



ENGINEERING DESIGN GUIDELINES

LANDSCAPE

Planning Scheme Policy No. 15.11

DATE POLICY TOOK EFFECT:

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1 General

1.1 Scope

This section sets out the Guidelines for landscape within new subdivisions and on-street works for private developments.

This Guideline contains procedures for the design of:

- On-street landscape works, including buffers mounds, stormwater management measures, traffic islands and roundabouts.
- Public Open Spaces including, signage, furniture and playgrounds.

1.2 Objectives

The objective of this guideline is to define Council's minimum landscape requirements and to assist the designer in achieving the following:

- Visual enhancement of the streetscapes
- Enlargement of the habitat and plant diversity in order to provide a food source for indigenous fauna
- Enhanced living environments by reducing the impacts of noise, fumes and car headlights
- Provision of shade trees
- Crime prevention through environmental design (CPTED)

1.3 Referenced documents

Council Guidelines and Specification

D7 Soil and Water Quality Management
 C273 Landscaping
 D20 Drawings and documentation guidelines
 Mackay City Council - Landscape Performance, Procedures & Style Manual for Development Applications
 Standard Drawings (various)

Australian Standards

AS/NZS 1158.3 Pedestrian area (Category P) lighting
 AS 3500 National Plumbing and Drainage, Part 1.2 Water Supply - Acceptable Solutions

 AS/NZS 4422 Playground Surfacing
 AS/NZS 4486 Playgrounds and Playground Equipment
 AS 4685 Playground Equipment

Other

Qld Government Building Safer Communities – Crime Prevention Manual for Queensland
 Healthy WSUD Technical Design Guidelines for South East Queensland (June
 Waterways 2006)

2 On-Street Landscaping Works

2.1 General

At the time of development, the Designer shall provide all on-street landscape; this shall include street tree planting, grass establishment to road verges and landscape of traffic islands and buffer mounds.

Council should be consulted prior to commencement of the design to ascertain whether there are any site specific design requirements.

Council has plant selection guidelines and suburban planting themes, Designers are encouraged to consult with Council in the preparation of the landscape design.

Landscape plans shall be prepared by a person of professional standing in the field of Landscape Architecture or Landscape Design, at a standard acceptable to Council. However, the Designer of the civil works involved in the development; that is, roads, street lighting, drainage and so on; shall certify that prior to Council's assessment of the landscape design that the design does not impact on the operation or ongoing maintenance of the civil works design as follows:

- Landscape within drainage channels does not reduce design capacities of the drainage system
- Initial and mature species size of street tree plantings does not impinge on intersection and property access sight distances or vehicle operator safety by the establishment of trees within roadway clear zones
- Mature species size of street trees will not affect street lighting standards for either vehicular or pedestrian traffic
- Street tree plantings are to conform to Council's requirements as specified in Section 2.4
- Appropriate provision is to be made for maintenance operations as part of the consideration of any landscape design

The Designer shall incorporate into their design the requirements for both installation and maintenance, especially during the initial "*on-maintenance*" period, as detailed in Council's construction specification *C273 Landscaping*.

2.2 Existing Vegetation

In order to retain any established landscape character, all trees located within existing road reserves shall be protected and retained unless approved otherwise by Council.

Significant trees located within the verge of new road reserves shall be protected wherever possible and where advised by Council. This may require the adoption of non-standard utility service alignments; therefore, Designers are encouraged to discuss proposed solutions with Council.

All instances of trees / vegetation removed without prior consent will result in referral of these matters for action by the Department of Natural Resources and Water under the Vegetation Management Act.

2.3 Verges

All verges shall be covered full width with topsoil to a depth of not less than 40mm and shall be lightly compacted and grassed in accordance with Council's Guidelines and Specifications. This shall also require full width turfing of all verges.

In order to guarantee a high standard of maintenance all verges are to be in a mowable condition, free from rocks and loose stones, and graded to even running contours.

Aside from grass establishment and tree planting, landscaping of the verge between the property boundary and kerb is not a Council requirement. However, additional landscape within the verge may be considered subject to Council approval. Generally, any additional landscape shall be clear of underground services or alternatively limited to ground covers or small shrubs less than in 600mm height from road surfaces.

Should any excavation of the underground services in this vicinity of the additional verge landscape be required, thus destroying the vegetation, Council will not be held responsible for plant replacement. Maintenance of planting in this vicinity will be the sole responsibility of the adjacent property owner/occupier.

2.4 Street Tree Planting

The ultimate aim of street tree planting is to provide:

- An attractive streetscape with character and charm. An individual character may be obtained by using a specific tree species for each street.
- Shade and the reduction of heat and glare from the road pavement. Parked cars may remain cool during the summer months.
- A reduction in pollutants and a cleaner environment.
- Habitat provision and enhancement. Native flowering trees provide a source of food and shelter for insects, birds and animals.

An avenue of trees of identical species and size planted at regular intervals has far greater visual and aesthetic impact than a mis-matched selection of incompatible trees. In order to promote continuity in new streetscapes, a single species should be nominated for each street.

Where a development is occurring in an established street setting, an assessment of the existing trees should be made and the most prevalent and healthy species chosen for verge planting. This species selection shall be approved by Council's Landscape Architect.

