Development manual planning scheme policy (PSP)
SC6.4.12 Landscaping and open space

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SC6.4.12.1 Policy intent

(1) Introduction

(a) Overview

The landscaping and open space section of this planning scheme policy provides advice and guidance relating to the sustainable landscape values and preferred landscape design outcomes for Townsville.

This policy applies to development requiring assessment against Part 9.3.3 Landscape code and other landscaping requirements of the Townsville City Plan and this planning scheme policy. Landscaping must therefore exemplify this landscaping and open space section to achieve the strategic intent of the Townsville City Plan.

Development must design landscaping and open space with climate in mind and shape works to specifically address features of Townsville's dry tropic climate. The consideration for climate transverses the design principles of this section, which articulate the policy intent of this landscaping and open space section.

(b) Scope

(i) Landscaping and open space requirements that align with design principles of this section are structured in the following categories:

1. Private open space;
2. Public open space;
3. Hardscape embellishments; and
4. Softscape embellishments.

(ii) The functions and development objectives for these categories of open space are outlined in this sub-section along with design and embellishment guidelines. The design principles and requirements of these sections should be addressed in the statement of landscape intent as detailed in Section SC6.4.2 Development application guidelines. This section identifies overarching design, sustainability and management principles that should be applied to open space development including:

1. general design principles, master plans and identified design outcomes;
2. principles of economic, environmental, and social sustainability; and
3. management frameworks for public open space Public Open Space (POS) Hierarchy, Public Open Space Management (POSM) Framework and Irrigation Profile Level (IPL) Framework (Refer to SC6.4.13.1 (6)).

(c) Reference and source documents

Reference and source documents that must be read in conjunction with this section are as follow:

(i) Townsville City Plan sections:

Part 4 – Priority infrastructure plan

Part 8.2.5 – Natural assets code

Part 9.3.3 – Landscape code

Part 9.3.4 – Reconfiguring a lot code

Section SC6.9 – Natural assets planning scheme policy

Section SC6.4.20 – Footpath treatment and outdoor dining design

Clause SC6.4.6.1 – Geometric road design

Section SC6.4.4 – Active transport infrastructure

Section SC6.4.14 – Public utilities and building over/near services

(ii) Australian Standards:

AS/NZS 1158.3.1	*Road lighting Part 3.1: Pedestrian area (Category P) lighting- Performance and installation design requirements*
AS 1170	*Structural design actions (set)*
AS 1428	*Design for access and mobility (set)*
AS 1926.1	*Swimming pool safety – safety barriers for swimming pools*
AS 2156	*Walking tracks (Set)*
AS 2890.3	*Parking facilities – Bicycle parking facilities*
AS 3996	*Access covers and grates*
AS 4373	*Pruning of amenity trees*
AS 4422	*Playground surfacing – Specifications, requirements and test methods*
AS/NZS 4486.1	*Playgrounds and playground equipment – Development, installation, inspection, maintenance and operation*
AS 4685.1	*Playground equipment and surfacing – Part 1: General safety requirements and test methods (Refer to current version)*
AS 4685.2	*Playground equipment and surfacing – Part 2: Additional safety requirements and test methods for swings (Refer to current version)*
AS 4685.3	*Playground equipment and surfacing – Part 3: Additional safety requirements and test methods for slides (Refer to current version)*
AS 4685.4	*Playground equipment and surfacing – Part 4: Additional safety requirements and test methods for cableways (Refer to current version)*
AS 4685.5	*Playground equipment and surfacing – Part 5: Additional safety requirements and test methods for carousels (Refer to current version)*
AS 4685.6	*Playground equipment and surfacing – Part 6: Additional safety requirements and test methods for rocking equipment (Refer to current version)*
AS 4685.11	*Playground equipment and surfacing – Part 11: Additional safety requirements and test methods for spatial network (Refer to current version)*
AS/NZS 4456.9	*Masonry units and segmental pavers and flags – Methods of test – Determining abrasion resistance*

AS/NZS 4586	*Slip resistance classification of new pedestrian surface materials*
AS 4970	*Protection of Trees on Development Sites*

(iii) Other:

Austroads	*Guide to Road Design* (Set)
Department of Transport and Main Roads Queensland	*Road Landscape Manual*
Department of Transport and Main Roads Queensland	*Manual of Uniform Traffic Control Devices* (MUTCD)
Department of Transport and Main Roads Queensland	*Queensland Guide to Traffic Management* (QGTM) - *Part 6: Intersection, Interchanges and Crossings Management*
Queensland Government	*Crime Prevention Through Environmental Design*, *Guidelines for Queensland*, Parts A and B (refer most current version).
Queensland Government	*Census of the Queensland Flora*, 2013, edited by Peter D.Bostock and Alisa E.Holland.
Western Australian Department of Sport and Recreation,	*Sports Dimensions Guide for Playing Areas*
Australia Building Codes Boards	Building Code of Australia

(d) Terminology

Crime Prevention Through Environmental Design – Crime Prevention Through Environmental Design (CPTED) provides a common-sense approach to designing environments (new or redevelopment) in ways that help to create safer spaces and reduce crime. CPTED may be applied to any built environment or facility.

Editor's Note – further guidance on implementing CPTED principles can be found in the following locations: Queensland Government, *Crime Prevention through Environmental Design, Guidelines for Queensland, Parts A and B*, (Refer to most current version), and CPTED Association website.

(2) Design principles

(a) Landscape character and place making

(i) Landscape design outcomes should demonstrate consideration and application of the landscape character and place making design principles, as described within this section. Landscaping and open space design provide the opportunity to protect and enhance the local character and place making of Townsville. Major aspects of achieving these outcomes include maximising shade, minimising reliance on irrigation, and using appropriate plant species and construction materials.

(ii) Deliver landscapes that reflect Townsville's local character and identity to facilitate and encourage community ownership, local tourism, and business growth and investment (e.g., open space design that provides opportunity for activation, festivals, and community-based activities).

(iii) Design safe public and private open spaces using CPTED principles that improve the quality and value of the built environment (e.g., create more liveable space that promotes Townsville as an attractive place to live and invest).

(iv) Respond to Townsville's dry tropic climate, local character and any specific vegetation of a local area with functional and attractive landscaping and open space design that also reflects the natural environment and any specific vegetation themes of a local area.

(v) Deliver landscaping and open space design in accordance with master plans adopted by Council. Master plans may specify strategy and plans to deliver key design and construction outcomes for local areas or sites.

Editor's Note - Outcomes identified in an adopted Master Plan take precedence over all other design guidelines, unless assessed and approved by Council.

(vi) Deliver landscaping and open space design in accordance with an identifiable character and/or desired design outcome of a local area, as applicable and where Council has not adopted a master plan. The design should seek to be consistent or complementary to this established direction and may include:

1. an established colour or furniture palette;
2. a dominant tree, plant species or planting style;
3. heritage features or an identifiable character;
4. significant natural features, materials, or environmental setting (e.g., natural bushland or coastal settings); and
5. a consistent, hierarchical based landscape design style.

Editor's Note - Statements pertaining to identifiable character or design outcomes for locations or land uses are contained within Townsville City Plan. Where applicable, landscape design outcomes are to comply with these statements and must be addressed within the "Landscape Statement of Intent". Where proposals will deviate from the desired outcomes, applicants must justify this deviation for further assessment and approval by Council.

(b) Economic sustainability

(i) Landscaping and open space design should demonstrate consideration and application of the economic sustainability design principles, as described within this section. Landscaping and open space design, establishment, and ongoing maintenance and management obligations must be economically sustainable for Council and property owners, and should:

1. incorporate equitable distribution of public open space assets that avoids overlapping of service areas and subsequent oversupply of public open space assets;
2. design landscaping and open space that considers the ongoing operational requirements and available maintenance resources; and

Editor's Note - Applicants are required to identify the ongoing operational requirements in a maintenance plan, as detailed in Section SC6.4.2 Development application guidelines, SC6.4.12.7 Attachment D – Parks and Open Space Maintenance Service Level and SC6.4.12.7 Attachment E - Parks and Open Space Maintenance Costing Table. For public open space, maintenance plans should be aligned with Public Open Space Management (POSM) Framework as outlined in Clause SC6.4.12.3 and developed with consideration of Clause SC6.4.12.7 Attachment A - Public Open Space Embellishment Framework.

3. prioritise landscaping and open space design that is low maintenance, including plant species selection and embellishments that respond to the extreme climatic conditions of the dry tropics.

(c) Environmental sustainability

(i) landscaping and open space design should demonstrate consideration and application of environmental sustainability design principles, as described within this section and Council's Corporate Plan through;

(ii) minimising the use of non-renewable resources;

(iii) protection, rehabilitation and enhancement of existing natural assets and ecological systems;

(iv) protection and integration of remnant vegetation, significant trees, and habitat areas in site planning, including, but not limited to:

1. large, existing mature trees;
2. vegetation in intact natural areas;
3. trees or vegetation protected by heritage listing;
4. trees or vegetation not formally protected by heritage listing but where the size and/or quantity present has a significant character impact;
5. marine plants including mangroves;
6. vegetation in riparian zones or on slopes, especially where the vegetation is performing a stabilisation role; and
7. vegetation external to the development site but where activities within the site may impact its long-term sustainability.

(v) promotion of local native and non-invasive introduced plant species;

(vi) promotion of ecological design and responsible urban forestry management;

(vii) implementation of integrated water cycle management practices by incorporating water sensitive urban design (WSUD) techniques to manage stormwater, slow runoff, recharge groundwater, store for re-use and to passively irrigate landscape areas. Refer to Section SC6.4.10 Stormwater quality;

(viii) implementing efficiency mechanisms and strategies to minimises the use of, and therefore conserve, non-renewable resources during both the establishment and ongoing maintenance of landscaping and open space (e.g., reduction of potable water use through water wise landscape and irrigation design);

(ix) ensuring landscaping and open space design responds to and enhances urban and community safety and resilience to natural hazards and risk, such as bushfires, flooding, coastal inundation and erosion, and cyclones;

(x) prioritising the use of renewable resources in landscape design such as renewable materials or substitutes (e.g: recycled products) and energy sources and embellishments (e.g. solar powered lighting);

(xi) reducing both directly and indirectly, resource consumption and waste generation by:

1. implementing opportunities for waste reduction and reuse (e.g., concrete recycling for gabion walls);
2. prioritising and promoting the use of recycled materials (e.g. recycled plastic composites);

3. promoting means for reducing carbon emissions and improving opportunities for carbon offsets and sequestration (e.g., reducing land clearing by promoting protection of existing trees and vegetation areas and incorporation of natural areas into public open space design); and

4. promoting environmentally sustainable design principles to reduce resource consumption, both directly and indirectly (e.g., increased street tree plantings to support passive cooling of streetscapes and buildings whilst improving amenity to promote pedestrian and cyclist activity).

(d) Social sustainability

Landscaping and open space outcomes should demonstrate consideration and application of social sustainability design principles, as described within this section, Part 9.3.3 Landscape code. and Section SC6.4.2 Development application guidelines.

Landscaping and open space design provides the opportunity to enhance the health and wellbeing, equity, and safety of the community.

(i) Promote community development principles in the design of open space by:

1. promoting social interaction and inclusion (e.g., civic spaces and private communal areas that promote, social activities and community gatherings);

2. promoting the equitable distribution of open space opportunities and resources (e.g., equitable distribution of different open space facilities throughout Townsville);

3. designing for community diversity (e.g., promoting open space design that responds to the varying needs of the community and creates a diversity of experiences suitable for different cultures and demographics);

4. engaging with the community on design proposals (e.g., working with the local community members and groups in the design or development of facilities within open space); and

5. seeking landscaping and open space co-design and development opportunities with First Nations peoples.

(ii) Encourage and improve the health, wellbeing and safety of the community by:

1. creating opportunities for community health and well-being activities (e.g., provision of outdoor activity elements that promote physical activity for all ages through structured or unstructured recreation);

2. applying principles for *Crime Prevention Through Environmental Design* (CPTED), which provides a common sense approach to designing built environments and facilities that help to create safer spaces and reduce and prevent crime; and

Editor's Note - Further guidance on implementing CPTED principles can be found in the following locations: Queensland Government, *Crime Prevention through Environmental Design, Guidelines for Queensland*.

3. complying with all standards and safety requirements to ensure safe open space for the community and maintenance personnel.

(iii) Ensure accessibility and equitable access of open spaces where possible (e.g., applying universal design principles in the design and construction of recreation facilities to promote inclusion of users of different abilities).

(iv) Landscape and open space design and location, must cater for accessibility and mobility requirements in accordance with AS 1428 Design for access and mobility (Set of standards), and as required by Part 9.3.3 Landscape code.

(3) Management and maintenance

The ongoing management and maintenance of landscaping and open space is fundamental to reinforcing the local character and identity of Townsville and ensuring sustainable outcomes for Council, property owners and the community. Landscaping and open space outcomes should demonstrate consideration for the ongoing management and maintenance principles, as described within this ~~sub-~~section. A development should seek to minimise maintenance requirements, including resources (e.g., irrigation and general water consumption, pruning and mowing). A proposed maintenance schedule must be provided with the design of Public Open Spaces identifying the ongoing operational requirements to allow effective life cycle costing planning – refer to Section SC6.4.2 Development application guidelines, Clause SC6.4.12.7 Attachment D - Parks and Open Space Maintenance Service Level and Clause SC6.4.12.7 Attachment E - Parks and Open Space Maintenance Costing Table. Typical ongoing management and maintenance principles are as follows.

(a) Landscaping and open space design should utilise low maintenance, but high-quality, materials, design elements and plant species.

(b) The irrigation, maintenance, and other resource inputs necessary to maintain the functionality and longevity of planting design outcomes and species should be sustainable, cost-effective and comparable with the available resources.

