than halfway from the drip line to the trunk.
- Cut all roots cleanly with equipment that is specifically designed to cut roots.
- Protect roots that are exposed during excavation from desiccation.
- Do not use heavy machinery within the feeder zone.
- As part of the construction process, the UOW Landscape Supervisor and Landscape Designer are to inspect the works at the start and completion of the works. The project Arborist is to submit a detailed report documenting the works completed and submit the report to the UOW Landscape Supervisor.

3.3.5.3 Trenching

Service trenches shall be placed as far from existing and proposed trees as possible. If services must be placed inside the drip line of a tree then tunnelling beneath the tree is preferable as it is less disturbing to the root system than tunnelling to the side. Trenching inside the drip line will seriously injure and possibly kill the tree. All work is to be completed by hand under the supervision of the project Arborist.

3.4 Soft Landscape

3.4.1 Soils

3.4.1.1 Existing Soils

A range of soils existing across the UOW campus depending on the underlying geology and existing topography. Where site topsoil is proposed for reuse then the landscape designer is to document that soil testing is to be undertaken by a UOW approved soils testing agency. The recommendations of that soil testing are to be included within the landscape design documentation for implementation by the landscape contractor.

3.4.1.2 Soil Selection

Soil selection for plants is an important factor when designing landscaped areas. The selection of soil can mean the difference between a poorly performing landscape and a thriving landscape.

Imported soils and mixes are to meet the relevant Australian Standards.

Where the existing soil cannot provide plants with sufficient nutrients and water penetration for their survival, the soil shall be improved or soil imported to supplement the existing soil. Where importing soil is not an option, soil tests may indicate the most effective way to improve the soil.

Construction waste/debris/fill is NOT to be used as landscape soil.

3.4.1.3 Structural Soils

The designer shall implement the use of structural soils to replace existing soil in areas where soil structure and composition is of poor quality for plant growth and where existing trees have struggled and performed poorly. Structural soils are also to be used to support tree planting within paved areas.

Structural soil material is typically a gap-graded crushed rock combined with a clay loam soil and a stabiliser. The blended material creates a ratio of soil to rock that can be compacted in accordance with standard specifications for sub-base materials and still provide soil-filled voids between the stones where roots can penetrate freely.

The soil component allows for adequate nutrient, water holding capacity and air movement. The material will not provide aeration or drainage unless particle size distributions are carefully specified and graded.

Adequate drainage shall be installed with structural soils. The ratio of soil to stone materials is critical and is determined by local climatic conditions, landscape treatment i.e. pathways or carparks, and plant selection.

3.4.1.4 Soil Drainage

The designer shall minimise disturbance to soil moisture levels. A change in moisture levels may cause a decline in vegetation health due to an increased susceptibility to pests and diseases. This will often lead to plant death.

Changing the ground level commonly disturbs surface drainage. This may divert water away from root systems or increase runoff and lead to water logging or collar rot.

Sub-soil drainage is affected when substantial areas of hard paving or buildings are placed near vegetation, where areas surrounding vegetation are heavily compacted, or where major changes to ground level occurs. Sub-soil drains shall be used where excess water is likely to be a problem. The landscape designer is to fully coordinate the subsoil drainage layout with the relevant design team member (generally the civil engineer).

3.4.2 Grasses

The designer shall consider the following when designing grassed landscape areas.

3.4.2.1 Irrigated Grasses

Irrigated grass areas have high maintenance costs and shall be limited to areas subject to high usage or to areas with specific visual and design significance.

Requirements for irrigated grass:

- Turf base for use to establish grassed areas is to be appropriate to the existing ground conditions and typically an 80:20 (sand:organic matter) mixture.
- Areas shall have grades of no less than 1:70 and be able to drain without ponding.
- Areas shall be easy to mow with appropriate equipment and machinery.
- Irrigated grass shall not have tight corners or be steeper than 1:6.
- Mowing obstructions shall be positioned to allow the easy manoeuvring of ride-on equipment (a minimum clearance of 2.7 metres shall be allowed in most areas, with a 2 metre clearance

allowed in tight developments where smaller machinery is acceptable).

- Where shrub and tree planting (including low branches) does not allow clearance for mowing equipment, it is preferable to incorporate planting into a mulched bed (self-seeding trees may be a problem in these locations).
- Paths or barriers to partition off narrow sections of grass are not desirable but paths can be positioned to define the edge of irrigated grass.
- Hard surfaces, mulch, granite or shade tolerant ground covers are preferred for shaded areas.