Tree species shall be selected for their suitability to the site conditions (eg. Small trees under power lines, drought resistance, soil suitability) and shall be in accordance with any relevant Council plant selection guidelines and suburban planting themes. (see Appendix A - Recommended Street Tree Species List)

To ensure consistency in growth rate and form all trees shall be no less than two metres in height and shall be well established in their root and branch formation. A minimum 45-litre container should ensure a good survival factor. Any trees to be planted within the Mackay CBD shall be required to be of minimum 100-litre container size.

Street trees are to have a minimum of 2.4 metre clearance from ground level at time of maturity. At the discretion of the traffic engineer, advanced stock may be required to provide a minimum 1.5 metre canopy clearance from ground level at the time of installation.

The alignment and placement of street trees measured from the tree at the estimated ultimate size shall be in accordance with the following:

- Greater than 4.0 metres from electricity or telecommunication poles or pillars

- Greater than 7.5 metres from streetlights to ensure effective street lighting
- Greater than 4.0 metre radius from high voltage transmission lines
- Greater than 2.0 metres from stormwater drainage pits
- Trees are to be planted in the front of properties at the centre of the lot, if no structures are present, at a rate of one per lot, or at the necessary rate to provide minimum 20-metre spacing. Within the CBD this density shall be reduced to a maximum 10m spacing. If this planting location will impinge on existing structures alternative locations shall be negotiated with Council's Landscape Architect.
- Trees are to be placed a minimum of 750mm and a maximum of 1000mm from the back of kerb
- Trees are to be placed a minimum of three(3) metres from driveway
- At intersections trees are to be placed a minimum of ten(10) metres back from the face of the kerb of the adjoining street
- Trees are to be located so as not to obstruct access to any services or signage
- Trees are to be located so as not to obstruct pedestrian or vehicular traffic, nor create traffic hazard or cause damage to existing trees

Street Trees shall be planted in accordance with Standard Drawing A4-49D and installed in accordance with Council Specifications.

Street trees planted within Mackay CBD are to be in accordance with the Mackay Master Street Tree Plan and in accordance with Standard Drawing A4-177.

Street trees should not be a plant listed in:

- Land Protection (Pest and Stock Route Management) Regulation 2003
- Mackay City Council Pest Management Plan or the
- Publication "Agricultural and Environmental Weeds - Far North Queensland" (Wet Tropics Management, Department of Natural Resources and Mines)

2.5 Buffer Zones

Mounds / Buffers adjacent to major roads controlled by the Department of Main Roads must comply with the requirements as specified by the Department of Main Roads and as outlined in this document. Generally, these buffers are five (5) to ten (10) metres wide along the full frontage of the major road.

Landscape of Buffer Mounds shall be in accordance with Standard Drawing A3-841 'Buffer Plantings' and A3-842 'Buffer Plantings - Plant Schedule'.

The aim of the Buffer Mound landscape is to:

- Reduce the visual impact of adjacent development by screening rooflines.
- Reduce the visual impact of proposed noise attenuation barriers, which may be constructed at some time in the future on the mound crest.
- Reduce the visual impact of the mound's severe geometric landform by screening with foliage to ground level.
- Introduce a "natural" vegetated landscape appearance by replacing open agricultural land with a façade of dense planting.
- Reinforce the local character by indigenous tree and shrub species.
- Provide additional functions, i.e. Shade over adjacent bikeways.

In order to accomplish the above aims, the species mix of plant selection should incorporate a range of species to provide variation in form, colour and texture, to contribute to a natural appearance. The front line of planting should have foliage down to ground level. The species mix to be provided shall be a minimum of 70% / 30% ratio of Native / Exotics. (Greater % if Native component is acceptable)

To ensure that buffer mounds are given the best possible chance of successful establishment and prolonged survival, a temporary irrigation system is required to be installed to the mounding. The preferred system is with a drip style irrigation system or similar below the surface of the mulch, which reduces the chances of vandalism and reduces excess water loss as a result of runoff and evaporation.

Strong recognisable character is further reinforced by repetition of some suitable species as street and park trees in the adjacent subdivision.

Use of disciplined plant selection based on themes such as colour, texture, or natural species associations, in addition to site suitability, creates higher quality landscapes than random assortments of nursery stock chosen solely for short notice availability and growth suitability.

Advance ordering and growing on contracts are desirable to ensure availability of desired species in the large quantities required.

Local species, which typify and reinforce the regions image, are preferred. Most are hardy, long lived and have dense growth, which suppress weeds and reduce long-term maintenance.

The landscape shall be designed so as not to create a safety risk to people using the mound and adjacent areas (i.e. no thorns, heavy nuts or poisonous fruits or berries). In addition, a 1 metre maintenance strip shall be allowed along the property boundary.

2.6 Stormwater Management Measures

The landscape design for stormwater management measures such as bioretention basins and swales should consider documents such as the *WSUD Technical Guidelines for South East Queensland* (Healthy Waterways 2006). It is important that the landscape design of these measures address stormwater quality objectives whilst also incorporating landscape functions. The Engineering Design Guidelines – Soil and Water Quality Management (Planning Scheme Policy No. 15.07) details the requirements for stormwater quality management.