(c) The level and type of maintenance and management activity requirements should generally align with the intensity of use for landscaping and open space.

(i) High intensity uses occur throughout Townsville and include district and citywide public open space that encourage daily social and recreational activities, and primary pedestrian and cycle linkages.

(ii) Passive uses occur in smaller, informal spaces that cater to local and private recreation and pedestrian and cycle linkages, which see occasional use by small numbers of people.

(iii) Sports parks generally have short periods of intense activity followed by long period of off-season low activity.

(iv) Other uses include low intensity uses such as natural and bushland areas, cemeteries, easements, and unallocated space. Nodes may encourage greater activity (e.g., a picnic or camping area).

(d) Reduce maintenance requirements of natural areas, such as bushland, coastlines and waterways, by regenerating and rewilding landscapes.

(e) Minimise environmental impacts that may result from landscape management and regeneration activities, and utilise environmentally sustainable practices, including for the management of natural hazard risks. Target noxious weeds and feral animals through the use of integrated pest management approaches.

(f) Provide opportunities for greater community involvement in the management and maintenance of public open space and landscaped areas, particularly joint management opportunities with First Nations peoples.

SC6.4.12.2 Private landscaping and open space

(1) Introduction

(a) Overview

Private open space are open spaces that are located on privately owned land that is accessible by the public. Private open space does not include fully enclosed spaces that are not accessible, or the gardens of dwelling houses. Private open space may include outdoor communal areas in multi-unit developments, or privately operated spaces within commercial developments. These may be laneways, plazas, courtyards or detailed planting areas that are not fully enclosed, thus allowing public access.

Both private landscaping and open spaces are a key element that contribute to the amenity and character of Townsville, the lifestyle of residents and the wider community, and success of businesses. Significant environmental benefits of private open space must be recognised for their contribution to the wider landscape. Potential positive contributions of these spaces include the reduction of stormwater runoff, increased biodiversity, the provision of ecological connectivity, reduction of urban heat through passive cooling and the breakdown of urban heat islands.

(b) Scope

Landscape elements within private open spaces may include areas of deep planting in natural ground, open to the sky and open landscaped areas including carparking areas, plazas, green walls and roofs, and screen planting. As in all planting for Townsville's dry tropic climate, emphasis is placed upon the establishment of shade through the planting of shade trees and screening planting as required to break up heat islands within development. Landscape elements within private open spaces reduce the size and bulk of built form, add local amenity or provide privacy screening, both within a lot or to adjacent lots.

These planting locations are the public interface of private developments and are often artificial environments that are highly constrained where planting is required on building podiums, in raised planters, on rooftops or awnings, or between retaining elements. Planting treatments in these locations require full coordination with architectural and engineering works to ensure their success.

(c) Deep planting

Deep planting is vegetation, usually trees or large shrub planting, that is planted into natural ground within a development to allow the canopy and root system to reach its full growth potential without being restricted by built elements above or below ground. These areas are open to the sky to allow for solar access and rainfall to assist in the growth of the planting. Deep planting is required in developments where more than 80% of the lot is covered by built elements.

Deep planting is to be provided as a minimum 10% of site area withing urban developments. Deep planting must:

(i) be located in an area of the site that is open to the sky to allow for solar access and rainfall capture;

(ii) allow for the retention and protection of existing significant vegetation where this exists on the site (existing vegetation can be included within areas of deep planting);

(iii) planted into the natural ground and not located above underground constraints to allow for plant root development; and

(iv) provide of a variety of plant species including larger tree species. Plant species suitable for this type of planting can be found in Clause SC6.4.12.7 Attachment C1 to C4 – Preferred Plant Species Lists.

(d) Artificial growing environments

(i) Artificial growing environments are those where planting is not growing in natural ground. This type of planting is characterised by high water use and high levels of maintenance. These life cycle costs need to be considered prior to inclusion in a development. Other considerations are:

1. safe access for maintenance;
2. non-potable water supply; and
3. coordination with building and engineering services for the development.

(ii) Types of artificial growing environments include:

1. retaining wall planting

   planting between tiered retaining walls to provide trailing planting to assist in reducing the perceived heights and overall impacts of the built structure;

2. green walls

   planting systems attached to building walls either internal or external to provide a green feature in the development and assist in passive cooling of the building;

3. green roofs

   planting of roof structures to provide a degree of stormwater polishing as well as passive cooling of the building by increased insulation of the roof surface. These treatments require close coordination with the architectural and engineering elements of the structure to ensure effective structural soundness as well as effective function to achieve building goals (green star ratings etc);

4. raised / container planters

   planting in isolated planting areas on building surfaces, requiring both drainage and irrigation connections to guarantee long term survival; and

5. podium planting areas

   planting in large areas on building surfaces, integrated with the built structure. Like raised/container planting, the coordination of both subsurface drainage and irrigation is essential to their functioning over time. Minimum soil depths and maximum weights are required to be adhered to in order to achieve both structural and planting stability and longevity.

(iii) In all cases these artificial planting environments must ensure that:

1. minimum soil depth of 600mm (in excess of drainage materials and waterproofing) is provided to allow for adequate root development and moisture retention within the planting area. Overall planting areas dimensions and soil volumes must be scaled to suit the proposed plant species and type;
2. drainage, waterproofing and civil, structural and hydraulic engineering requirements are provided in accordance with related building codes and structural and hydraulic requirements;

3. species used are suited to their location and the amount of maintenance allowed in the maintenance schedule for the development with an emphasis on minimising irrigation and maximising passive cooling of the space/building;
4. plant selection provides the required visual amenity for the development without adversely impacting on neighbouring developments;
5. safe maintenance access is provided in compliance with all applicable standards, BCA, WH&S requirements; and
6. planting provided within the development is robust and securely installed to minimise damage during cyclonic conditions or other predictable weather conditions.

(e) Screen planting

Screen planting involves landscaping to manage users or provide general amenity or privacy, and larger vegetated buffers to minimise adverse impacts from development, such as visual, noise and air quality impacts. In all cases, the use of species with a suitable natural hedging form is preferred rather than artificially hedged species. Landscape screening must ensure that:

(ii) design and species selection allows for long-term performance, ease of maintenance and access, and minimal irrigation requirements;

(iii) provide a minimum of 2 tier planting and

(iv) provide a variety of plant species that;

1. meet planting densities to adequately achieve the purpose of the screening, including larger tree species where possible;
2. avoid damage to any surrounding infrastructure by utilising appropriate setbacks; and
3. are suitable for this type of planting.

(2) Residential communal areas

Residential communal areas may be provided by development at ground level, or on a podium, rooftop or partially open storey. Residential communal areas are an important asset to enhance social connection, lifestyle, health and wellbeing of residents and their visitors. It is important for residential communal areas to therefore meet the needs and aspirations of the community, as well as sustainable landscaping outcomes. Residential communal area must ensure that:

(a) flexible spaces are provided that meet different users' needs and aspirations are provided. Flexible spaces also provide opportunities for community initiative and ownership (e.g. community garden, recreational open space);

(b) contribute to the local character of locality or development;

(c) cost effective for shared funding arrangement, such as body corporates, to maintain and replace at end of life;

(d) fully or partially open to the sky;

(e) oriented and shaded with consideration for the dry tropics climate, solar access during winter and summer, wind tunnels, and shading from surrounding buildings and landscapes; and

(f) CPTED principles are used to provide spaces that are safe for use at various times of the day and night.

Editor's Note - Further guidance on implementing CPTED principles can be found in the following locations: Queensland Government, *Crime Prevention through Environmental Design, Guidelines for Queensland, Parts*

A and B, (refer to current version), and CPTED Association website.

(3) Commercial and industrial development

Private open space of commercial and industrial development will vary greatly, depending on the use, and may include areas such as shared employee recreation space, publicly accessible plazas, laneways, outdoor carparking areas and campuses. It is important for commercial and industrial development to provide private open space to attract employees and visitors, reduce impacts from development, respond to Townsville's dry tropic climate, and contribute to the lifestyle, amenity and character of Townsville. Commercial and industrial private open space must ensure that:

(a) design provides cues to distinguish between a public area, a semi-public area and a private area;

(b) carparking areas provide shade trees and landscaping in accordance with Clauses SC6.4.5.3 Public transport facilities and SC6.4.5.4 Car parking;

(c) provide a variety of plant species including larger tree species;

(d) plant species suitable for this type of planting can be found in Clause SC6.4.12.7 Attachment C1 – C4 – Preferred Plant Species Lists;

(e) employee break-out areas are separated and private from public areas;

(f) amenity and character of the streetscape, development and adjoining lots is retained and enhanced; and

(g) open spaces are oriented and shaded with consideration for Townsville's dry tropic climate, solar access during winter and summer, wind tunnels, and shading from surrounding buildings and landscapes.

SC6.4.12.3 Public open space

(1) Introduction

(a) Overview

The landscape and character design outcomes associated with the development of public open space are required to demonstrate alignment with the standards set out in this section and addressed in accordance with Section SC6.4.2 Development application guidelines.

Public open space includes all areas of open space that are publicly owned and/or accessible. Public openspace includes parks and land that has been reserved for the purpose of sport and recreation, ecological function and natural environment protection, infrastructure corridors, stormwater management, and the general provision of green space.

Public open space, existing, planning and proposed, contributes significantly to community well-being, urban place-making and the general amenity and liveability of a city. Parks and other open space typologies also perform dual or multifunctional roles. This includes supporting the provision and buffering of roadways, stormwater devices and other infrastructure networks including but not limited to bikeways, and utility services, particularly within corridor parks. These spaces can often provide a means of maintenance or other function to associated infrastructure, making them a critical part of the function of many forms of open space.

Within public open spaces, there are some areas that are designated for special uses or functions, possibly with specialised facilities for recreation uses. In these spaces, the nature of the recreation activity may control access and preclude free, unrestricted access to members of the public. In other cases, land its associated and facility result in a single use activity. In all cases public infrastructure must meet accessibility requirements ensuring equitable access to public open space.

(b) Scope

Public open space Hierarchy and framework seeks to provide access to open space in accordance with the planning scheme in particular The Local Government Infrastructure Plan. This document identifies trunk network vs local and non-trunk, and dedication/contribution charge for non-trunk network.

(2) Public open space hierarchy – typology and hierarchy

(a) The public open space hierarchy refers to the size, form, and function of public open space which will vary significantly across different park types and other public open space typologies. As such, public open space networks are usually defined by various open space typologies that are rationalised, planned, and designed against a "Public Open Space Hierarchy".

This approach ensures that the distribution, development and management of public open space occurs in a strategic and structured manner that reflects the different classifications and importance of each open space typology.

Group and individual typologies within the Public Open Space Hierarchy reflect the diversity of functions and uses between different open space typologies within the city. Council's open space hierarchy has been divided into four functional groups:

(i) recreation parks;

(ii) sports parks;

(iii) streetscapes; and

(iv) other public open space.

(b) Importantly, it should be recognised that one area of public open space may contain more than one open space typology function across the different functional groups.

For example, a park may contain two informal sports fields (district sporting function), a local recreation node (local park function) and a drainage corridor (utility function). In instances such as this,the public open space may be:

(i) classified based on the most dominant function (e.g., classified a district sports park, with the presence of a local recreation node recognised but not separately designated); or

(ii) split into different functional areas, where each area is separately recognised and designated.

Classification of public open space against the hierarchy is reached through a strategic audit and evaluation of the open space, its characteristics, and the standards of embellishment. Profile, accessibility, and usage catchments are also a key determinant in hierarchy classifications, with typologies generally being categorised on a local, district or regional basis.

To support these classifications, council has developed a Public Open Space Embellishment Framework that defines the embellishments and infrastructure that are "Suitable" or "Accepted" for different public open space typologies. The purpose of this framework is to support equitable, cost-effective and sustainable development of public open space that is functional and meets the needs of the community.

The Public Open Space (POS) Embellishment Framework is further defined in Clause SC6.4.12.7 Attachment A - Public Open Space Embellishment Framework, and the balance of this section.

Editor's Note - Open Spaces classified as being of District or Regional significance have been determined as priority trunk infrastructure. (Refer Part 4 Priority Infrastructure Plan of the Townsville City Plan).

The proposed landscape design and character outcomes associated with the development

of public open space are required to demonstrate alignment with the standards set out in this section and address this through landscape design outcomes and in the “Landscape Statement of Intent”, as detailed in Section SC6.4.2 Development application guidelines.

(c) Recreation parks

Recreation Parks are generally defined by their size, location and potential uses in accordance with RAL and trunk infrastructure requirements. These parks include the following:

(i) amenity parks are landscaped areas with a strong focus on visual attributes. Traditionally Amenity parks may include monuments, memorials or gateway treatments. The park area may also include opportunities for passive recreation such as seating areas. An example of an Amenity Park is Garbutt Park, Garbutt, which acts as an entrance statement welcoming visitors and residents to Townsville;

(ii) civic parks and spaces are areas generally associated with a high level of built infrastructure. While recreation use is minimal they provide landscape and amenity values for the general community. Civic parks provide an urban respite for social interaction and community gatherings. Often characterized by hard surface treatments associated with its setting and high activity use levels, these spaces may be used for social events such as community markets;

(iii) pocket parks are open space parklands that offer a limited range of recreational activities for local residents. They are generally associated with specific urban design outcomes, e.g. to support small lot housing. These parks are intended to act as a supplement where local parks are too distant to access on foot for local residents;

(iv) local recreation parks are open space parklands that offer local residents a communal open space to complement their own backyards. Local recreation parks are ideally located within 400m walking distance from residential properties and are generally accessed by non-motorised transport. These parks contain only basic infrastructure for recreational use;

(v) district recreation parks are much bigger than local sized parks that can service several suburbs, or a whole community and or a community event. The parks provide for a variety of passive and active recreation and/or contain facilities to cater for a wider user group of all age and levels of ability. The parks are well known destinations for those people living within their catchment, enabling the park to become a significant social hub;

(vi) regional recreation parks are open space parklands that offer a wide variety of both active and passive recreation opportunities to a broad section of the community. The park area is capable of hosting large community events such as festivals, and unique functions. These parks have major embellishment features designed to attract visitation from a wider catchment area and encourage extended stay. It provides unique recreational experiences and is a major landmark and/or destination; and

(vii) recreation corridors are usually a linear open space that follows creeks, drainage channels, service corridors or green belts. Corridor parks traditionally have a dual functionality and may include opportunities for cycling, walking and other recreational activities. It can also provide an important ecological link for flora and fauna. Corridor parks are intended to provide a safe connection between two or more destination points. As a minimum, the width of these spaces should be no less that 15 metres at the narrowest point. These spaces are often the location of active transport use and design priority must be given to making these spaces safe for this purpose by maintaining passive surveillance opportunities and minimising narrow constrained spaces that could allow for entrapment.