3.4.2.2 Dryland Grasses

Dryland grass shall be used in areas low usage or where aesthetics are not a top priority. The surface shall be level and smooth.

Grass shall not be sown on slopes greater than 1:4, areas with less than a 3 metre clearance, acute corners or in other difficult to mow areas.

Obstructions in dryland grass shall be spaced far enough apart for mowing by 2 metre wide equipment.

Bitumen and straw mulch shall be used to assist in the establishment of grass and reduce erosion on sloping surfaces.

3.4.2.3 Native Grasses

The use or retention of native grass and herb species is encouraged. Native grass plantings that are mulched shall be maintained with mulch at a depth of 50–100 mm. All bare areas should be covered and finished level with or below the level of adjacent footpaths, roads and kerbs.

3.4.2.4 Grass Species and Applications

Situation	Grass Species
High profile turf areas: - Shade - Sun	Soft Leaf Buffalo Legend Couch
General turf areas	Kikuyu
Native grasses (seed and tube stock)	Local native grasses such as Kangaroo Grass, Mat Rush, Carex, Tussock Grass, Flax Lily

3.4.3 Plants

Plant species shall be chosen carefully to suit the intended purpose; otherwise the plants can detract from the space or even not survive.

Plants can provide screening from prevailing environmental conditions such as high winds and also from roads or buildings. Careful consideration shall be given to the selection of species and its appropriateness for providing a screen. Selection of species shall also take into account the surrounding

plant species, so that ~~trees~~ plants blend into the surrounding environment when mature.

Where possible, screen planting for future developments shall be carried out several years before construction of the development so that the plants have time to mature to fulfil their screening role.

Correctly designed planting can fulfil the following functions within a landscape:

- Provide shade.
- Introduce visual interest.
- Provide screening and wind breaks.
- Divide the space into a series of spaces.
- Provide habitat for wildlife.
- Add scale to an open space and define that space.

3.4.3.1 Plant Selection

Plant species for use in UOW grounds shall be chosen carefully. Designers shall consider the site conditions, the mature size of the plant, maintenance requirements and design intent when selecting plants. Plants shall be predominantly Australian Native species.

The following shall be considered when selecting plants:

- Refer to the UOW Environmental Management Plan (EMP).
- Plants should be 100% Australian native with approximately 50% of these being local to the Illawarra Escarpment and coastal plain.
- Selection of an appropriate species for its intended purpose.
- The mature height and crown spread of the tree.

The following shall be considered when designing planted areas for a new landscape:

- The tree and plant spacing. Different types of ~~tree planting~~ plants have different spacing requirements, especially in areas of dense planting such as wind breaks, screening and forward tree planting.
- Clearances from above and below ground services, as well as new and proposed buildings.
- Sight lines for both pedestrian and vehicular traffic.
- Access for mowing and other maintenance vehicles.

3.4.3.2 Protection of Existing Infrastructure

The use of root barriers provides protection to the surrounding infrastructure against disruption from tree roots, with minimal impact on the tree. Properly installed root barriers protect pavement, footings and kerbs from cracking and lifting caused by certain tree species.

Root barriers shall be installed vertically in a continuous length in a narrow trench dug on the tree side of the pavement or kerb with the top edge flush with the finished ground surface. If a ribbed root barrier material is used, then the root barrier shall be positioned so that the ribs run vertically. The trench should be backfilled and tamped sufficiently to avoid later subsidence. The barrier should not be torn or pierced.

3.4.4 Mass Planting Beds (Shrub Beds)

Shrub beds form an integral part in the landscape on the UOW campus. If properly designed and maintained they provide amenity and quality to the area.

Shrub beds provide spatial definition, visual interest, treatment of slopes, cohesion in the space, fauna habitat & refuge and a setting for buildings.