2.7 Roundabout & Median Strip Landscape Design

Roundabout and median strip landscape design must have due regard for plant siting and maintenance requirements. Planting in roundabouts and medians are to be set back from the inside kerb edge as follows:

Roundabouts

- 0.0m - 1.0m setback - appropriate pavement material;
- 1.0m - >3.0m setback - shrubs / groundcovers only with a maximum mature unpruned height of 600mm above the road pavement (not top of kerb); and
- 3.0m - >3.0m setback - trees and shrubs / ground covers. Roundabouts of 6.0m in diameter in low speed zones of 50km/h or less, a small single trunked tree with a mature diameter of 100mm may be located in the centre of the roundabout, providing such achieves a clear trunk height at planting of 1.5m above the road pavement level.
- Mown grass or turf is to be discouraged in roundabouts.

- Grass should be avoided for use in median landscapes.

Median Islands

- 0.0m - 0.3m - appropriate pavement treatment (Applicable to state controlled roads only);
- 0.0m - 1.0m setback - appropriate ground covers, 200mm high, with minimal pruning requirements
- - 1.5m setback - shrubs / ground covers only. Shrubs and ground covers to have a maximum maintained mature height of 900mm above the road pavement (not top of kerb); min. 1.5m setback - trees and shrubs / ground covers. Trees are to be primarily single trunked species. Tree species chosen will depend on the species spatial requirements and clearance from service elements and light poles; and
- Trees will generally not be planted in medians with an internal width less than 3.0m
- In median strips, three (3) metres or wider, trees may be located centrally or staggered provided such accords with traffic engineering visibility requirements. Tree species will be selected for appropriate canopy shape.
- Ends of median strips require special consideration and discussion with Council with regards to clear zones and safety requirements.
- Irrigation is to be placed in medians with subsoil drainage installed to adequately stop the ingress of water into the roadway. Irrigation shall be of such a design and quality of material and workmanship that the ingress of water into the pavement due to failure or damage is avoided.
- The root system of plants must not interfere with subsurface drainage.
- The design should minimise the requirements for maintenance.
- Interfaces between grass and areas of chip mulch are to be avoided. Where grass does interface with chip mulch, a concrete mowing strip of 300mm wide must be provided.
- Irrigation is to be placed in medians with subsoil drainage installed to adequately stop the ingress of water into the roadway. Irrigation shall be designed to prevent pavement failures by ingress of water.
- The mature unpruned height of under plantings on road verges or in roundabouts, medians and splitter islands is not to exceed 600mm above road surfaces. This height, however, may be reduced at the discretion Council with approval to take into account individual site requirements.

2.8 Stockpiling of Materials

Stockpiling of material is undertaken in a manner that minimises environmental impacts and nuisance and annoyance to existing and adjacent premises. Existing or future public open space sites used for stockpiling are decompacted and remediated prior to any further landscape or grassing works.

- Stockpiles of landscape are stored separately on site
- Landscape material is free of any deleterious material that has the potential to impact upon the intended use of the land, prior to stockpiling.
- Stockpiles are treated appropriately to prevent wind and water borne erosion and weed infestation. Temporary erosion and sediment controls are installed to contain the stockpile and are removed upon usage of landscape material.

2.9 Managing Impacts During Construction

Landscape works are to be carried out in a safe manner that minimises adverse impact to the natural environment caused by erosion, saltation, incineration of cleared vegetation, and rubbish and avoids noise, dust and saltation impacts / nuisance, redirection of stormwater runoff and any inconvenience to residents and other premises.

- The landscape works incorporate temporary stormwater runoff, erosion and sediment controls and trash traps.
- Stormwater runoff, erosion, and sediment controls are constructed prior to commencement of any clearing works.
- During construction, dust suppression measures (such as watering of the site) are implemented to protect nearby premises
- Temporary construction works do not pond or concentrate stormwater runoff in adjoining properties
- Temporary construction works do not create nuisance or annoyance on adjoining premises as a result of altering the stormwater runoff pattern exiting the site
- Construction traffic to and from the site uses the highest classification streets and roads where a choice of access routes is available.
- All materials associated with the landscape works that are dropped, deposited or spilled on streets giving access to the site are removed and the streets are cleaned as soon as practicable after the event. Any damaged areas are repaired and reinstated to the original condition.
- Where works are carried out on existing roads a traffic control plan is prepared in accordance with the Manual of Uniform Traffic Control Devices and maintained during the works.
- Traffic Control Devices. All traffic control measures are properly erected

3 Public Open Space

3.1 General

At the time of development, the Designer shall landscape all public open spaces to the satisfaction of Council and in accordance with this guideline.

Where a development is proposing to undertake any work within existing or proposed park a landscape plan shall be prepared for approval by Council.

Landscape plans shall be prepared by a person of professional standing in the field of landscape architecture or landscape design, at a standard acceptable to Council.

3.2 Crime Prevention Through Environmental Design

It is important when designing parks that the principles of crime prevention through environmental design are considered and incorporated into the design, in particular:

- Dense stands of vegetation should be confined to park peripheries and should not be located along side paths and play equipment. Vegetation should not block casual surveillance of picnic and play areas from adjacent residences.
- Landscaping should not restrict sightlines and opportunities for natural surveillance within and of a site, therefore all new vegetation around centres of activity should be single clean trunked trees with shrubs which do not grow beyond 600mm height. This will avoid the problem of concealment and allow a greater area of surveillance from the road.
- Lighting where required should be sufficient to deter loitering and vandalism.
- Large shrubs and trees should be planted in such a way as to prevent or reduce illicit access to buildings and neighbouring properties.
- Safety in large parks or areas of vegetation within a development may be enhanced by planting trees in thin strips which maximises the number of trees planted but which also restricts the ability of offenders to hide within a "mass" of vegetation.