Editor's Note - Currently, further definitions and intent statements are not developed for all individual recreation park typologies. Refer to Part 4 Local government infrastructure plan of the Townsville City Plan for definitions, distribution and land areas relating to trunk recreation parks.

(d) Sports parks

Sports parks provide facilities suitable for the practice and play of structured or organised sports. These are categorised according to their size and location and the level of embellishments provided. Facilities provided include large, open park spaces for sporting activities, lighting, a club house, toilet facilities, change rooms and off street parking.

Categories of sports parks include district, regional, and special use parks. District and regional sporting parks are generally accessible to the public at all times for various sporting activities while special use parks have specialised facilities that precludes free, unrestricted public access. These facilities may be under the control of Council or a private organisation creating a user pays system for the facility. Special use parks may include facilities to support the following activities: Water play parks/Privately Owned or Leased Swimming Pools, Equestrian, Archery/Bow hunting/Sport Shooting, Golf, Tennis, Lawn bowls, Model Planes and Motor Vehicle Sports.

Editor's Note – Refer to The Townsville City Council Sport and Recreation Facility Strategy 2018-2028 and supporting documentation for further guidance.

(3) Public Open Space Management (POSM) framework

(a) A key objective of the public open space management and associated levels of service is to ensure that the level of embellishment is consistent and sustainable with the available resources to maintain them.

Associated with the Public Open Space Hierarchy, council has developed a Public Open Space Management (POSM) Framework that specifies acceptable maintenance levels of service against different open space typologies. This POSM Framework and associated levels of service are also applied against the road hierarchy.

In accordance with the POSM Framework, infrastructure must not be provided where the necessary maintenance required exceeds the allocated maintenance level of service in order to ensure the public open space or items remain serviceable and safe for public use (e.g., dynamic fitness equipment that requires regular safety inspections or electric barbeques that require weekly cleaning to remain hygienic should not be installed in a park that has assigned monthly maintenance service). Further, the cost to establish, maintain and ultimately renew the infrastructure must be sustainable and cost effective for council and the community in the long term.

In order for council to properly assess future POSM requirements for each public open space development proposal, council requires a maintenance plan for maintenance activities, as detailed in Section SC6.4.2 Development application guidelines, Clause SC6.4.12.7 Attachment D - Parks and Open Space Maintenance Service Level and Clause SC6.4.12.7 Attachment E - Parks and Open Space Maintenance Costing Table. This maintenance plan must demonstrate alignment with the adopted POS Embellishment Framework and POSM Framework.

(b) Irrigation Profile Level (IPL) framework

As part of council's commitment to efficient, cost effective and responsible use of natural resources, council has developed an Irrigation Profile Level (IPL) Framework to categorise and define irrigation water usage within public open space.

(c) The IPL Hierarchy identifies and defines a number of “profile levels” based on the level of irrigation applied, an indicative “functional application” based on open space typologies, and the performance indicators associated with each irrigation application rate. Refer to Clause SC6.4.13.1 IPL hierarchy definition and matrix.

Supporting this, the IPL Matrix identifies a number of criteria and “influences” used in the determination of an assigned IPL. Refer to Clause SC6.4.13.1- IPL hierarchy definition and matrix.

Importantly, it must be recognised that the level of irrigation required is directly dependent upon the landscaping which it must support. As such, in the development of new public open space, the landscaping should be designed with consideration of the typical IPL classification for the public open space typology as well as the extent of landscaping and irrigation defined by the POS embellishment standards. Additional requirements are identified in Clause SC6.4.13.2 Irrigation design and system requirements.

For existing public open space, the IPL classification must be based upon the required irrigation application rate necessary to support the health and longevity of the existing landscaping. Where a change to the IPL is proposed, this must include consideration of the open space typology, the intended use of the open space area and the impacts of reduced water application rate on existing plant specimens and include changes to the landscaping plantings where required.

Critically, an area of public open space may have more than one IPL (e.g. “high” IPL level around the activity node or within the minimum usable space, and then a “medium” or “low” profile for the balance of the open space). To achieve this in an efficient and effective manner, however, the associated landscaping and irrigation systems must be purpose-designed for this outcome (i.e. separate irrigation systems consistent with species selection and placement based on principles of hydro-zoning).

(4) Streetscapes

(a) General requirements

Streetscape areas are the street or road landscape area including all public open space within the road reserve. The design and development of streetscapes will vary according to the road hierarchy, its associated function, as well as the surrounding land use and built environment.

Editor’s Note - Applicants should refer to Clause SC6.4.6.1 Geometric road design for more information.

It is noted, however, that there is interdependency between elements within the private realm and the overall streetscape. Critically, elements with the private realm (e.g., residential, or commercial frontages) contribute to the appearance and function of a streetscape. It is important, therefore, that any streetscape design proposal is integrated and responsive to the surrounding context.

All streetscapes must be designed, constructed and planted in accordance with:

(i) the provisions within the Townsville City Plan, planning scheme policies and this section of the Development manual planning scheme policy;

(ii) all applicable Australian Standards and legislation;

(iii) all applicable council local laws; and

(iv) all council approved standard drawings.

Editor’s Note - Where streetscape outcomes are within roads managed by the Department of Transport and Main Roads, applicants should refer to the Department of Transport and Main Roads’ *Landscape Design Manual* (2013). Requirements of the Department of Transport and Main Roads’ Landscape Design Manual will take precedence in these instances. Engagement and approval from other stakeholders/authorities may additionally be required as part of any development proposal.

All streetscape outcomes should be underpinned by and contribute to the safety and functionality of the streetscape while upholding the sustainability principles outlined in the landscape policy. At the same time streetscapes need to contribute to the aesthetic value of the place. Streetscapes must also represent value for money in both their implementation and life cycle costs while responding to the needs of the community and local environment.

Editor's Note - Whilst the above strategic objectives are relating specifically to streetscape outcomes, these objectives are aligned with the overarching sustainability principles outlined at the beginning of this section and within Part 9.3.3 Landscape code. Alignment with both the above strategic objectives and the overarching sustainability principles are to be expressed in the proposed streetscape design outcomes and detailed in the "Landscape statement of intent" per Section SC6.4.2 Development application guidelines.

(b) Safety

Streetscapes shall not introduce risk to road users and contribute positively to a safe road environment while being safe to construct and maintain.

Streetscapes shall create a safe road environment by ensuring:

(i) a safe system approach to road safety is used, as detailed by Austroads, where additional hazards, safety or security risks are not introduced to the streetscape;

(ii) safe and efficient pedestrian, cyclist and vehicle movement is facilitated through the integration of all infrastructure and landscape elements within the road corridor;

(iii) safe sight distances. Set backs and other clearances are applied and maintained as per Austroads Part 3 and Part 4. At intersections, use of Minimum Gap Sight Distance, and at roundabouts, criteria 1 and 2, are mandatory;

(iv) clear zones and frangibility requirements are met in accordance with clear zone criteria as per Austroads Part 6;

(v) signage and other road furniture is not obscured;

(vi) safety and traffic management is enhanced through the functional use of landscape plantings;

(vii) surface treatments are slip-resistant and non-reflective;

(viii) effects of glare and shadowing are minimised;

(ix) CPTED principles are incorporated into all streetscape designs; and

(x) a safe work environment for maintenance personnel is achieved and requirements for traffic control are minimised.

(c) Functionality

Proposed outcomes are fit-for purpose and comply with landscape and road planning and design principles, appropriate to the road hierarchy and function.

To this end streetscapes must:

(i) be supported by all other ancillary infrastructure requirements that are essential to the overall functionality and longevity of the streetscape, including but not limited to subsoil drainage, root barrier and irrigation (where required by Council); and

(ii) demonstrate sound application of design theories including legibility, form, function, connectivity, way-finding, accessibility and mobility, robustness, place-making and imaging.

Editor's Note - Where proposed streetscape outcomes deviate from the outlined requirements of this section, the merit for this deviation must be detailed. Notes documenting how all safety, functional and operational requirements are satisfied by the design exception must be included for further consideration. Any variances will be assessed on a case-by-case basis relative to the situation. Approval will not be granted where the design exception opposes safety requirements or increases safety risk. All plans are required to be signed off

by a RPEQ registered engineer.

(d) Environmental sustainability
Ecological and sustainable design principles are incorporated to mitigate the environmental impacts of the road and maintain or improve the intrinsic value of the streetscape.

These include:

(i) street trees must be integrated into the streetscape that will create shade for all users (including pedestrians and cyclists) and ameliorate the urban heat island effect;

(ii) applying an appropriate planting approach such as: structured, naturalistic, and water sensitive planting; grass seeding; or turfing;

(iii) providing a buffer between the road and surrounding land uses;

(iv) integrating the streetscape within natural areas through planting approaches with a natural appearance and naturalistic, informal distribution;

(v) improving the health and resilience of the urban forest by establishing green corridors along streets or roads and providing habitat corridors within the urban matrix;

(vi) functional landscape components must be incorporated such as the use of vegetation to screen headlight glare;

(vii) using varied vegetation treatments to highlight progression or transition to a different speed environment;

(viii) using vegetation and other components to maintain or frame views;

(ix) large areas of streetscape must be treated in an economical way, with regard to construction, maintenance and ongoing contribution to the urban fabric;

(x) streetscape treatments must assist with integrated stormwater management by establishing vegetation that will reduce erosion and avoid large expanses of impervious surface; and

(xi) vegetation with “temporary irrigation “and other treatments must be incorporated in ways that minimise maintenance in high risk areas, require reduced maintenance interventions and become self-sustaining over time.

(e) Aesthetic value
Streetscapes provide high visual amenity and are contextually sensitive to the character of the surrounding built and natural environment. Streetscapes shall be contextually sensitive and provide high visual amenity by:

(i) establishing streetscape characters themes that address, retain, reflect and where possible enhance the local context of the project area (architectural themes, colours, visual heritage values etc.);

(ii) creating balance in term of scale and mass between new streetscape components and the existing natural features and urban building forms;

(iii) integrating natural elements that recognise and promote the value of the urban forest in all streetscapes;

(iv) establishing innovative approaches to providing functional, high amenity outcomes whilst maintaining and enhancing the safety and operational function of the road;

(v) responding to changes in road conditions and promoting legibility under varied road conditions or different design speeds;

(vi) presenting a visually cohesive and unified suite of treatments that are simple, refined and without unnecessary, non-functional embellishment;

(vii) creating treatments that are visually recessive except where intended to be highly visible feature elements;

(viii) maintaining an uncluttered road environment with limited visual intrusion that will minimise risk of road user distraction and minimise conflict with official traffic signs and signals; and

(ix) devising colouration and surface treatment solutions that shall mitigate the visual impact of dirt, staining and adhesion of other pollutants.

(f) Community value
Proposed streetscape outcomes are responsive to the needs and concerns of stakeholders and maintain or improve the quality of life and liveability of communities by:

(i) identifying and addressing community values and associated interests, perceptions and preferences as part of transport and road landscape planning and design process;

(ii) promoting participation and contribution by implementing effective community engagement processes;

(iii) enhancing public amenity for all users through improvements to user comfort, way finding and walkability;

(iv) promoting the health and well-being of the community by improving the useability of pedestrian networks through provision of shade and the like;

(v) improving accessibility, connectivity and security within the streetscape;

(vi) establishing streetscapes that are functional and facilitate equitable access to a variety of multi-modal transport systems;

(vii) seeking design outcomes that create a sense of community and reinforce local character, identity, and cultural heritage; and

(viii) improving experiences both for users traveling within the transport infrastructure corridor itself and the community beyond.

(g) Economic Value
Streetscapes must represent value for money and provide cost effective design outcomes that seek to minimise costs over whole of life cycle by:

(i) implementing appropriate designs that provide balanced outcomes across all strategic objectives;

(ii) creating iconic gateway entry statements, in strategic locations only, which emphasise the urban or regional identity and enhance tourism, business potential and associated economic benefits;

(iii) promoting increased usage and visitation to business and services through the provision of user friendly vehicular, pedestrian, cyclist and public transport networks which incorporate a high level of amenity and deliver a high quality experience;

(iv) ensuring the ongoing cost and level of service for operational requirements associated with the streetscape is appropriate for the hierarchy and profile of the road;

(v) minimising the overall cost of operational activities through responsive design that reduces high cost, high risk, high frequency and high intensity activities;

(vi) avoiding landscape treatments that require traffic control to maintain (for example hedges in a road reserve that require lane closure to maintain);

(vii) creating designs that will evolve into a self-sustaining streetscape and have a progressive reduction in the number of maintenance interventions over the operational

life of the corridor;

(viii) promoting alternatives to permanent irrigation where seasonally dry landscape aesthetic outcomes are consistent with the local character and road; and

(ix) promoting innovation in the development of alternative treatment types that achieve a balance between the desired aesthetic and reduce maintenance outcomes.