The designer shall consider the following when designing ~~shrub~~ mass planting beds:

- Irrigation of shrub beds beneath eaves or other overhangs.
- Plants shall be spaced at a distance approximately three-quarters of their mature width unless forming a screen, in which case they shall be planted closer.
- Mass planting beds are ideal on steep slopes that are otherwise unsuitable for grass cover and in heavily shaded areas or areas that are difficult to mow (maximum gradient of 1 in 3).
- Mass planting beds reduce erosion caused by storm water.
- Mass planting beds require adequate surface fall to drain excess water.
- Avoid placing beds in low-lying areas where water cannot easily be removed.
- Avoid creation of areas that may encourage undesirable activities such as hiding and loitering.
- Future vehicular access for mowing, litter removal, tree surgery, pest control and other maintenance.
- Large shrub beds require relatively high levels of maintenance.
- Avoid the use of spiky shrubs near pedestrian areas, child care areas and high litter areas.
- Mass plantings next to paths, buildings, lawns and fences shall have a minimum clearance equal to their mature drip-line radius.
- Mass planting beds can provide windbreaks where winds are likely to make the area unpleasant.
- Avoid obstruction of access to manholes, valves etc.

- Lines of sight for vehicles particularly at car park entrances and pedestrian crossings;
- Bushfire control and Asset Protection Zone requirements.

3.4.5 Mulching

3.4.5.1 Principles

The type of mulching material to be used for planting areas shall be selected on the basis of its general purpose and location of the bed within the environment.

When applying mulch to newly constructed shrub beds, it shall be applied so its settled depth is 75mm. This will prevent most seed germination in the soil. Fine mulch shall not be used as it is prone to being either blown or washed away and decompose too rapidly. Fine mulch also forms a layer that denies access to water into the soil.

3.4.5.2 Types

Organic Mulch:

- Leaf mulch and woodchip produced by the UOW.
- Leaf litter mulch commercially available from landscape supply companies.

Inorganic Mulch:

- Decomposed Granite shall be used in low maintenance areas where some pedestrian traffic across the shrub beds is expected. Decomposed granite shall not be used as mulch on sloping sites greater than 1:30 or in areas where loose material can spill onto pathways.

3.4.6 Staking and Tying

Juvenile trees may require support to protect them from wind, vermin and vandalism. Staking shall be provided to protect juvenile trees with the support they need to develop into mature trees.

3.5 Hard Landscape

3.5.1 Paving

Hard paving surfaces form part of the landscape features for UOW. Paving materials shall be selected to ensure aesthetics and quality is consistent across the UOW campus. A unit paving is to be used generally for all footpaths across the Campus. Stone tiles are utilised at building entries and at areas of high priority.

Permeable paving is useful where a hard surface is required to be installed near trees. Structural soils and permeable paving, used together, allow water to filter through the paving surface to the soil layers below, providing water and nutrients to the plant's root system while still providing a hard wearing, trafficable surface.

The permeable paving may be pavers with porous material between, special pavers or gravel stabilised with epoxy resin or other bonding agents. Permeable pavers are similar to normal clay and concrete pavers but contain a series of drainage holes in the surface of the pavement. After installation the drainage holes shall be filled with a freely draining material. Adequate drainage shall be installed with permeable paving.

Sand is not to be used as a bedding for paving across the UOW Campus.

3.5.2 Edging

Grass edges shall be stable and able to withstand traffic by maintenance vehicles. They must also be able to withstand mechanical grass cutters.

Both curved and straight edging forms are used across the Campus – curved edging is to have smooth even curves with no flat spots.

Concrete and galvanised steel edging are suitable materials to be used.

3.5.3 Retaining Walls

Retaining walls are to be constructed at no more than 900mm in height from the adjacent finished ground level. Two types of retaining wall systems used include brick retaining wall and timber sleeper retaining wall.

Gabion walls will also be considered in certain circumstances.

Subsoil drainage surrounding by a free drainage material is to be installed to the back of all retaining walls to ensure that all water can drain away freely. Subsoil drainage is to be connected to the Campus stormwater drainage network.

3.5.4 Fences and Screens

Fencing and screening throughout the Campus is used on property boundaries or to provide a visual barrier for privacy or to screen undesirable views such as rubbish bins or service areas.

Solid fencing shall be metal Colorbond and range in height between 900mm and 2400mm in a 'Woodland Grey' colour or approved equal.

Screens shall be constructed with a steel frame structure and finished in a satin black powdercoat colour. Timber battens shall be fixed to the front of the steel frames so that the fixings are not visible from the front of the screen.

3.5.5 Decking

Timber decking is used to provide seating opportunities to areas under tree canopies as well as performance spaces for students and staff alike.