3.3 Treatment To Park Boundaries

Vehicles should be prevented from driving into parks, drainage reserves and public open spaces by the provision of barriers along the road frontages. These may be log barriers, bollards or natural features such as existing vegetation or newly planted and staked trees. Access for maintenance vehicles shall be provided through a lockable gate or removable bollard.

Definition of the park side boundaries should be indicated by installing a log barrier fencing or bollards at approximately 20-metre centres, down each side. These should be offset from the surveyed boundary by 100mm in order to allow future erection of private fencing without having to remove Council's markers. Definition of the park boundary is intended to deter encroachment onto park by adjacent private properties and to define the park limits.

Log barriers and bollards shall be in accordance with Standard Drawing A4-46D & A4-160B unless otherwise approved by Council.

3.4 Internal Circulation

The park layout should be designed to ensure that internal circulation or movement within the park is:

- Safe
- Unencumbered
- Highly visible internally and externally
- Linked to external cycle and pedestrian networks

Design features including access points, street frontages, car parks, pedestrian / bike paths, park equipment and lighting should be considered.

Design of paths, car parking and access points should consider the needs of people with mobility challenges. Pathways shall be in accordance with Design Guideline D1 and comply with accessibility standards.

3.5 Planting

Council parks seek to provide a range of recreation opportunities and there is scope to utilise planting design to help achieve this objective, options include:

- Shade trees evenly planted throughout the site to maximise protection from the sun.
- Island or corridor planting to concentrate trees for easy maintenance and encourage bird life for pleasure viewing.
- Grouped planting will also provide shade adjacent to open space to allow unencumbered active play areas.
- Lines of tree planting to define edges of informal kick-about areas.

A minimum 70% of the proposed tree planting should be native, and species should be selected on their adaptability to site conditions and their value to local fauna. Where the proposed park adjoins an area of established native vegetation, an extension of this habitat into the park should be implemented by using compatible species. The designer should also be encouraged to use rare and endangered plant species, or species proven to have excellent bird, butterfly and insect attracting qualities.

In order to promote the unique landscape characteristics of the region exotic flowering trees and non-native palms should only be used as features or emphasis, where necessary.

Council has plant selection guidelines and suburban planting themes and designers are encouraged to consult with Council in preparation of the landscape design.

Street trees should not be a plant listed in:

- Land Protection (Pest and Stock Route Management) Regulation 2003
- Mackay City Council Pest Management Plan or the
- Publication "Agricultural and Environmental Weeds - Far North Queensland" (Wet Tropics Management Authority, Department of Natural Resources and Mines)

3.6 Grassing

All parks shall be covered with topsoil to a depth of not less than 40mm and shall be lightly compacted and grassed in accordance with Council's Guidelines and Specifications.

In order to guarantee a high standard of maintenance all parks shall be in a mowable condition, free from rocks and loose stones, and graded to even-running contours.

Grass should be established within the proposed park as quickly as possible in order to avoid erosion and sedimentation to the local waterways, and prevent the establishment of weeds in accordance with Council's Guidelines and Specifications.

Edging is designed to provide adequate separation between turf and gardens and to provide safety for maintenance staff and other user groups.

Built edges must be installed at grass mulch interfaces in local, district and regional parks and in commercial and retail centre development. Appropriate edging for these areas may include reinforced concrete edging, recycled plastic and bricks laid on a mortar bed. Timber edges within Council controlled land is not acceptable.

Detailed requirements are as follows:

1. Extruded concrete edge, flush mounted or proud - machine installed with at least one 12mm deformed bar through the centre for reinforcement or steel pins where a raised kerb is used, both a minimum 150mm wide or
2. Recycled plastic kerb 50mm wide
3. Brick - laid either header or stretcher course on mortar; or
4. Timber edges (only applicable on land not to be managed by Council at any time) are built to a high durability standard. The minimum dimensions of the cross section of the timber edge are to be 140x45. CCA Pine 50x50 CCA stakes are to be installed at both ends of every panel with galvanized batten screws.

All edging, especially that associated with Council managed land, is to be designed with smooth navigable lines and must be able to accommodate the operational characteristics of mowers and maintenance vehicles. Inward facing 90 degree or sharper corners are not permitted.

At garden and turf interfaces, edging is to finish flush so that obstacles and trip hazards are not created.

3.7 Mounding

Mounding may be used within the park design to provide topographical interest, to emphasise views, to help screen adjacent properties or eyesores, or as part of the internal design. The mounds should not exceed a gradient of 25% (1 in 4) in order to reduce erosion and allow mowing. Planting of trees and shrubs over the mound will further emphasise height and shape.

Care should be given to ensuring that the mound does not restrict visibility into and out of the park thus threatening the safety of users or provide unwanted visibility into private properties.

Landscape mounding shall be in accordance with Standard Drawing A3-841 and A3-842 unless otherwise approved by Council.

3.8 Stormwater Management Measures

The landscape design for stormwater management measures such as bioretention basins and swales should consider documents such as the *WSUD Technical Guidelines for South East Queensland* (Healthy Waterways 2006). It is important that the landscape design of these measures address stormwater quality objectives whilst also incorporating landscape functions. The Engineering Design Guidelines – Soil and Water Quality Management (Planning Scheme Policy No. 15.07) details the requirements for stormwater quality management.