(5) Other public open space

(a) Other types of open space that are listed below generally have very little in the way of embellishments other than those to allow the fulfillment of their purpose. Infrastructure or embellishments in these spaces may change over time and result in a change in the function of the open particular space allocation.

(i) Natural and bushland areas: are set aside primarily for conservation purposes to protect and retain natural vegetation and habitat areas. Size may range from small to large areas that reflect the importance of the environmental value. These parks may also provide opportunities for outdoor recreation activities such as bushwalking, trail running, mountain biking, nature viewing and appreciation. Embellishment improvements are generally limited infrastructure associated with the above activities such as seating, lookouts and signage. Some of the park areas may also include cleared areas intended to be rehabilitated to improve habitat corridors.

(ii) Utility spaces / easements are areas that are often owned or maintained by council, for specific utility services such as electrical transmission, telecommunications, water and sewerage pump stations or other infrastructure purposes. These spaces may offer some dual functionality for recreation activities such as walking, cycling or civic amenity.

Editor's Note - Applicants should refer to guidelines for public utilities or more information.

(iii) Unallocated open space may be any reserve area of land and/or water reserve which has not been named or developed at present, but which has been deemed important enough to be set aside for future open space development. A proposed park area is usually substantially undeveloped with no built infrastructure and only minor improvements such as rural fencing.

(iv) Cemeteries are an area under the control of council that is dedicated for the burial of the dead, or containing graves, tombs, funeral urns and interment of ashes.

(6) Open space embellishments

(a) General requirements

The design requirements for public open space areas are in a general sense to embellishments to open spaces to fulfill the design principles of landscaped and open space areas nominated in Clause SC6.4.12.1 (2) Design principles and Part 9.3.3 Landscape code.

Embellishments may be hard or soft landscape embellishments but must be consistent and sustainable to achieve the open space use allocation in accordance with the POS Embellishment and the POSM Framework.

As such, infrastructure must not be provided where the necessary maintenance required exceeds the allocated maintenance level of service. This is to ensure that the public open space or items remain serviceable and safe for public use (e.g. dynamic fitness equipment that requires weekly safety inspections or electric barbeques that require daily cleaning to remain hygienic should not be installed in a park that has assigned fortnightly maintenance service intervention). Further, the cost to establish, maintain and ultimately renew the infrastructure must be sustainable and cost effective for council and the community in the long-term.

Open space embellishment levels should be consistent with the assigned public open space hierarchy and typology (Refer to SC6.4.12.7 Attachment A - Public Open Space Embellishment Framework) and / or road hierarchy classification or the characteristics of the associated land use.

Where private open space is associated with development, the private open space shall be considered on a case-by-case basis with consideration of the design selection criteria set out below.

(b) Selection criteria

The following key characteristics should be considered in the design process when selecting the level of embellishment for all public open space (including Streetscapes):

(i) comply with any adopted master plan, environmental, heritage and character requirements;

(ii) consider the context, functionality and purpose for use (e.g. particular open space usage patterns for the site such as regular use for community events, or shared usage by multiple tenants in a large residential complex);

(iii) consider the setting, durability and aesthetic requirements for the intended area (e.g. specific materiality requirements for areas with a risk of vandalism, or more ornate detailing for intimate private courtyard space);

(iv) cater for the expected usage rates, demographic/s and their associated needs (e.g. reduced intervals between accessible bench seats along a pathway at a location with large senior user group);

(v) be located at appropriate locations or intervals, clustered near activity nodes and/or to complement any distinguishing site features (e.g. seating situated to maximise a vista or allow surveillance of a play area by carers);

(vi) be climatically appropriate and consider localised conditions of the site (e.g. dynamic activity elements in coastal areas are not located in areas exposed to high onshore winds and salt spray);

(vii) ideally be located under natural or built shade to allow day long use through reduced exposure, glare and heat absorption (e.g. playground slides to be shaded or, communal gathering areas located under shelters);

(viii) complement natural materials or features and/or incorporate these where possible (e.g. grass mounding for seating; feature rock retaining walls consistent with local geology);

(ix) be vandal resistant;

(x) be installed on an appropriate surface material, on well drained ground and with an appropriate level of flood immunity (e.g. playgrounds not installed in an area surrounded by a retention basin); and

(xi) prioritise use of recycled, sustainable materials where practicable and available (e.g. decking to be constructed of recycled plastic and composite fibre supports).

(xii) complement those facilities in nearby precincts or parks, ideally providing diversity in the facilities available to the community;

(xiii) be consistent with any an existing style that is already established unless approved otherwise;

(xiv) only include high quality, fit for purpose, proprietary items for which replacement parts are readily available from an Australian distributor;

(xv) for district and regional level parks, custom items may be permitted at particular sites,

where the profile and location of the park warrants it;

(xvi) avoid the use of timber elements unless approved otherwise;

(xvii) utilise high quality finishes that will reduce ongoing maintenance requirements and/or frequency (e.g. 2PAC epoxy paint in lieu of powder coating where items are not easily dissembled or repainted); and

(xviii) for all foreshore locations and other locations subject to salt spray or prolonged wet conditions, embellishments must be constructed of marine grade materials, including 316L stainless steel fittings, to ensure improved asset longevity and lifecycle cost reduction.

Editor's Note - Areas within this section provide specifications for individual open space infrastructure types and for landscape treatments in streetscapes.

SC6.4.12.4 Hardscape embellishments

(1) Introduction

All hardscape embellishments must be designed, constructed, and maintained in accordance with:

(a) appropriate abrasion resistance in accordance with test methods stipulated in AS/NZS 4456.9 - Masonry units and segmental pavers and flags - Methods of test - Determining abrasion resistance;

(b) appropriate slip resistance capability as required by AS/NZS 4586 - Slip resistance classification of new pedestrian surface materials;

(c) be colour-fast, UV resistant and non-reflective;

(d) ensuring treatments are durable, weatherproof, and of robust construction and finish to reduce repair or replacement frequency;

(e) minimising the potential to create litter traps;

(f) promoting resistance to damage, vandalism, unauthorised use and removal;

(g) promoting easy cleaning, unhindered accessibility and suitable for maintenance activities including mechanical cleaning procedures;

(h) incorporating erosion and sediment control measures to reduce clearing out of drains; and

(i) minimising the need for herbicide applications and brush cutting around furniture such as guard rail posts or signs.

Where the width of hard landscape treatments may exceed 6 m, it is desirable that a combination of hard and soft landscape treatments is used to avoid large expanses of hard surface and minimise the Urban Heat Island Effect. This excludes roundabouts below 10 m in diameter.

(2) Surface treatments

(a) General

Surface treatments within all open space are to be:

(i) of an appropriate extent and material that will be durable under the local climatic and site conditions, being permeable where possible to mitigate potential overland flow;

(ii) fit for the intended purpose of the surface, its location, and the anticipated type and level of usage;

(iii) shaded wherever possible and not prone to excessive heat retention, reflectivity and glare;

(iv) not conducive to water pooling or slippery when wet;

(v) designed and located with consideration of the need for softening of hard surfaces with plantings; and

(vi) be practical to maintain.

(b) Materials

Landscape hardscape treatments may include:

(i) artificial turf – this treatment is only to be used in public spaces where it provides a maintenance advantage to Council or an aesthetic associated with high profile public infrastructure (playground);

(ii) stencil-crete;

(iii) concrete (plain, coloured or exposed aggregate);

(iv) permeable paving treatments (Refer to Clause SC6.4.12.7 - Attachment B - Permeable Paving Colour Guide or click here to view the document); and

(v) other associated hard landscape treatments – unit pavers (brick pavers or similar) are not to be used in public open space as their life cycle costs are excess of expectations for hard pavements.

Editor's Note - Refer to the potential specialty footpath requirements under Clause SC6.4.20.1 Footpath treatment.

(3) Fencing, barriers and screening

(a) Fencing, barriers and screening elements described in this section may be fencing or architectural screening to obscure a view into or out of a location. These barriers may also perform an acoustic attenuation function (refer to Section SC6.4.19 Noise and vibration) or to mark a property boundary or edge of a particular activity or use area.

(i) Fencing, screens / barriers are often used to define a property boundary and may include, but are not limited to the following:

1. fencing panels;
2. bollards;
3. post and rail systems;
4. architectural screening;
5. rural type fencing; and
6. other crash barriers.

(ii) Fencing, screens / barriers are to be provided in order to:

1. provide a legible definition of the open space boundaries and limits;
2. provide enclosure of a space appropriate to its function (e.g. fenced playgrounds);
3. prevent encroachment into open space by adjacent private properties;
4. mitigate noise impacts from adjoining land uses (refer to Section SC6.4.19 Noise and vibration);
5. prevent unwanted vehicle access by the provision of barriers along the road frontage, including into drainage reserves, parks and other public open spaces;
6. restrict access to unsafe locations or private property; and

7. promote passive surveillance of an area (CPTED).

(iii) All fencing, screens / barriers must be designed, constructed and installed in accordance with:

1. the provisions within the planning scheme, planning scheme policies and this section of SC6.4 Development manual planning scheme policy;

2. manufacturer specifications;

3. all applicable Australian Standards and legislation;

4. all applicable council local laws; and

5. council's approved standard drawings.

Editor's Note - Currently, limited standard drawings are formally adopted for fencing.

(iv) Fencing, screens / barrier materials, design and location.

1. Materials, design and location should not unreasonably hinder pedestrian circulation through open space, with sufficient pedestrian access points to be provided.

2. Where vehicle access prevention is required along pathways or bikeways, bicycle deflections rails are the preferred method and removable bollards should be avoided. Refer to Section SC6.4.3 Standard drawings SD-066 - Miscellaneous Traffic Details – Shared Path Terminal Treatments Deflection Rail and Intersection at Side Road.

3. For public open space or streetscapes, proposals should seek to be consistent with the existing style that is already established unless approved otherwise.

4. Materials, design and location should be considered in the context, functionality and purpose (e.g. post and rail installed where prevention of vehicle access, including motorbikes, is required).

5. Public playground area and pool fencing must be in accordance with AS1926.1 Swimming pool safety – safety barriers for swimming pools. Fixings for fencing and gates must be of a commercial grade to contend with high usage.

6. Where appropriate, use of plants to for screening or to soften the fencing is recommended, except where this will conflict with CPTED requirements.

7. Fencing of private allotments along common boundaries with open spaces, particularly corridor parks, must restrict their screening height to 1500mm to promote a level of passive surveillance of the adjacent open space. Above this height, the fencing material must allow for views through to the adjacent open space promoting passive surveillance of these open spaces. Where appropriate, Council may condition the use of transparent panels to increase the level of casual surveillance.

(v) Fencing / screening alignment and type shall include consideration of ongoing maintenance requirements and ensure:

1. access for maintenance and other authorised vehicles shall be provided through a lockable gate or removable bollard, including provision of a kerb ramp or crossover at a safe location acceptable for Council;

2. planting must be offset from fencing to allow enough space for the maintenance of the fencing and the planting and to discourage the dumping of refuse from private property into public open space. Minimum offsets are suggested at 0.5 – 1m however these are dependant of the size of the adjacent open space;

3. where provided in turf, a minimum 2 m wide clearance to other infrastructure (including trees) shall be maintained on either side of the fencing alignment to allow efficient mowing activities;

4. where bollards are provided in concrete, construction joints shall be provided to minimise damage to concrete slabs due to collisions, and allow ease of removal and replacement to damaged bollards; and

5. fencing is to be located within the surveyed boundary of the open space allotment or where open space borders private property, fencing is to be located within the surveyed boundary of the private allotment.

(4) Shelters and shading devices

(a) General

(i) Shelters and shading devices may include, but are not limited to the following:

1. awnings;

2. picnic shelters or gazebos; and

3. shade sails.

(ii) All shelters and shading devices must be designed, constructed and installed in accordance with:

1. the provisions within the planning scheme, planning scheme policies and this section of SC6.4 Development manual planning scheme policy;

2. manufacturer specifications;

3. all applicable Australian Standards and legislation;

4. all applicable council local laws; and

5. council's approved standard drawings.

Editor's Note - Currently, no standard drawings are formally adopted for shelters and shading devices.

(b) Awnings

Editor's Note - Due to the place-specific, custom nature of awnings, no standard specifications are currently developed. Proposals will be considered on a case-by-case basis in accordance with all applicable building and engineering requirements, Australian Standards and council's overarching design and management principles. Applicants should refer to Clause SC6.4.20.2 Outdoor dining design for permanent outdoor dining structures for shading requirements applicable in this situation.

(c) Shade sails

(i) All shade sails are to be:

1. designed, engineered, built and certified against Building Code of Australia, C2 wind rating requirements as per AS1170 *Structural design actions* and all other applicable standards;

2. located with consideration of shading requirements, sun orientation and natural shading opportunities on site. As such, provision must be considered on a case-by-case basis, and account for the existing versus desired extent and daily duration of shade cover (natural and built);

3. provided in public car parking areas as a substitute to natural shading when there is insufficient available planting space or shade sails are deemed a more practicable and/or cost effective shading system;

Editor's Note - Refer Clause SC6.4.12.5 (6) Car park plantings for additional information.