Where timber decking is used underneath existing tree canopies, a screw pile system should be used as a sub structure for the timber deck. The screw

piles are to be installed so that they do not obstruct the existing root structure of the tree.

For all other decks, steel bearers are to be used with timber joists and large format timber decking boards that are screw fixed in place

3.5.6 Steps

Steps to all outdoor landscape areas are to be of precast concrete construction. An aluminium and carborundum nosing piece is to be cast into or fixed into the front edge of each step. Steps are to be manufactured by a specialist precaster to be approved by UOW.

3.5.7 Balustrades / Handrails

Stainless steel handrails are to be installed to all stairs and pedestrian ramps in accordance with AS 1428.

3.5.8 Tactile

Tactile indicators are to be installed to all pedestrian ramps, stair landings and kerb ramps as required by AS 1428.

3.5.9 Tree Guards and Tree Grates

Tree grates protect the root system of the tree in paving and add a decorative element. When selecting a tree grate ensure that the grate can be adjusted to accommodate the growth of the trunk.

Tree grates shall be installed for existing trees in areas of high pedestrian or vehicular traffic. New trees should not be planted in areas of high pedestrian or vehicular traffic.

Newly planted trees in open space areas shall be protected with plastic tree guards where plant size is tubestock. These guards protect the trees from vermin, make the small trees visible and create a microclimate with the guard. The guards are generally placed around the tree with three supporting stakes and the area around the tree is mulched for a 1000mm diameter.

3.5.10 Lighting

Lighting to landscape areas is installed for both functional and aesthetic reasons. Pedestrian access areas are to be well lit to provide a safe and secure environment and to comply with the relevant Australian Standards and lighting codes.

Lighting is to be integrated with the landscape design as part of the design process.

Post top lighting is used along pathways, bollard lighting only as decorative low level path lighting and uplighting for signage, feature trees and visual features.

3.6 Irrigation

Irrigation is generally not used across the UOW Campus landscape except for:

- Watering of raised landscape areas on building podiums.
- Watering of feature lawn areas on grade.

Subsurface drip systems are recommended for raised podium landscape areas (mass planting and turf) while a pop up sprinkler system is desirable for feature lawns on grade.

The designer is to ensure that all coordination with hydraulic, drainage and electrical consultants is completed to ensure the success of the system.

All irrigation is to be installed by a UOW approved specialist subcontractor.

3.7 Furniture

A range of furniture is currently used in the landscape areas across the UOW Campus. Furniture includes seating, table seat combinations, rubbish bins, bicycle racks, water bubblers / refill stations.

Particular furniture types are to be confirmed with the UOW Landscape Supervisor.

Locations of furniture should consider pedestrian traffic, exposure to weather and climate, safety and appreciation of views where applicable.

3.8 Carparks and Roundabouts

Trees and plants planted along roadsides and in carparks often suffer stress from lack of water and air. When trees do grow well, the road or carpark surface is often damaged by the root system. Providing more space around the tree shall reduce this problem.

The designer shall consider the following when designing landscaped areas for roads and carparks:

- Fast growing, large trees have the most potential to disrupt hard surfaces;
- Trees with nuisance litter drop such as fruit or sap are not suited to roadside or carpark planting.
- Ensure that plants have access to adequate moisture and air. The area shall be ventilated properly with air and moisture pipes. Permeable paving and structured soils can be used to help achieve this.
- Ensure that a root barrier is installed when trees are planted close to hard surfaces.
- Avoid the use of hard surfaces too close to the trunk, which may cause girdling as the tree grows.
- Provide adequate watering points through the landscape. Hosetaps should be located at 30 metre centres.

3.9 Watercourses and Waterbodies

The designer shall consider the following when designing streams and ponds:

- Uniform grades for pedestrian safety.
- Ponds and streams shall not create environmental hazards.
- Ponds and streams shall not be located where they will prevent Utility Authorities from gaining access to their mains or services.
- Ponds and streams shall not be located where they will obstruct vehicular or pedestrian access. Where necessary, bridges shall be designed to provide access. Ensure access is suitable for all emergency and service vehicles.
- The maximum depth shall not exceed 3.0 m because of the increased risk of temperature stratification beyond this depth.

The designer shall consider the following when selecting plants for use in ponds and streams:

- The proposed plants shall be able to establish and grow.
- Plants shall be unlikely to colonise outside the proposed area.
- The maximum height of the plants shall be consistent with maintaining desirable visual characteristics around the pond or stream.
- The over-wintering form of a plant shall not cause degradation of the aesthetics of the area.
- Plants shall not grow to a density that would provide habitats suitable for mosquito breeding.