3.9 Furniture

Park furniture should reflect the intended function of the park and compliment any distinguishing features present eg. Seating situated to maximise a viewscape. Some preferred features of furniture include:

- Park benches located under a natural or built shade structure to allow daylong use. If the shade is built, it should have an impervious roof eg. Colourbond to provide shelter during rain.
- Well drained ground and hard surfacing below any structure. Surface material could be pavers, coloured or exposed aggregate concrete etc.
- Shade structures should maximise protection from the sun during the hours of 12 noon - 4pm.
- Refuse bins should be located for ease of use and pick up by refuse trucks eg. adjacent to playgrounds or picnic areas, at park exits.

Designs of furniture should reflect a strong aesthetic and vandal resistant appearance and be in compliance with specified requirements indicated in Council's Landscape Style Manual.

Where possible, natural features may be used e.g. mounding for seating, trees or natural rock for bollards to simulate park furniture.

Council has park furniture themes and master plans, Designers are encouraged to consult with Council in the preparation of the landscape design.

3.10 Signage And Interpretation

A park name sign is to be provided in accordance with Council's *Landscape Style Manual*. The park name is to be submitted to Council for approval with the landscape drawings. The proposed name is to preferably have the same theme as the subdivision's street names. The name is to be creative and imaginative in order to appear to children for local parks and to adults for district and regional parks.

If the park has any historic, cultural or natural value, the provision of interpretive signage will provide further interest to local users. Council can provide assistance in developing interpretive concepts.

3.11 Lighting

Lighting requirements within parks will be advised by Council in accordance with the classification of the park.

As a guide, two (2) park lights on poles shall be provided for every park of 4,000 square metres. However, this may vary depending upon the shape and alignment of the park and

the presence of existing vegetation. Generally, parks should be well lit providing safe nocturnal environment for local users. Council will consider the relaxation of one or both lights where existing street lights are adjacent to the park area. Underground power should be provided to each pole. Light fittings should be vandal resistant.

Pathways within parks that require lighting shall be lit to the lighting category determined from the Road Lighting Standards AS/NZS 1158.3, "Pedestrian area (Category P) lighting". Minimum lighting requirements shall be Category P2 with the absolute minimum level subject to approval by Council being Category P4 due to extenuating circumstances.

3.12 Provision Of Water

Facilities for drinking, such as drinking tap / bubbler, shall be provided for each park area, and should be located near active recreational areas, adjacent to a well used access route, and within an area serviceable from the road frontage. A soak-away trench shall be provided to the base of each tap to prevent ponding and water logging.

Irrigation is to be provided and the proposed system shall comply with the Council requirements for irrigation.

3.13 Water Features

Water should also be considered as an aesthetic feature of the park. Council does not recommend a formal water feature incorporating concrete structures and pumps, due to the excessive maintenance requirements, but utilising an existing water course as a park highlight could be possible. Sensitive manipulation of an existing creek could facilitate a year-round aquatic environment, thus encouraging greater bio-diversity and providing an exciting focal point to the park and surrounding subdivision.

3.14 Playgrounds

To ensure play equipment is as safe as possible and appropriate for the intended users, it should conform to the current and relevant Australian Standards for playgrounds and play areas and additional standards as may be established by Council.

Where playground equipment is required by Council as a condition of the development permit of the subdivision, or proposed to be installed by the developer, the following requirements should be considered and incorporated into the design:

- Type of play equipment proposed should be selected in consultation with Council.
- The age range of the users should influence the type of equipment provided.
- The siting of the playground should not infringe upon adjacent residential properties; a minimum distance of 10 metres between equipment and park boundaries should be provided and suitably landscaped with a minimum of 3 metre of screen planting to reduce noise and visual impact. Such landscape is to be consistent with CPTED Principles.

During installation and maintenance periods it is the responsibility of the developer to undertake, by suitably trained and certified staff, the inspection and documentation of safety inspections of playground equipment in accordance with AS/NZS 4486.1. Such records are to be provided to Council at the end of the "on maintenance" period

To conform to safety requirements impact absorbing surfacing should be installed to the play area in accordance with the relevant Australian Standard eg. sand, continuous rubberised matting, shredded car tyres.

The site must be raised and free draining with positive falls and sub-soil drainage connected to a storm water system.

A concrete surround edge must be installed to the softfall perimeter. Construct a 200x150 reinforced edge with 2/12mm deformed bars, doweled expansion jointing every 9 meters and crack control every 3 meters. A large round edger must be used to remove all sharp edges and located outside of the fall zone.

All screws, bolts and other connection items to be installed shall be of 316-grade stainless steel construction.

Shade cover over playgrounds is to be provided, in order to encourage day long use. Preferably, this should be a permanent shade structure approved by Council; however, shade trees planted at maximum 6-metre centres around the safety area are acceptable.

The provision of seating overlooking the playground will be required.

4 Irrigation

4.1 General

All irrigation systems connected to Council's water supply shall be installed to satisfaction of Council. The installation of water meters, backflow prevention device and isolation valves are mandatory in all irrigation systems. Refer AS 3500 *"National Plumbing and Drainage, Part 1.2 Water Supply - Acceptable Solutions"*.

The Designer shall ensure that the installation of an irrigation system to all landscaped traffic islands and roundabouts is provided for.

An irrigation plan prepared by an experienced irrigation consultant, shall be submitted to Council for approval together with the landscape plans and the proposed planting plans for the traffic islands / roundabouts.

The design of all watering systems must ensure an efficient and economical application of water. Such systems are to be designed to use low water application and shall run only during Council's nominated times.