4. be provided at approved locations and in accordance with council's Public Open Space Embellishment Framework, as detailed in Clause SC6.4.12.7 Attachment A - Public Open Space Embellishment Frameworks, unless approved otherwise

5. be primarily provided over high use activity elements. Demand and need for shade sails is likely to be higher in greenfield sites or where there are minimal mature shade trees. In these instances, shade sail provision should be supplemented by ancillary shade tree plantings to ensure both natural and built shade are developed in the long term;

6. be located to minimise proximity to trees that may increase maintenance due to leaf drop or pose a risk to the sail structure from falling limbs during storm events;

7. have a 2.5 m minimum clearance between the highest accessible standing point of the shaded equipment/item and the lowest point of the shade sail. Access opportunities from adjacent structures should also be avoided, in order to reduce potential vandalism and damage to the structure or sail;

8. within playground areas, all poles are to be located outside equipment fall zones and, where practicable, outside the softfall surfacing area provided this will not conflict with mowing activities or circulation;

9. be of premium quality shade fabric made of 100% monofilament yarns with a 10 year fabric warranty unless approved otherwise;

10. include hot-dipped galvanised and powder coated poles of a colour consistent with any existing colour palette or adjacent park infrastructure;

11. pole profile and diameter should inhibit climbing of the poles or anti climbing devices should be installed;

12. include marine grade fittings for all locations; and

13. include quick release mechanisms on all sails for ease of removal during storm events and all necessary edge reinforcement and hardware to ensure longevity of the shade sail.

(d) Shelters and gazebos

(i) All shelter structures are to be designed, engineered, built and certified against Building Code of Australia, C2 wind rating requirements as per Australian Standard AS 1170.2 *Structural design actions – wind actions* and all other applicable standards.

(ii) All shelter installations within public open space are to:

1. be provided at approved locations and in accordance with council's Public Open Space Embellishment Framework, as detailed in Clause SC6.4.12.7 Attachment A - Public Open Space Embellishment Framework;
2. have a minimum 300 mm clearance from the edge of the roofline to the edge of the slab to reduce erosion around the structure;
3. be design and installed without roof guttering systems unless specified otherwise;
4. have a frame constructed of oiled hardwood timber, or marine grade metal materials;
5. include marine grade fittings for all locations; and
6. where painted, be of a colour consistent with any existing colour palette or accompanying furniture suite.

(5) Structures and buildings, Llokout platforms, and fishing pontoons

(a) General requirements
Structures and buildings may include, but are not limited to the following:

(i) public toilets;

(ii) community facilities;

(iii) commercial facilities;

(iv) lookout platforms;

(v) fishing pontoons;

(vi) clubhouses, change rooms or canteens; and

(vii) sheds and shipping containers.

Currently, no further guidelines and standards are developed for the provision of structures and buildings across the public open space network. Inclusion of structures and buildings will be considered on a case-by-case basis and in accordance with the Public Open Space Hierarchy and Embellishment Frameworks and all other applicable sections of the Townsville City Plan and sections of SC6.4 Development manual planning scheme policy. Where council develops and adopts a strategic plan for the provision of outdoor sporting facilities, all development proposals will be assessed against the provisions within that plan.

(b) Public toilets

Currently, no further guidelines and standards are developed for the provision of public toilets across the public open space network. Inclusion of public toilets will be considered on a case-by-case basis in accordance with the Public Open Space Hierarchy and Embellishment Frameworks and all other applicable sections of the Townsville City Plan and sections of SC6.4 Development manual planning scheme policy. Where council develops and adopts a strategic plan or design guidelines for the provision of public toilets, all development proposals will be assessed against the provisions within these documents.

(c) Lookout platforms and fishing pontoons will only be permitted in limited circumstances, at specific locations, and where all relevant considerations are reasonably satisfied.

(i) Where the proposed lookout platforms or fishing pontoons are associated with public open space, council owned land or will involve potential future council assets, infrastructure may only be permitted at approved locations and in accordance with Clause SC6.4.12.7 Attachment A - Public Open Space Embellishment Framework.

(ii) In order to properly assess any such proposals, council may request the provision of a maintenance plan as part of the development application, as per Section SC6.4.2 Development application guidelines, Clause SC6.4.12.7 Attachment D - Parks and Open Space Maintenance Service Level and Clause SC6.4.12.7 Attachment E - Parks and Open Space Maintenance Costing Table.

Due to the place-specific, custom nature of lookout platforms and fishing pontoons, no standard specifications are currently developed. Proposals will be considered on a case-by-case basis in accordance with necessary requirements defined by all applicable engineering and water safety standards, legislation, and council's overarching design and management principles. Engagement and approval from other stakeholders/authorities may also be required as part of any development proposal.

(6) Furniture (and park signage)

(a) General requirements

Where within public open space or streetscapes, furniture should be consistent with any existing or adopted furniture suite for the public open space or streetscape, unless approved otherwise.

Currently, no city-wide adopted furniture suite is developed. Some individual locations do, however, have formally adopted furniture suites and colour schemes. Others have informally established suites and colour schemes that have developed over the years. In both instances, new furniture selection should be consistent with these suites unless reasonable justification for deviating from the palette can be established.

(i) Furniture may include, but is not limited to the following:

1. barbeques (gas, electric and wood-fired);
2. benches, seats and picnic settings;
3. refuse bins;
4. signage for public open spaces;
5. bicycle parking facilities;
6. water bubblers and taps; and
7. tree grates and guards.

(ii) All furniture must be designed, constructed and installed in accordance with:

1. the provisions within the planning scheme, planning scheme policies and this section of SC6.4 Development manual planning scheme policy;
2. manufacturer specifications;
3. all applicable Australian Standards and legislation;
4. all applicable council local laws; and
5. council's approved standard drawings.

Editor's Note - Currently, limited standard drawings are formally adopted for furniture.

(b) Electric and gas barbeques

(i) Within public open space, gas and electric barbeques are to only be provided at approved locations and in accordance with Council's Public Open Space Embellishment Framework, as detailed in Clause SC6.4.12.7 Attachment A - Public Open Space Embellishment Framework.

Deviation from Council's Public Open Space Embellishment Framework

provisions for barbeques may only be considered where sufficient benefit to the wider community is demonstrated and supplementary conditions are satisfied. Proposed deviations must be discussed with council at preliminary approval stage and will only be approved where all community expectations have been considered; an extended maintenance period has been successfully negotiated and all other conditions are satisfied.

(ii) Where permitted, gas and electric barbeques must be provided in accordance with council approved standard drawings.

Editor's Note - Currently, no standard drawings are formally adopted for electrical and gas barbeques.

(iii) The following are the specifications for outdoor gas and electric barbeques:

1. cooktops to be all stainless steel construction, including high efficiency mono pressed stainless steel hotplate with laminated heat dispersion coating, high contact heating element and all stainless clamp plate;
2. timing, ignition and temperature control functions should feature on all hotplates to ensure optimum cooking temperature is constantly maintained and to maximise performance and efficiency. Visual and audible indication of operation and mode change should also be a key feature;
3. safety push button/stop systems are a mandatory requirement. These should ideally be located above the bench top, out of reach of children and fitted with a safety delay feature to ensure units cannot be inadvertently turned on;
4. hotplates are to be enclosed in a raised hob elevated and isolated above the bench top and with a minimum 100 mm protection zone. Benches should be designed without protrusions or ledges that may assist climbing;
5. hotplates should be non-porous with no welds, creases or deep corners to trap food and bacteria. An automatic pre-heat mode should also feature and deliver minimum sterilising temperature;
6. enclosure frames are to consist of high strength, powder-coated aluminium extrusions. Cladding to be 18 mm compressed fibre cement backing panels with 0.55 mm stainless steel decorative fascia panels or approved similar. All doors to be stainless steel powder-coated or brushed stainless steel and fitted with a door lock matching council's preferred security key system;
7. barbeques are to be ideally located underneath a shelter, mounted on a concrete slab with minimum 450 mm clearance around the bench top on all sides;
8. units should be fitted with a fat collection tray with unobstructed access through maintenance access doors. Components should be designed to be easily unbolted and lifted out for maintenance and easy replacement;
9. electric components to be all fully sealed and power requirements are to be 240 volt A.C., 3.6 Kw, per plate or approved similar. All electrical works to be undertaken by a qualified electrician and in accordance with all relevant Australian Standards and legislation;

10. gas barbeques may only be permitted by council where electricity power supply is restricted or where connection to an electrical supply is cost prohibitive. Gas supply to be installed by a qualified plumber and in accordance with all relevant Australian Standards and legislation;

11. a water tap should be readily accessible to the barbeque cooking and eating area for ease of use during barbeque operation and cleaning; and

12. a minimum 2 year warranty must be provided with all barbeques installed within public open space.

(iv) Wood fire barbeques and open fire areas

1. Wood fire barbeques or open fire areas are NOT to be provided unless approved by Council.

2. “Natural settings” will be the only exception where wood fire barbeques or open fire areas may be permitted. Adequate environmental, fire and other safety measures must be included as part of any provision proposal to Council.

3. Where permitted, wood fire barbeques must be provided in accordance with council approved standard drawings.

Editor’s Note - Currently, no standard drawings are formally adopted for wood fire barbeques and open fire areas.

(v) Benches, seats and picnic settings

1. Where provided, benches, seats and picnic settings must be provided in accordance with council approved standard drawings with allowance for DDA at picnic settings.

Editor’s Note - Currently, no standard drawings are formally adopted for benches, seats and picnic settings**.**

2. All benches, seats and picnic settings are to be flange mounted on an appropriately sized concrete slab unless approved otherwise.

(vi) Refuse bins

1. Where provided, refuse bins must be provided in accordance with council approved standard drawings.

Editor’s Note - Currently, no standard drawings are formally adopted for refuse bins.

2. For district and regional level parks, civic spaces and amenity parks, acceptable bin provision includes 240 L rubbish and recycling wheelie bins, with single or dual bin enclosures, mounted on a concrete slab. Cigarette Butt bins may be attached where deemed appropriate or requested by Council.

3. For local recreation parks and all other public open space, acceptable bin provision is restricted to 240 L rubbish and recycling wheelie bins, mounted on a concrete slab with a metal security bin stand unless approved otherwise.

Editor’s Note - Refuse bin style and design for streetscapes will be considered on a case by case basis until further standards and design guidelines are developed.

4. For all public open space and streetscapes where bin enclosures are provided, these must be fitted with a door lock matching council’s preferred security key system.

5. For all public open space, variations to size and quantity standards may be approved, as required to support the associated waste collection requirements, particularly at locations of high usage or where sporting and community clubs are

co-located.

6. All bins and enclosures are to located to ensure ease of accessibility for use and waste collection, without compromising the amenity of the public open space or adjacent land uses.

7. All bins and enclosures are of a design, construction and location that minimises any likely impacts, or the risk of hazards due to vandalism or fire.

(vii) Bicycle parking facilities

1. Bicycle parking facilities are to be provided in accordance with AS 2890.3 Parking facilities – Bicycle parking facilities.

(viii) Tree guards

1. Tree guards may be used in order to temporarily, semi-permanently or permanently protect trees during establishment and ongoing growth.

2. Trees guards should consist of proprietary available products and be installed as per manufacturer specifications.

3. Where new trees are to be planted within known areas of high vandalism, more durable, vandal resistant, temporary tree guards may need to be selected and installed to reduce potential loss of new plantings during establishment.

4. Where tree guards are to be provided semi-permanently or permanently and/or in conjunction with tree grates, tree guards are to be designed, constructed and installed as an integrated component of the tree grate system. In these instances, all requirements for tree grates detailed below should be considered, where applicable.

(ix) Tree grates and surrounds are to be provided in accordance with the following;

1. tree grates are to be designed, constructed and installed in accordance with AS 3996 – Access covers and grates;

2. tree grates and alternative tree surrounds are to be provided in order to increase the usable walking space, protect tree and root systems and provide a cost effective solution to reduce maintenance requirements;

3. installation of tree grates and tree surrounds is to be limited to high trafficable areas of streetscapes (as detailed in Clause SC6.4.20.1 Footpath treatment), regional level parks and civic spaces, unless approved otherwise;

4. the tree grates or surrounds should be of an appropriate material, size and colour suitable for the location, tree type and available space. Tree grate or surround design must allow for the penetration of air and water to the soil, whilst minimising potential trip and slip hazards and rubbish trapping. Consideration should be given to the growing habit of the selected trees, trunk shape, "off centre" trunks and expected changes to trunk and root diameter, allowing for variation or future modification with tree growth;

5. tree grates or surrounds must be installed flush with adjacent surfaces, with grate metal support frames and appropriate fixings to be installed at the time of construction, as required to meet the specified loading capacity;

6. tree plantings with grates or other surrounds must be supported by all other necessary elements including but not limited to, structural root cell, root barrier, drainage gravel, and perforated pipe;

7. permeable paving may be considered to be a suitable tree surround option, particularly for installation around existing, mature trees but will only be considered on a case by case basis so that maintenance and arboricultural considerations can be evaluated; and

8. where Clause SC6.4.20.1 Footpath treatment applies, permeable paving may be considered as an alternative option for tree grates but would be considered on a case by case basis. In these instances, the specified colours must be used, in accordance with the pavement treatment hierarchy as per Section SC6.4.20.1 Footpath treatment. Clause SC6.4.12.7 Attachment B - Permeable Paving Colour Guide, provides the corresponding permeable paving colours relative to the footpath treatment pavement hierarchy.

(x) Water fountains and taps

1. For all public open space, ready access to a potable water source is to be provided as part of any open space development, including at activity nodes and at reasonable intervals along corridor parks or recreational pathways.

2. All water fountains and taps should be located near existing services and water supply points wherever possible, focused around activity nodes or areas of high use.

3. Dog bowls should be included as part of water fountain provision where necessary as detailed in Clause SC6.4.12.7 Attachment A - Public Open Space Embellishment Framework. Additional separate stand-alone units (or two dog bowls per water fountain) may be required where anticipated usage will be very high (e.g. in dog off-leash area).

4. All water fountains should be installed on a concrete slab, above a drainage well and with adequate surface drainage inlets to prevent water pooling on adjacent surfaces.