3.10 Child Care and Children's Play

Child care areas form part of UOW's commitment to providing quality childcare facilities. A child's entitlement to play should be recognised and reflected in the range of experiences made available to them.

Where appropriate, a playground and equipment shall be accessible to all persons.

Play areas are to be developed in conjunction with the relevant stakeholders and are to be approved/commented on by Kidsafe (NSW).

The designer is to ensure that the play design will meet the requirements of the independent certifiers that will be required to assess the space.

Natural systems of play that heighten children's experiences and creativity are favoured over play structures.

All play areas are to comply with the relevant Australian Standard.

3.11 Podium and Rooftop Landscape

Landscape development occurs on rooftops and on concrete podiums (over lower building levels) across the UOW Campus. Design requirements in terms of drainage, waterproofing, planting mixes, mulches and plant types are critical in the success of these landscapes. Microclimate plays a key role in plant selection with wind and shade patterns being of paramount importance.

Irrigation to all raised planter beds is essential and should be integrated with a rainwater collection system from the building.

Full coordination of all drainage and services in rooftop / podium gardens is critical to the design process and is the responsibility of the landscape designer.

The form of the raised planter walls should be insitu concrete with integrated colour and finish where possible.

Consider unit paving on pedestals as a system of drainage for paved areas.

3.12 Green Walls

The design and integration of green wall systems is to be considered in appropriate locations across the UOW Campus. Green walls can provide a natural insulation system to buildings and create a visual aesthetic consistent with the UOW landscape character. A system that includes stainless steel wiring attached to walls with climbing plants in ground is preferable to integrated planting wall systems due to ongoing maintenance requirements and performance costs.

Consideration of drainage, water supply and correct plant selection are critical to the success of a green wall system.

3.13 Public Art

The integration of art with the landscape is to be considered as part of the design process.

Art may take any number of forms including sculpture, digital media, pattern making, furniture design and so on. The landscape designer is to consider opportunities for public art within the landscape so that the artwork works seamlessly with the overall landscape character.

4.0 MAINTENANCE

4.1 Effective Maintenance Design

It is important that the design produces both a functional and aesthetic environment that can be efficiently maintained.

As landscape environments need ongoing maintenance the following design principles aim to minimise this task:

- Ensure that grassed areas are large enough to manoeuvre ride-on mowing equipment.
- Ensure that shrub beds and grassed areas have adequate surface drainage.
- Plan the placement of trees in lawn areas to ensure efficient mowing.
- Ensure that a mowing edge is constructed against walls and planting beds and finish edges flush with adjacent grass areas to avoid hand clipping.
- Plant trees and shrubs in prepared areas that are suitable for the ground and climatic conditions.

- Ensure that at least adequate distance is allowed between trees and buildings so that they do not impact on each other e.g. restrict root growth, block gutters with leaves.
- Ensure that service easements remain free of trees and large shrubs.
- Consider the use of root control barriers to protect UOW assets.
- Choose plants that are local to the Illawarra, long lived, hardy and require minimal maintenance.
- Design paths and paving to accommodate the desired lines of access and egress.
- Ensure preparation of soil for planting and grassing to enable proper plant establishment.

4.2 Landscape Maintenance Periods

All new landscape elements must be regularly maintained to ensure that the landscape is delivered as designed at the end of the specified landscape maintenance period. All plant material should have good shape and form and display vigorous healthy growth. Garden beds should be weed free with uniform depth of mulch. Hard landscape elements such as paving, walls, planter boxes etc. should be free of defects and meeting landscape design specifications.

Landscape maintenance periods may differ depending on the size and scope of the landscape job. The landscape designer shall determine the appropriate maintenance period length after discussions with the UOW Landscape Supervisor and Project Managers. Unless otherwise specified, the landscape maintenance periods shall be:

Soft Landscape Elements (plants, mulches, turf etc.) = **13 weeks**

Hard landscape Elements (paving, paths, seats, structures etc.) = **52 weeks**

5.0 AUSTRALIAN STANDARDS

The design shall comply with the latest versions of all relevant codes and standards in force at the time of specification. The table below contains a list of some of the relevant codes and standards that will inform the landscape design process.