The irrigation system shall be installed in accordance with Council Specifications and shall be installed to a standard compatible with Council's central irrigation control system, the Toro 'IrriNet' system. No alternative type is to be installed without prior written approval of Council. Reference should be made to construction specification C273 'Landscaping' for details of these requirements.

All irrigation pipework installed under roadways shall be laid in minimum 100mm dia. uPVC Class 9 conduit of diameter equal to that of the irrigation pipe plus 50%.

The water connection and installation of the irrigation system shall be carried out by Council personnel or an approved contractor at the developers / applicants cost. The maintenance period for irrigation works shall be three months and shall run concurrently with the 'on maintenance' / establishment period for landscape works. Thereafter all maintenance and watering will be the responsibility of the Council.

The installation of an irrigation system on Council property, other than buffer mounds, traffic islands and roundabouts, eg. verges will not be permitted unless:

- The system is separate from the development and all pipework is located adjacent to the kerb and channel.
- Or the verge is irrigated from sprinklers that fall within the development property boundaries.

These requirements have come about in order to prohibit the installation of water lines across the underground services located within the verge. These water lines would not appear in Council records and are therefore at risk of breakage during service repair work / trench excavation.

If a separate irrigation system within the verge is desired, the developer will be required to pay all installation costs, which include:

- Tapping into main
- Installation of backflow prevention device
- Installation of pipework and pop-up sprinklers
- Installation of solenoid valves and automatic controller in accordance with Council central irrigation control system.