5. For all public open space, water fountains and taps should be designed, constructed and installed as per council specifications detailed in Section SC6.4.3 Standard drawings for landscape and open space. Each water fountain/tap is be connected to a metered water connection.

(xi) Park signage may include, but is not limited to the following:

1. park name signs;

2. information signs;

3. directional signs; and

4. regulatory signs.

Editor's Note - For signage within public open space, consideration should be given to the Public Open Space Embellishment Framework and council's corporate branding requirements, as detailed in Council's Graphic Standards Manual (GSM).

(7) Electrical / Lighting / CCTV

(a) Lighting

(i) All lighting must be architecturally consistent with other lighting in the locality and suitable for tropical climatic conditions (including a heat rating of >50ºC). All lighting products proposed must be readily available from an Australian stockist and noted by the stockist as being readily available into the foreseeable future (i.e. not a discontinued product).

(ii) Public open space lighting must be designed, constructed and installed in

accordance with:

1. the provisions within the planning scheme, planning scheme policies and this section of SC6.4 Development manual planning scheme policy;
2. manufacturer specifications;
3. all applicable Australian Standards and legislation;
4. all applicable council local laws; and
5. council's approved standard drawings.

Editor's Note - Currently, no standard drawings are formally adopted for lighting.

(iii) Lighting requirements within public open space will be advised by council in accordance with the hierarchy classification of the public open space or pathways involved, including defining the appropriate lighting category.

(iv) Power supply options (mains or solar) will be considered on a case-by-case basis, subject to the nature of the proposal, the existing supply opportunities and the site context.

(v) All lighting works must be undertaken in accordance with Section 6.4.14 Public utilities and building over/near services.

(vi) Pathway lighting - Bicycle paths or pedestrian paths within public open space that require lighting shall be lit to the council specified applicable pathway lighting category, as per AS 1158 Lighting for roads and public spaces and Section 6.4.14 Public utilities and building over/near services.

(vii) Activity node lighting - Pathways within public open space that require lighting shall be lit to the council specified applicable pathway lighting category, as per AS 1158 Lighting for roads and public spaces and Section 6.4.14 Public utilities and building over/near services.

Editor's Note - Currently, no further standards are set for lighting of activity nodes. Council will consider these requirements on a case-by case basis until formal standards are set.

(viii) Sports field and court lighting in accordance with Section 6.4.14 Public utilities and building over/near services.

Editor's Note - Currently, no further standards are set for lighting of sports fields and courts. Council will negotiate these requirements on a case-by-case basis. Guidance on the recommended levels of illumination for each sport can be found in external references such as the Western Australian Department of Sport and Recreation Sports Dimensions Guide for Playing Areas.

(b) Electrical

(i) All electrical works must be undertaken in accordance with Section 6.4.14 Public Utilities and building over/near services~~,~~ all applicable Australian Standards and legislative requirements.

(c) CCTV

(i) All CCTV systems must be undertaken in accordance with Section 6.4.14 Public utilities and building over/near sServices (or similar public surveillance system standards) and all applicable Australian Standards and legislative requirements.

(8) Activity elements (incl. playgrounds, water play, etc.)

(a) General requirements

All activity equipment proposed should be readily available into the foreseeable future (e.g.. not a discontinued product) and have locally available spare parts and servicing.

(i) Activity elements may include, but are not limited to the following:

1. outdoor fitness equipment;
2. play spaces and play equipment;
3. softfall surfacing;
4. skate and parkour elements and facilities; and
5. informal sporting facilities.

(ii) All activity elements must be designed, constructed and installed in accordance with:

1. the provisions within the planning scheme, planning scheme policies and this section of the Development manual planning scheme policy;
2. manufacturer specifications;
3. all applicable Australian Standards and legislation;
4. all applicable council local laws; and

(b) Outdoor fitness equipment

(i) Outdoor fitness equipment may include a combination of:

1. static fitness equipment such as step ups, hurdles and sit up benches; and
2. dynamic fitness equipment such as bench presses, leg presses and pull downs.

(ii) Within public open space, outdoor fitness equipment shall only be provided at approved locations and in accordance with council's Public Open Space Embellishment Framework, as detailed in Clause SC6.4.12.7 Attachment A.

Editor's Note - Currently no further guidelines and standards are developed for the provision of outdoor fitness equipment across the public open space network. Inclusion of fitness equipment within public open space will be considered on a case-by-case basis and with consideration of the Public Open Space Hierarchy and Embellishment Frameworks. Where council develops and adopts a strategic plan for the provision of outdoor fitness equipment, all development proposals will be assessed against the provisions within that plan.

(iii) Fitness equipment selection

1. All fitness equipment shall be designed, manufactured, installed, certified and maintained in accordance with all applicable Australian Standards, including:

a) AS4685 – *Playground equipment – General safety requirements and test methods;*

b) AS2555 – *Supervised adventure playground – Guide to establishment and administration;*

c) AS4422 – *Playground Surfacing – Specification, requirements and test methods;* and

d) AS4486.1 – *Playgrounds and playground equipment – Development, installation, inspection, maintenance and operation.*

2. Equipment selection should take into account the existing demographics and cater

for multiple age groups, subject to the population profile within the local area. Projected changes to the local demographic and/or aging of the original groups that will utilise the equipment should also be considered.

3. A diversity of exercise activities should be developed within the site.

4. Future inspection and maintenance requirements of the fitness equipment must be considered as part of the design and selection process. More maintenance intensive equipment must be limited to district or regional level public open spaces only.

5. Longevity of materials must be considered, particularly within the context of the local conditions (e.g. only include equipment of a high quality design and materials, particularly for moving parts and where intense usage is anticipated).

6. For all proposed fitness equipment, council require the provision of a maintenance plan as part of the development application, as per Section SC6.4.2 Development application guidelines, Clause SC6.4.12.7 Attachment D - Parks and Open Space Maintenance Service Level and Clause SC6.4.12.7 Attachment E - Parks and Open Space Maintenance Costing Table.

(iv) Fitness equipment siting

1. Fitness equipment should be located away from play spaces to reduce the temptation for children to play on the equipment.

2. Ideally, equipment should be located along or in close proximity to a primary access path, with the fitness units to be offset from this for the comfort of users.

3. All fitness equipment is to be located on concrete slabs, all required shock pads, and wet-pour rubber surfacing in accordance with AS/NZS 4422 *Playground Surfacing – Specifications, requirements and test method*.

(v) Play spaces and play equipment

1. Play spaces are to be provided in order to:

   a) provide a wide range of quality inclusive play opportunities that meet the needs and abilities of all children and young people alike;

   b) aid children's development by providing spaces and elements for physical coordination activities such as balancing, climbing, jumping, crawling and running;

   c) assist in the development of social skills such as sharing and cooperation;

   d) promote children's use of their imagination and development of problem solving skills; and

   e) provide a place for meeting and socialising amongst children, parents and other care givers.

2. Play spaces shall include a combination of:

   a) active, equipment based play structures (e.g. swings);

   b) active, non-structured play areas (e.g. kick-around areas or grass mounding);

   c) imaginative and creative play areas (e.g. trees or natural "cubby" areas); and

   d) a parent or care-givers area (e.g. picnic settings or bench seats).

3. Within public open space, play spaces and play equipment shall only be provided at approved locations and in accordance with council's Public Open Space Embellishment Framework, as detailed in Clause SC6.4.12.7 Attachment A.

4. Playground equipment selection

   a) All playground equipment shall designed, manufactured, installed, certified and maintained in accordance with all applicable Australian Standards, including:

      AS 4685 *Playground equipment – General safety requirements and test methods, including AS 4685 parts 1- 6 and part 11*;

      AS 4486 *Playgrounds and playground equipment – Development, installation, inspection, maintenance and operation*; and

      AS/NZS 4422 *Playground surfacing –Specifications, requirements, and test method*.

   b) Should take into account the existing demographics and cater for multiple age groups, subject to the population profile within the local area and the likely park users. Projected changes to the local demographic and/or aging of the original groups that will utilise the equipment should also be considered.

   c) Diversity of play experiences between sites within the local area should be provided where possible.

   d) Future inspection and maintenance requirements of the play facilities must be considered and elaborate, more complicated equipment limited to locations with a higher maintenance level of service.

   e) Longevity of materials must be considered, particularly within the context of the local conditions (e.g. plastic coated chains are to be avoided due to accelerated deterioration in Townsville's dry tropic climate).

   f) Equipment selection and orientation should take into account the potential for vandalism. As such, equipment with significant amounts of hard, non-transparent panels should be avoided, except where this can be mediated through orientation and casual surveillance opportunities.

5. Playground equipment siting

   a) Active and passive play areas should be integrated but physically separated to promote more cohesive use of the space and facilitate quiet areas for creative and imaginative play activities.

   b) Play spaces, particularly toddler areas, should be sited within close proximity to the main activity node to maximise accessibility and casual surveillance from parents, carers and adjacent users.

   c) Play spaces should ideally be located within close proximity to the main access path. Care should be taken, however, to not create a point of conflict by locating a busy activity area on a main thoroughfare of the open space, as per below.

   d) Play spaces should be located away from potential safety hazards such as car parks or trafficable areas, watercourses or steep slopes.

e) Play spaces should be located away from adjacent properties to limit potential nuisance from ongoing noise. A minimum buffer of 15 m from adjacent property boundaries should be applied.

f) Sun safety and protection opportunities including natural and built shade options should be addressed in accordance with Clause SC6.4.12.4 (5) Shelters and shading devices. Shading opportunities should consider sun orientation and ensure that shading of the equipment is maximised during the highest UV risk period of the day and over the highest need elements (e.g. metal slides).

g) Natural elements such as turf mounding, trees, shrubs and rocks should be safely integrated into the play space where possible.

h) Fencing of the play space is to be considered on a case-by-case basis and established as required, in accordance with Clause SC6.4.12.4 (4) Fencing, barriers and screening.

i) At larger playgrounds of a district or regional level, consideration should be given to the location of public toilets within short walking distance of the play space.

Editor's Note - Public toilets should be installed at select locations only. Refer to Clause SC6.4.12.4 (4) Public toilets for further details.

j) Large, purpose built, "all-abilities" play areas are to be considered on a case by case basis. The preference is for inclusive play elements to be designed into the play space to promote inclusivity.

k) All playground equipment must be installed in accordance with the manufacturer's specifications. Certification of the equipment and the design must also be provided.

6. Softfall surfacing

a) Softfall surfacing shall be provided in order to:

- create a safe, impact absorbing surface underneath activity elements; and
- provide textual stimulation through different surfacing types (e.g. sand and rubber softfall).

b) Softfall surfacing may include a combination of:

- wet-pour rubber softfall or approved rubber alternatives, including shock pads beneath;
- astro turf, including shock pads beneath; and
- certified softfall sand.

Editor's Note - Organic softfall surfacing such as woodchips is not considered an acceptable softfall outcome.

c) Softfall surfacing shall be installed under all play spaces/equipment where a fall zone has been identified. Within public open space, the provision of equipment, and therefore softfall surfacing shall be at approved locations and in accordance with council's Public Open Space Embellishment Framework, as detailed in ClauseSC6.4.12.7 Attachment A.

d) Rubber softfall surfacing

- Rubber softfall must be installed in accordance with the equipment fall zone requirements, manufacturer's specifications and council approved standard drawing SD-642 in Section SC6.4.3 Standard drawings for landscape and open space. Certification of the softfall installation must also be provided.
- Shockpads shall be installed under all rubber softfall layers, as required by the applicable Australian Standards.
- Rubber softfall colour selection shall minimise large areas of bright colours prone to fading in the sun. Rubber softfall mixes shall contain a minimum 70% EPDM rubber due to higher UV rating of this product.
- Small, narrow and intricate designs (e.g. less than 300 mm in width) within the rubber softfall should be avoided due to ongoing deterioration of such designs.
- Rubber softfall shall be prioritised to areas requiring higher levels of accessibility or underneath high wear items.

e) Sand Softfall

- Sand softfall must be installed in accordance with the equipment fall zone requirements and council approved standard drawing SD-643 in Section SC6.4.3 Standard drawings for landscape and open space. Certification of the softfall sand and its installation must also be provided.
- Installation of sand softfall must include a buffer zone between the sand area and any nearby paths or other hard surfaces where it may create a slip hazard. The buffer must be scaled and constructed to prevent sand spillage onto the path or other hardstand.

(c) Water play areas

(i) Water play areas will only be permitted in limited circumstances, at specific locations, and where all relevant considerations are reasonably satisfied, and will be considered on a case-by-case basis.

(ii) Where the proposed water play areas are associated with public open space, council owned land, or will involve potential future council assets, the infrastructure may only be permitted at approved locations and in accordance with council's Public Open Space Embellishment Framework, as detailed in Clause SC6.4.12.7 Attachment A. Approval from the relevant council asset owner/s will also be required.

(iii) In order to properly assess any such proposals, council require the provision of a maintenance plan and a life-cycle costing as part of the development application, as per Section SC6.4.2 Development application guidelines, Clause SC6.4.12.7 Attachment D - Parks and Open Space Maintenance Service Level and Clause SC6.4.12.7 Attachment E - Parks and Open Space Maintenance Costing Table.

(iv) All water play areas must be designed and installed to comply with all relevant Australian Standards.

(v) Due to the site-specific, custom nature of water play areas, no further specifications are currently developed. Proposals will be considered on a case-by-case basis in accordance with necessary requirements defined by all

applicable engineering, electrical, drainage, swimming pool and water safety standards, legislation, local laws and council's overarching design and management principles. Engagement and approval from other stakeholders/authorities may additionally be required as part of any development proposal.

(d) Informal sporting facilities

(i) Informal sporting facilities may include but are not limited to:

1. basketball half courts;
2. outdoor table tennis tables;
3. handball courts or rebound walls;
4. skate facilities and;
5. parkour practice areas.