Issuing Body	Document Number	Title
Australian Building Codes Board	BCA 2006	Building Code of Australia
Standards Australia	AS 1428.1	Design for access and mobility
Standards Australia	AS 4373	Pruning of Amenity Trees
Standards Australia	AS 1924	Playground Equipment for Parks, Schools and Domestic Use.
Standards Australia	AS/NZS 3500.1	Water Supply
Standards	AS 4419	Soils for Landscaping and Garden Use for new soil works

Issuing Body	Document Number	Title
Australia		
Standards Australia	AS 4454	Compost
Standards Australia	AS 4422:1996	Playground Surfacing – Specifications, requirements and test methods
Standards Australia	AS 4685:2004	Playground Equipment
Standards Australia	AS 4486.1:1997	Playgrounds and Playground Equipment – Development, installation, inspection, maintenance and operation
UOW	OHS064.9	WHS Consideration for Design http://staff.uow.edu.au/content/groups/public/@web/@ohs/documents/doc/uow017017.pdf

6.0 WORKS AS EXECUTED DOCUMENTATION

The landscape designer shall arrange for ‘works as executed’ (WAE) documentation to be prepared by the landscape contractor or registered surveyor. The WAE documentation is to be checked and verified by the landscape designer before being submitted to the UOW Facilities Management Division for their records. A complete copy of all the landscape construction drawings and specification in both PDF and DWG format is to be forwarded to the UOW Facilities Management for their records following handover of the project to the UOW.

7.0 LANDSCAPE DOCUMENTATION

7.1 Landscape Drawing Standards

All landscape documentation is to comply with the standard set out in the UOW Documentation Standards FMD-MAI-STA-013. Details can be found on the UOW website:

<http://www.uow.edu.au/facilitiesmanagement/designstandards/index.html>

7.2 Landscape Construction Details

- Unit paving detail (update)
- Typical path plan (update)
- Brick surround to stormwater grate (update)
- Brick infilled pit cover (update)
- Tree planter in paving (update to structural soil)
- Freestanding seat wall (update)
- Retaining seat wall (update)
- Timber retaining wall detail (update)
- Tree grate to existing tree (update)
- Typical planting detail (delete & update)

Timber bench detail (update)
 Turf detail (update)
 Garbage bin detail with paving below (retain & update)
 Timber bollards (retain & update)
 Timber edge to mass planting
 Tile paving
 Stone tile detail
 Concrete stair
 Timber decking
 Handrail
 Concrete edge
 Steel edge
 Mass planting bed (on ground)
 Mass planting bed (disturbed ground)
 Raised planting bed (rooftop garden)
 Raised turf (rooftop)
 Structural soil / tree grate
 Turf Sports fields
 Timber screens
 Advanced trees in grass
 Tree protection detail

8.0 LANDSCAPE CONSTRUCTION DETAILS

Attachment 1	LCD-01: Unit Paving Details
Attachment 2	LCD-02: Path Details
Attachment 3	LCD-03: Brick Surround to Stormwater Pit
Attachment 4	LCD-04: Brick Infill Pit Cover
Attachment 5	LCD-05: Tree Planting Within Unit Paving
Attachment 6	LCD-06: Mass Planting – Natural Ground
Attachment 7	LCD-07: Mass Planting – Disturbed Ground
Attachment 8	LCD-08: Raised Planting Bed (On Slab)
Attachment 9	LCD-09: Lawn Turfing Details
Attachment 10	LCD-10: Turfing Details
Attachment 11	LCD-11: Advanced Tree in Grass
Attachment 12	LCD-12: Tree Protection Detail
Attachment 13	LCD-13: Timber Screen Fence
Attachment 14	LCD-14: Timber Edge – Mass Planting
Attachment 15	LCD-15: Steel Edge – Mass Planting

Attachment 16	LCD-16: Concrete Edge – Mass Planting
Attachment 17	LCD-17: Precast Concrete Stairs
Attachment 18	LCD-18: Stainless Steel Handrail Details
Attachment 19	LCD-19: Freestanding Brick Seating Wall
Attachment 20	LCD-20: Brick Retaining Seating Wall
Attachment 21	LCD-21: Timber Retaining Wall
Attachment 22	LCD-22: Timber Seating Bench
Attachment 23	LCD-23: Precast Concrete Bench
Attachment 24	LCD-24: Timber Bollards