APPENDIX A

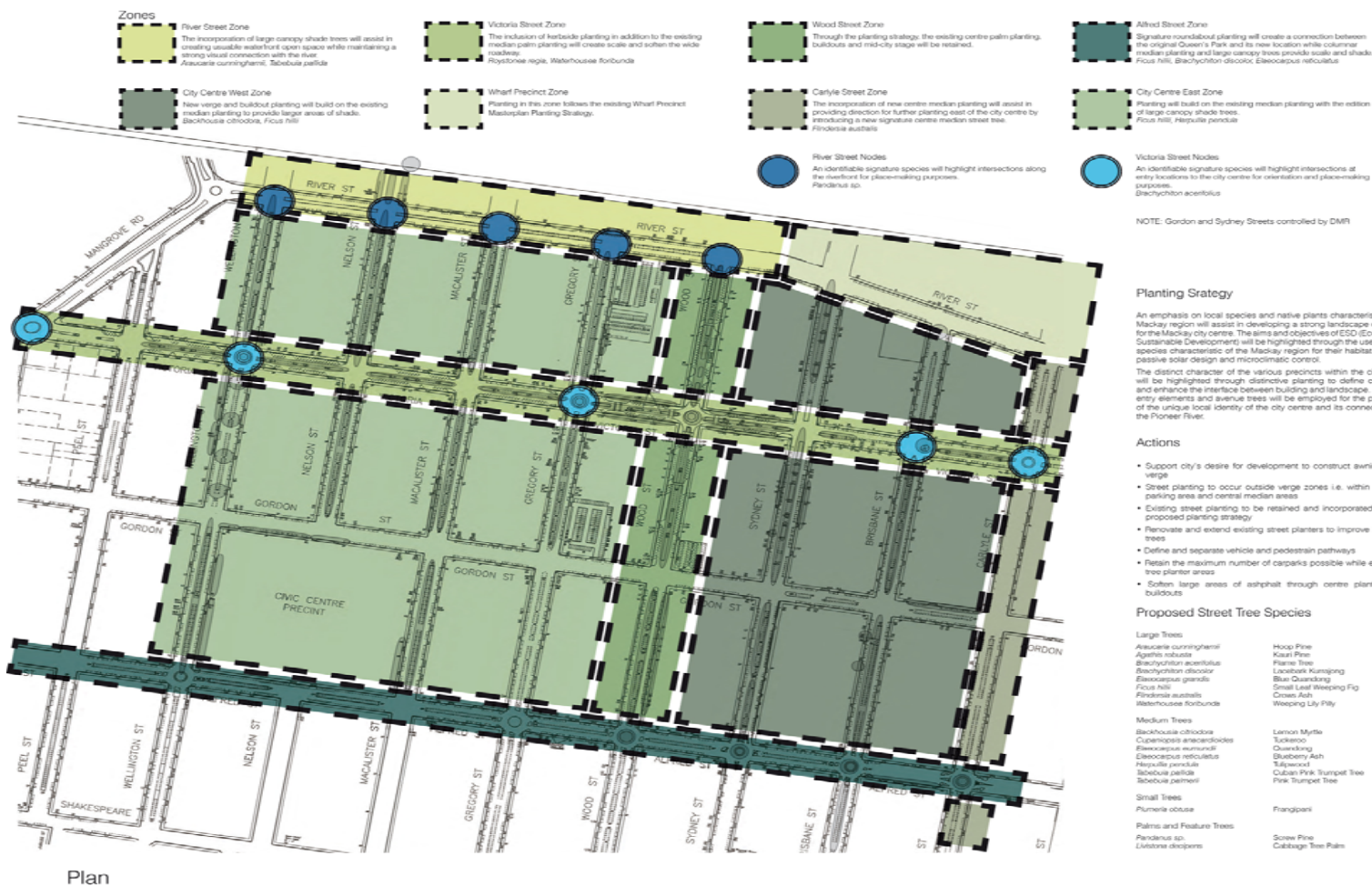
RECOMMENDED STREET TREE SPECIES

STREET TREE PLANTING LIST

Occur	Botanical Name	Common Name	Height*	1a	1b	2	3	4	5	Under Power Lines
Qld	<i>Acmena hemilampra</i> 'Compact Form'	Broad Leaf Lilly Pilly/ Blush Satinash	S		Y	Y	Y			Y
CQC/Qld/+	<i>Arytera divaricata</i>	Rose Tamarind	S/M		Y	Y	Y		Y	
QLd	<i>Backhousia citriodora</i>	Lemon Scented Myrtle	M			Y	Y			
CQC/Qld	<i>Banksia integrifolia</i> subsp compar	Coastal Banksia	M	Y	Y	Y	Y			
N.Qld	<i>Buckinghamia celsissima</i>	Ivory Curl Tree	S/M		Y	Y				
CQC/Qld/+	<i>Brachychiton acerifolius</i>	Flame Tree	L		Y	Y	Y		Y	
CQC	<i>Callistemon viminalis</i> (local form)	Weeping Bottlebrush	S/M		Y	Y	Y	Y	Y	Y
CQC/S.Qld	<i>Cassia brewsteri</i> var tomentella	Velvet Bean	S			Y			Y	?
Exotic X	<i>Cassia</i> 'Rainbow Showers'		M/L		Y	Y	Y			
Qld/ Nsw	<i>Cryptocarya triplinervis</i>	Three Veined Laurel	M							
C/Qld/+	<i>Cupaniopsis anacardioides</i>	Tuckeroo	M	Y	Y	Y	Y			
CQC/Qld/+	<i>Euroschinus falcatus</i>	Ribbonwood/Maiden's Blush	M		Y	Y	Y		Y	
CQC/Qld	<i>Flindersia australis</i>	Crows Ash	L		Y	Y	Y		Y	
CQC/Qld/+	<i>Harpulia pendula</i>	Tulipwood	M		Y	Y	Y		Y	
Qld/ Nsw	<i>Mallotus philippensis</i>	Red Kamala	M							
CQC/Qld/+	<i>Melaleuca leucadendra</i>	Weeping Paperbark	M	Y	Y	Y	Y	Y		
CQC/Qld/+	<i>Mimusops elengi</i>	Red Coondoo	M	Y	Y	Y	Y		Y	
Qld	<i>Pittosporum ferrugineum</i>	Rusty Pittosporum	M							
CQC/Qld/+	<i>Podocarpus elatus</i>	Brown Pine	L		Y	Y	Y		Y	
Qld/ NT	<i>Pongamia pinnata</i>		S							
CQC	<i>Syzygium australe</i> (local form)	Creek Cherry	S/M		Y	Y	Y			
CQC/	<i>Syzygium australe</i> (selected dwarf forms)	Creek Cherry	S		Y	Y	Y		Y	Y
Exotic	<i>Tabebuia pallida</i>	Evergreen/Silver Tabebuia	M	Y	Y	Y	Y			
CQC/Qld	<i>(Syzygium floriubundum)</i> Waterhousea floridunda	Weeping Lilly Pilly	M/L			Y	Y			
N.QLD	<i>Xanthostemon chrysanthus</i>	Golden Penda	M		Y	Y	Y			?
#	Soil type/location suited									
1a	Exposed seafront									
1b	Sandy soil (may be hydrophobic)									
2	well-drained alluvial									
3	well-drained hillslopes									
4	glue-pot/poorly drained soils									
5	Shallow, skeletal or rock									

APPENDIX B

MACKAY MASTER STREET TREE PLAN



MACKAY CITY CENTRE PLANTING STRATEGY

LANDSCAPE ARCHITECTURE URBAN DESIGN MASTER PLANNING

GAMBLE MCKINNON GREEN

preliminary

SCALE
1:2000 (S) A1
DRAWING NO.
MCKINNON PT 102 (A)
08021
DATE
2005-09-02





GAMBLE MCKINNON GREEN

preliminary

SCALE
1:2000 (A1)
DRAWING NO.
000011 P15.01 (A)
PROJECT NO.
000211
DATE
2005-09-02



PRELIMINARY 2008
VERSION 2
21/26
Policy took effect on 31/03/08

MACKAY CITY COUNCIL PLANTING STRATEGY existing vegetation

ENGINEERING DESIGN GUIDELINE PLANNING SCHEME POLICY IN 10.11
LANDSCAPE

APPENDIX C

PARK MAINTENANCE PROGRAM

(TEMPLATE)

PARK MAINTENANCE PROGRAM (TEMPLATE ONLY)

DEVELOPMENT DETAILS

Development Name _____
 Stage (if applicable) _____
 Development Approval Reference _____
 Park Address _____
 UBD Reference (eg 161 H16) _____
 Park Real Property Description _____

SUPERINTENDENT

Company Name _____
 Superintendent Name _____
 Address for Correspondence _____
 Telephone/Facsimile/Email _____

COUNCIL DELEGATE

Name _____
 Position _____
 Telephone/Facsimile/Email _____

AGREEMENT

We agree that responsibility for park maintenance works for the above development during the maintenance period will be undertaken in accordance with the table below.