Editor's Note - Currently no specific requirement relating to informal sporting facilities are developed.

(9) Dog off leash facilities

(a) General

Dog off leash facilities are designated spaces under council's local law where within an open space dogs can recreate with their owners. These areas provide a safe and fun environment for owners and their dogs to enjoy parks and open spaces. Areas where these facilities are proposed to be established shall have due regard for;

(i) Site selection

1. within public open space, dog off leash facilities shall only be provided at approved locations and in accordance with council's Public Open Space Embellishment Framework, as detailed in Clause SC6.4.12.7 Attachment A;
2. an appropriately sized large dog off leash fenced facility should range between 2000 (minimum) to 4000 m^2;
3. an appropriately sized small dog off leash fenced facility should range between 1000 m^2 to 1500 m^2. Small dog off leash fenced facilities will not be installed as stand-alone facilities;
4. dog off leash facilities should have adequate drainage and should have reasonable flood immunity (Q10); and
5. dog off leash facilities should have cross fall drainage of at least 2%. to minimise ponding.

(ii) Surface finish and planting

1. groundcover in the open space within the off leash facility is to be turf consisting of 25 mm depth of dense, well rooted, vigorous grass growth with a 25 mm depth of topsoil. The type of turf to be used will be selected from the Clause SC6.4.12.7 Attachment C1 - C4 - Preferred Plant Species Lists;
2. the use of garden beds should be avoided;
3. trees should be incorporated into the overall design of the dog off- leash areas with existing established trees providing visual amenity to the park and provide protection from the wind and sun;

4. landscaping and plants add to the amenity of the park, but it is important to ensure that species selection is non- toxic and non-irritating to dogs. Some trees may have seeds, stems, leaves, fruits, or flowers that are irritating and/or toxic to dogs; and

5. all dog off leash enclosures are required to be irrigated with pop up sprinklers to maintain grass cover throughout the year.

(iii) General
All dog off leash facilities must be designed, constructed, and installed in accordance with:

1. the provisions within the Townsville City Plan and this section;

2. manufacturer specifications;

3. all applicable Australian Standards and legislation;

4. all applicable council local laws; and

5. Council's approved standard drawings.

Editor's Note - Currently there are no approved standard drawings for dog off leash areas.

(b) Siting of dog off leash facilities

(i) Dog off leash facilities should also be located away from other non-congruent recreation activities (e.g., barbeque areas, play spaces and fitness equipment) and adjacent residential areas. As a general guide it is recommended that a spatial buffer of approximately 40 m is considered appropriate. However, other factors such a site gradient and vegetation coverage can be utilised to lessen the spatial buffer.

(ii) A variety of open and shaded spaces should be created within a dog off leash facility. There should be enough space to include active running areas as well as quieter environments where dogs can sniff, play and interact with their owners. As a guide it is recommended that a dog off leash area have shade coverage (both natural and artificial) of approximately 35 per cent.

(iii) Effective dog off leash areas disperse the dog and human traffic throughout the park, and spread the wear and tear on the underlying surface evenly across the facility.

(iv) In all instances dog off leash facilities should be supported by sufficient car parking spaces to accommodate the amount of vehicle traffic likely to be generated by the particular use of the site. Refer to Clause SC6.4.12.7 Attachment A - Public Open Space Embellishment Framework.

(v) To enhance site accessibility and convenience, locate dog off leash areas in close proximity to the available car parking. Additionally, equitable access ramps and a connecting path from the car parking to the dog off leash facility should also be installed.

(vi) The placement of Dog off leash facilities and planting treatments, shall take into account the maintenance requirements for maintaining such a facility.

(vii) For all public dog off leash facility designs,, council require the provision of a maintenance plan as part of the development application, as per Section SC6.4.2 Development application guidelines, Clause SC6.4.12.7 Attachment D - Parks and Open Space Maintenance Service Level and Clause SC6.4.12.7 Attachment E- Parks and Open Space Maintenance Costing Table.

(c) Design of dog off leash areas

In general, any embellishments installed within the Dog Off Leash Areas that promote gathering, seating, drink fountains and bins, should be located away from entry and exit points and also away from the activity areas; long running spaces and agility equipment. With regard to maintenance of these areas, placement of equipment must allow space for maintenance (mowing). A minimum of 3 metres between embellishments and fencing is required to allow space for mowing and manoeuvring of maintenance machinery.

(i) Entry way

1. Double gated entry to prevent dog escapees is required at all access points. Consideration should be given to the installation of multiple access points, to minimise congestion.
2. Access points are high wear areas and appropriately sized concrete areas are required here. These concrete pads should cover the entire entrance areas and extend out past the arc of the gate openings.
3. Gates should be fitted with self-closing child-proof latches to prevent dog escapes and unsupervised children from entering the facility.
4. A separate entry for a maintenance gate (which should be 3.5 m wide) will be installed within the perimeter fence line. This should be located away from all the other user access points.
5. Other physical structures to support amenity such as shelters, benches or drinking fountains should be located at a suitable distance away from the access points to discourage dogs and people from congregating.

(ii) Fencing

1. Secure perimeter fencing will be installed that discourages canines from escaping under, over or through the fence;
2. The fence alignment shall avoid acute angles that can result in entrapment issues for dogs and humans;
3. Fencing around all dog off leash facilities will be a minimum of 1.5 m in height; and
4. Fencing materials must provide good visibility so that park users can see activity inside and around the park. Standard powder coated fencing panels traditionally used in pool fencing should be utilised as fence panels.

Editor's Note - Be aware that smaller dog breeds may be able to run through the gaps in the panels of traditional pool fencing. When designing small dog off leash areas give consideration to the installation of alternatives or undertaking modifications to the fencing panels to ensure that the enclosure is fit for purpose.

(iii) Seating

1. As a minimum, four bench seats should be installed within the large dog off leash areas, and two bench seats within small dog off leash areas.
2. Seating should be placed in areas to maximise the benefit of any nearby shade.
3. Seating should be aligned and in close proximity to the fencing of the off leash area. This ensures that the majority of the dog activity will occur in front of where the owner is sitting.

4. The type of seating used within the dog off leash will be consistent with any existing or adopted furniture suite within the nearby park open space. Consideration should also be given to the space between the slat sizes utilised on the bench seat. Minimum gaps should be utilised to avoid dog paws entrapment points.

5. Picnic tables must not be located inside dog off leash areas as this encourages food to be brought into the facility.

(iv) Drink facilities

1. As a minimum, two drink fountains shall be installed within dog off leash areas. These fountains should be accessible by dogs and people, but should be located to discourage congregation in high traffic areas.

2. Water fountains and taps should be designed, constructed, and installed as per council's standard drawing *SD-664 – Furniture – Drinking Fountain.*

(v) Waste facilities

1. As a minimum, two dog faeces bag dispensers should be installed within dog off leash areas.

2. Dog faeces bag dispensers must have a locking device to prevent bags being pulled continuously and scattered in the park. Dog faeces bag dispensers should be located in close proximity to the access points (but should also not impede access). However, dog faeces bag dispensers must also be located in positions that ensure an ease of refill, which does not require council staff to enter the enclosure.

3. Two covered rubbish bins shall be installed outside of the dog off leash area, in close proximity to the main gate access point without impeding access. Bin positions should be located for easy collection.

4. Generally, the acceptable bin provision will be a 240 L rubbish wheelie bin, mounted on a concrete slab with a metal security bin stand. Variations to size and quantity standards may be approved, as required to support the associated waste collection requirements, particularly at locations of high usage.

(vi) Lighting

1. Most dog off leash facilities do not require lighting. In many instances one security light may be installed to link the entrance of the dog off leash area to the adjacent car parking.

2. Full lighting of dog off leash facilities will be accepted where there is a demonstrated need and where the lighting will not have a negative impact on adjacent residential areas.

3. All lighting shall be carried out to the applicable lighting category, as per the Australian Standard AS11580 – Lighting for roads and public spaces.

(vii) Agility equipment / separate small dog area / specialised play

1. Not all dog off leash facilities will require agility equipment or a dedicated small dog off leash area. These facilities will only be supported where there is a demonstrated demand on a case-by-case basis.

2. If agility equipment is considered appropriate it should be located away from access points and high running areas. Consultation with agility dog groups should be undertaken prior to assist in the design of appropriate agility facilities within dog off leash areas.

3. Small dogs are dogs that weigh less than 8 kilograms or are less than 35 cm in height when measured from the floor to the top of the dog's front shoulders.

4. Small dog off leash areas will not contain agility equipment.

5. Specialised canine recreation equipment will be considered on a case-by-case basis. Consideration of ongoing maintenance costs, asset replacement costs and any potential impacts on canine health will be the major considerations when determining the request to install specialised canine recreation equipment.

(viii) Signage

1. Council information signs on dog off leash area rules are required to be installed in close proximity to all access points.

2. Council standard information signs shall be used at all dog off leash areas and outline usage and behavioural requirements.

3. Park name signage should be installed in close proximity to the dog off leash area so that people utilising the facility are able to readily recognise the name of the facility. Generally, dog off leash areas will not have a separate specialised park name.

4. When dog off leash facilities are not readily visible from the road frontage, directional signage from car parking facilities or areas of high visibility are required.

(10) Transport and access infrastructure

(a) General requirements

(i) Transport and access infrastructure within open space is considered to include:

1. car parking, both on and off street, associated with the open space or facilities;

2. internal roadways;

3. pedestrian paths, bicycle paths, shared paths;

4. public transport facilities;

5. end of trip facilities;

6. pedestrian bridges;

7. walking tracks; and

8. boat ramps.

(ii) All transport and access infrastructure within public open space must be designed, constructed, and installed in accordance with:

1. the provisions within the Townsville City Plan, planning scheme policies, Section SC6.4.4 Active transport infrastructure and this section of the Development manual planning scheme policy;

2. all applicable Australian Standards and legislation;

3. all applicable council local laws; and

4. Council's approved standard drawings.

Editor's Note - Refer to Clause SC6.4.12.3 (4) Streetscapes and landscape treatments for requirements relating to areas of a designated road reserve.

(iii) Bicycle, pedestrian, and shared paths within public open space are to connect to activity areas within the open space, and to the on-street verge pathway network. Where a verge pathway network does not exist, consideration may be given towards the future design and establishment of such a network to achieve the best outcome for connectivity.

Editor's Note - Refer to Section SC6.4.4 Active transport infrastructure for design guidelines for consideration of the type of paths to be provided through/within public open space. Consideration should be given to connectivity of networks.

(iv) All landscaping and irrigation associated with transport and access infrastructure is to be in accordance with the provisions of this section, and Sections SC6.4.12.Landscaping and open space and SC6.4.13.Irrigation.

(b) Pedestrian bridges

(i) Pedestrian bridge provision is to:

1. prioritise the use of concrete culverts where practical;
2. use durable materials such as concrete, hot dipped galvanized steel, stainless steel, structural composites, recycled plastics and other similarly performing products (timber structures will not be accepted); and
3. incorporate erosion control measures where necessary to prevent undermining of the bridge footings or other elements.

Editor's Note - Refer to Section SC6.4.17 Structures for further information relating to pedestrian bridge requirements.

(c) Walking tracks

(i) Walking track provision is to:

1. be provided in accordance with infrastructure design requirements, track markers and signage, in accordance with AS 2156 *Walking tracks*;
2. be at select locations only, where construction of the walking track/s will not create any foreseeable adverse impacts including unsustainable maintenance requirements, public safety and liability concerns, habitat destruction, land slip or slope destabilisation; and
3. be provided in accordance with any council adopted walking track strategy.

Editor's Note - Inclusion of walking tracks will be considered on a case-by-case basis and with consideration of the Public OpenSpace Hierarchy and Embellishment Frameworks. Where council develops and adopts a strategic plan for the provision of walking tracks, all development proposals will be assessed against the provisions within that plan.

(d) Boat ramps

(i) Boat ramp provision is to:

1. be permitted in limited circumstances only, at specific locations, and where all relevant considerations are reasonably satisfied; and
2. include engagement with, and approval from all relevant authorities and asset owner/s.

Editor's Note - Due to the place specific, custom nature of boat ramps, no standard specifications are currently developed. Proposals will be considered on a case-by-case basis in accordance with all necessary requirements defined by all applicable engineering, water safety and transport standards, legislation, and council's overarching design and management principles.

(11) Landscape entry statements

(a) Landscape entry statements are features used in both public and private open space to identify a particular place, residential or commercial development or locality that may include signage or graphics on a structure, wall or fence. They may be a standalone art element (Clause SC6.4.12.4 (13)) Public art) or installation, built feature or soft landscape feature.

(i) Landscape entry statements must meet the following requirements:

1. to be suitably located to clearly identify the public open space, individual neighbourhood or development, or area of distinctive character to which they refer;
2. to be of a form that is easily maintained into the future and does not increase risk within the area;
3. to be of a scale and form appropriate for the hierarchy classification and surrounding landscape character;

Editor's Note - Refer to SC6.4.12.7 Attachment A - Public Open Space Embellishment Framework relating to signage in public open space.

4. where involving a wall entry statement, the wall is to be located within the private property on the property boundary, unless relating to public open space or designated park;
5. any private properties containing wall/s or other landscape entry statements require a covenant protecting the wall or feature and outlining maintenance responsibilities, and a property note in council's rates system to ensure owners are aware of the existence of the wall or feature;
6. other entry statements of an alternative nature or located within the road reserve will be considered on merit and must meet requirements for visibility and frangibility;
7. landscape entry statements for residential or commercial estates are to be provided and maintained by the developer for the life of the development; and
8. landscape entry statements will not include water features.