Date of commencement of agreement:

Signature: _____

Duly Authorised On Behalf Of _____
 (insert name of Superintendent) _____

Date: _____

Duly Authorised On Behalf Of _____

Date: _____

Item Description	Maintenance Standard/Action	Responsibility
Park Amenities	Repair or replace defective park visitor facilities (e.g. barbecues, play equipment, toilets) on the same day in district and metropolitan parks, and within five working days at other locations.	Developer / MCC / Not Applicable
	Safety hazards to be repaired on same day (urgent) or barricade the site and arrange repairs within 20 working days.	Developer / MCC / Not Applicable
	Maintain equipment to manufacturer requirements.	Developer / MCC / Not Applicable

PARK MAINTENANCE PROGRAM (TEMPLATE ONLY)

Grass mowing and edge trimming	Mow grass at least 16 times a year with a mid-mounted mower or equivalent. Set cutting height at about 50mm. Schedule one cut per month from March to October and two cuts per month from November to February. Hand trim around structures such as fences and signs in conjunction with each mowing service. Maintain grass growth along path edges to within 100mm of the edge.	Developer / Not applicable
Cleansing	Pick up litter and large debris (fallen branches etc) from "maintained parkland" at least once a month in local parks and once a week in district and metropolitan parks. Dispose of the litter and debris to a legal place of tipping. Note: "Maintained parkland" includes all mown areas, roads, car parks, picnic areas, pathways, playgrounds and pavement areas.	Developer / MCC / Not applicable
	Sweep leaves and small debris (e.g. eroded materials) from paths and pavement areas by blowing or sweeping at least once a month in metropolitan and district parks and once a quarter in local parks.	Developer / MCC / Not applicable
	Empty rubbish bins at least three times a week (Monday, Wednesday and Friday) in district and metropolitan parks and once a week in local parks.	Developer / MCC / Not applicable
	Clean toilets including pans, basins, tiled surfaces and floors at least once a day. Replenish supplies of toilet paper. Spot remove graffiti. Clean gutters of leaves at least once every six months.	Developer / MCC / Not applicable
	Clean electric barbecues and surrounds at least three times a week (Monday, Wednesday and Friday). Empty fat receptacles at least once a month.	Developer / MCC / Not applicable
Landscape	Weed garden beds, rehabilitation sites and landscape areas at least once a quarter. Replace dead and poorly performing plants and replenish mulch at the same service frequency. Water young plants during dry periods to prevent wilting.	Developer / Not applicable

PARK MAINTENANCE PROGRAM (TEMPLATE ONLY)

Playground	Undertake a routine visual inspection to detect hazards from broken equipment, broken glass, vandalism, etc at least once a month in local parks and once a week in district and metropolitan parks.	Developer / MCC / Not applicable.
	Undertake operational inspections to check the operation and stability of play equipment at least once a month in district and metropolitan parks. Inspections to be undertaken by a trained playground maintenance inspector or engineer.	Developer / MCC / Not applicable
	Check under-surfacing for trip hazards at least once a quarter and more frequently in high use playgrounds. Rake and replenish bark under-surfacing as required.	Developer / MCC / Not applicable
Buildings, facilities and furniture	Repair or replace missing, defective or damaged rubbish bins.	Developer / Not applicable
	Check toilet operation including flushing mechanisms, door locks, leaking taps, lights, etc at least once a month. Repair or replace defective and vandalised fixtures and fittings and remove graffiti.	Developer / MCC / Not applicable.
	Check barbecue operation including hot plate temperature (thermostat and heating times) and fat drainage at least once a month.	Developer / MCC / Not applicable
	Sand and oil exposed timber surfaces every six months. Repair or replace damaged or defective furniture and remove graffiti.	Developer / MCC / Not applicable.
Paved areas and pathways	Check paved surfaces (e.g. asphalt) at least once every six months. Repair potholes, trip hazards and failures. Check drainage of paths and pavement areas and rectify defects.	Developer / MCC / Not applicable.
Bridges and boardwalks	Oil exposed timber surfaces as needed. Check structural stability, handrails and decking at least once every six months. Repair defective items and vandalism and remove graffiti.	Developer / MCC / Not applicable
Irrigation	Check operation of valves, timers, pipes and sprinkler heads at least once a week and rectify defects. Adjust irrigation times during extended wet weather.	Developer / MCC / Not applicable
Utilities	Check operation of pumps, lights, drinking fountains and taps at least once every three months. Replace defective or damaged globes, washers and other utility components.	Developer / MCC / Not applicable

PARK MAINTENANCE PROGRAM (TEMPLATE ONLY)

Signage	Check signage for vandalism and graffiti at least once every three months. Repair or replace damaged, missing, unreadable or faded signs.	Developer / MCC / Not applicable
Fence and barriers	Repair or replace sections of fence/barriers removed or damaged by vehicles etc and rectify defects.	Developer / MCC / Not applicable
Turf	Top dress, fertilise, control weeds and replace worn or damaged turf as needed.	Developer / MCC / Not applicable
Trees	Replace dead and poorly performing planted trees. Control weeds and replenish mulch around the base of young trees. Water young plants during dry periods to prevent wilting.	Developer / Not applicable
	Prune dead limbs and remove defective branches over park activity areas to reduce hazards.	Developer / MCC / Not applicable
Vegetation Management	Continue programs that have been specified in Council approvals to control proclaimed and environmental weeds.	Developer / MCC / Not applicable
	Trim back vegetation along paths and around park facilities to maintain surveillance opportunities and required clearance widths.	Developer / MCC / Not applicable