(ii) Landscape entry statements are be provided in accordance with the following hierarchy and requirements:

1. "Suburb" level landscape entry statements:

a) generally be located on public land and owned by council after completion of any applicable maintenance period; and

b) conform with Council's corporate graphics standards;

Editor's Note - Refer to council's Graphics Standards Manual.

2. Estate" level landscape entry statement:

a) Walls or acoustic fence located within private property.

b) Lettering or logos must be of materials and attachment that resists vandalism and requires no painting or recoating (e.g. laser-cut polished aluminium, engraved stone block or similar).

c) Tiling or stone pitching to wall faces must utilise appropriate outdoor adhesives and grouts.

3. Neighbourhood/village" level landscape entry statement:

    a) generally a sign wall located on private property; and

4. "Street" level landscape entry statement:

    a) generally not acceptable.

(12) Public art and water features

Public art is considered to be "a concept or work created by an artist/s in any medium, permanent, temporary or ephemeral, which enables stimulation of one or more of the senses and is situated in a place of public access".

(a) Public art installations and water features are only permitted in limited circumstances and must conform with the following criteria:

(i) the public art proposal must demonstrate alignment with Council's adopted public art policy;

Editor's Note - Refer to Council's Public Art Policy.

(ii) the provision of the public art adds interest to the public open space or streetscape, reinforces the unique identity of Townsville, and contributes significantly to the sense of place;

(iii) the public art is used as a medium to interpret the social and cultural values of the community, reflecting Townsville's diverse heritage and cultural identity, as well as the social context of the site;

(iv) the public art responds to the environmental context of the site, and is integrated into the overall landscape or streetscape, being well-chosen and appropriately sited;

(v) the provision of public art or water feature within public open space is in accordance with council's Public Open Space Embellishment Framework, as detailed in Clause SC6.4.12.7 Attachment A, unless approved otherwise;

(vi) approval from the relevant Council asset owner/s will also be required to secure approval for such a feature / installation;

Editor's Note - Where a public art strategy has been formally approved by council for a precinct or development, this may take precedence over the Public Open Space Embellishment Framework provisions.

(vii) the provision of public art within streetscapes and at centres is aligned with the expected levels of embellishment and characteristics of the road or centre hierarchy classification (water features will not be approved as part of streetscape or centre improvement works);

(viii) all public art or water feature installation shall not create a public safety risk to the community or council maintenance staff;

(ix) engagement and approval from the relevant council asset owner/s and other stakeholders is required for the installation of such embellishments;

(x) for all public art and water feature proposals, council may request the provision of a concept statement and details including, but not limited to the following:

1. concept images or models;

2. detailed description of the artwork/theme/concept;

3. materiality and scale;

4. structural detailing and footing designs;

5. public safety considerations;
6. ongoing maintenance requirements;
7. project budget/costs;
8. all water features must be designed and installed to comply with all relevant Australian Standards;
9. previous works and references; and
10. for all public art and water feature proposals, council require the provision of a maintenance plan as part of the development application, as per Section SC6.4.2 Development application guidelines, Clause SC6.4.12.7 Attachment D - Parks and Open Space Maintenance Service Level and Clause SC6.4.12.7 Attachment E - Parks and Open Space Maintenance Costing Table.

(xi) where art installations or water features are proposed as a development entry statement, applications may will only be approved where the feature will be solely located within private property and the developer will remain, for the life of the asset, solely responsible for all aspects relating to the water feature (including ongoing maintenance and water costs).

SC6.4.12.5 Softscape embellishments

(1) Introduction

Softscape embellishments are generally those that are not built items. These include earthworks and mounding, planting and turf areas, and planting works including tree, shrubs and groundcover planting. These soft landscape embellishments are used in most open space areas to achieve many different aesthetic outcomes including, screening, shade, and the creation of themed spaces based on plant types, form, or locational attributes.

All softscape outcomes must be designed, constructed and planted in accordance with:

(a) the provisions within the Townsville City Plan, planning scheme policies and this section of the Development manual planning scheme policy;

(b) all applicable Australian Standards and legislation;

(c) all applicable council local laws; and

(d) all council approved standard drawings.

Editor's Note - Where streetscape outcomes are within roads managed by the Department of Transport and Main Roads, applicants should refer to the Department of Transport and Main Roads' *Landscape Design Manual* (Refer to current version). Requirements of the Department of Transport and Main Roads' *Landscape Design Manual* will take precedence in these instances. Engagement and approval from other stakeholders/authorities may additionally be required as part of any development proposal.

(2) Plant species selection

(a) The biophysical attributes of the plant should be considered, in additional to the ideal growing conditions of the species and its appropriateness for the site conditions and Townsville's dry tropic climate. Plant species used are to be those recommended in the Preferred plant species list in Clause SC6.4.12.7 Attachment C1 - 4 – Preferred Plant Species Lists.

Editor's Note -The list found in Clause SC6.4.12.7 Attachment C1 – 4 - Preferred Plant Species Lists, has been prepared as an indicative list that takes into account council's requirements and those of relevant service providers, and is acceptable for use in most circumstances. The species list does not account for frangibility requirements relating to street tree plantings in streets or roads. This, along with all other relevant considerations associated with the site context must be considered in the development of the landscape plan and species selection.

(b) Plant species are to be selected by a suitably qualified and experienced horticulturist, landscape architect or designer to reduce or preferably eliminate the reliance on irrigation.

(c) Plant species are not to include undesirable species listed in the undesirable plant species list.

Editor's Note - Currently, no undesirable plant species list has been developed.

(d) Declared weed species - Plant species used are not to include prohibited or restricted species listed in the Townsville City Council Biosecurity Plan.

Editor's Note - Refer to the Department of Agriculture, Fishers and Forestry for a declared weed species list. Currently, no design guidelines relating to other soft landscaping elements are developed.

(3) Planting design principles

Planting design principles such as scale, proportion, repetition, balance, contrast, focal points, and transition should be applied in the development of all planting designs.

The design qualities of the plant species including size, scale, form, line, texture, and colour should be considered and maximised through the planting design process.

The intended function and location of the plant species should be appropriate to its growing habit, size, and other design qualities, in particular ensuring the expected size of the mature specimen can be support in the available planting space to eliminate unnecessary maintenance interventions such as hedging.

Open space contribution from roof gardens and vertical gardens will be assessed on a case -by-case basis and with consideration of other on-site open space and landscaping provision.

(a) Maintenance and service requirements:

(i) The irrigation, drainage, root barriers, maintenance, and other resource inputs necessary to maintain the functionality and longevity of planting design outcomes and species must be sustainable, cost-effective and analogous with the available resources.

(ii) The quantity and density of planting proposed shall consider the expected mature plant size, the density required to achieve the desired effect, account for expected die out during establishment, and avoid any foreseeable maintenance issues.

(iii) Planting location and/or species selection should not create any, adverse impacts on access, circulation, or critical sightlines.

(iv) Plant habit and location, must not have an adverse impact on adjacent properties, built assets, services, roads, drainage, or other infrastructure.

(v) Streetscape planting must be safe, functional and respond to local conditions to achieve an aesthetic outcome that responds to local and community needs, while minimising life cycle costs and ongoing maintenance. These treatments may include the installation of street trees, planted or mulched garden areas, turf areas, artificial turf areas and irrigation (where required by Council).

(b) Vegetation used in streetscape planting must conform where required to the following definitions:

(i) "Frangible" vegetation

is plants (including trees) with a stem or trunk diameter equal to or less than 100 mm in diameter at maturity, measured from 300 mm above the finished ground level. Shrubs and ground covers are considered frangible except for shrubs that exceed 3.5 m in height.

(ii) "Non-frangible" vegetation

is plants (including trees) with a stem or trunk diameter greater than 100 mm in diameter at maturity, measured from 300 mm above the finished ground level. This includes shrubs greater than 3.5 m in height and most trees.

(iii) Setback

is the distance measured from the outer edge of the specified component to the centre of the vegetation trunk.

(iv) Clearance

is the distance measured from the edge of the specified component to the perimeter of the second component or vegetation.

(v) Canopy clearance

is the vertical distance measured between the finished ground level and the underside of the tree canopy.

(vi) Planting clearance

measurements between planting measured from trunk centre to trunk centre.

Editor's Note - The above definitions are based on Austroads' *Guide to Road Design*, Part 6B: *Roadside Environment* (Refer to current version) and Department of Transport and Main Roads' *Landscape Design Manual* (Refer to current version) – Appendix 4.

(4) Streetscape treatment provision

(a) Requirements relating to all safety objectives such as clear zones, sight distances and frangibility will take precedence and determine the placement and control of landscaping elements within the streetscape. Refer to Clause SC6.4.12.3 (4) Streetscapes for design criteria.

(b) All hard and soft landscape treatment construction must be in accordance with the specifications set out in Sections SC6.4.12 Landscaping and open space, SC6.4.3 Standard drawings and SC6.4.13 Irrigation.

(c) Kerb types will be as per Section SC6.4.3 Standard drawings (Typical Road Cross Sections SD-001, SD-002, SD-003, SD-004, SD-005, SD-006, SD-010), and Clause SC6.4.6.1 Geometric road design.

(d) Where a zero object height is necessary, only hard landscape areas must be established, subject to meeting all other requirements within this section and other sections of SC6.4 Development manual planning scheme policy.

(e) A minimum 1.2 m width of hard surface treatment (which may be inclusive of road pavement, kerb, concrete, mountable aprons etc.) must be provided between soft landscaping and the edge of the traffic lane, unless approved otherwise.

(f) In areas >70 km/hr, an increase to 3 m in width of hard surface treatment may be required between soft landscaping and the edge of the traffic lane, subject to assessment of the associated risks of the road environment.

Editor's Note - The above widths are based on standard clearances between traffic lanes and work sites, as detailed in *Manual Uniform Traffic Control Devices* (MUTCD), Queensland. These clearance requirements may be subject to reduction or increase dependent on the road speed environment being assessed and subject to council approval. The intention for all standard clearances is to ensure a safe work environment, reduced inconvenience to road users and reduced the reliance on traffic control and the associated costs.

(g) For medians, specific requirements apply being:

(i) Streetscape treatments shall be provided in accordance with Clause SC6.4.6.1 Geometric road design and Table SC6.4.12.1 Treatment Application Based on Median Width and other requirements of this policy.

(h) For the roundabouts, specific requirements apply being:

(i) streetscape treatments shall be provided in accordance with Table SC6.4.12.1 Treatment Application Based on Median Width, Table SC6.4.12.2 Treatment Application Based on Roundabout Diameter and other requirements of this section. Also refer to Clause SC6.4.6.1 Geometric road design;

(ii) splitter or blister islands should not accommodate any soft landscaping unless approved otherwise (generally, islands must be an average width of 6 m or greater and all safety and operational requirements must firstly be satisfied); and

(iii) where garden areas and trees are provided, plant species in the central islands of roundabouts should only consist of ground covers, low growing shrubs and/or mulched areas with clean trunked trees unless approved otherwise.

Table SC6.4.12.1 - Treatment Application Based on Median Width

Treatment	Appropriateness of Treatment Application by Median Widths (including width of kerbs)				
	< 2.5 m	**2.5 m – 3.5 m**	**3.5 m – 6.0 m**	**6.0 m – 10.0m**	**> 10.0m**
Hard landscape (Stencil-crete, artificial turf, concrete or similar) [1] where the width of hard landscape treatments may exceed 6.0m, a combination of hard and soft landscape treatments should be applied to avoid large expanses of hardscape, subject to satisfaction of all safety requirements.	Yes	Yes	Yes	Yes[1]	Yes[1]
Turf (Zoysia spp. or approved alternative) [2] may be approved in select locations only, minimum clearances may still apply subject to road speed environment. Unless approved otherwise, turf areas must be a minimum width of 2.0 m to support an irrigation system in a safe and efficient manner and facilitate efficient operational maintenance. Turf areas greater than 6.0m in width should be combined with other hard and soft landscaping treatments.	No	No[2]	Yes	Yes	Yes
Garden areas (Ground covers below 0.7m in height) *Frangible* [3] - may be approved in select locations only, minimum garden area width and clearances may still apply subject to road speed environment, subject to satisfaction of all safety requirements.	No	No	No	Yes[3]	Yes[3]
Small trees *Frangible or Non – frangible*	No	No	Yes	Yes	Yes
Medium trees *Non – frangible*	No	No	No	Yes	Yes
Large tree *Non – frangible*	No	No	No	No	Yes
Palms	No	No	No	No[4]	No[4]

Not desirable. [4] select locations only, minimum setbacks may also apply subject to species selection and mitigation of risks associated with frond drop. *Frangible or Non – frangible*					

Table SC6.4.12.2 - Treatment Application Based on Roundabout Diameter

Treatment	Treatments Application by Roundabout Diameter (including Width of Kerbs and Mountable Apron)			
	< 7.0 m	**7.0 m – 10.0 m**	**10.0 m – 14.0m**	**> 14.0m**
Hardscape (Stencil-crete, artificial turf, concrete or similar) [1] - where the width of hardscape treatments may exceed 10.0 metres, a combination of hard and soft landscaping treatments must be applied to avoid large expanses of hardscape.	Yes	Yes	Yes[1]	Yes[1]
Turf (Zoysia spp. or approved alternative) [2] - may be approved in select locations only, minimum clearances may still apply subject to road speed environment. Unless approved otherwise, turf areas must be a minimum width of 2.0m to support an irrigation system in a safe and efficient manner and facilitate efficient operational maintenance. Turf areas greater than 6.0m in width should be combined with other hard and soft landscaping treatments.	No	No	No[2]	No[2]
Garden areas (Shrubs/Ground covers below 0.5m in height) [3] - may be approved in select locations only, minimum garden area width and clearances may still apply subject to road speed environment.	No[3]	Yes[3]	Yes[3]	Yes[3]
Small trees *Frangible or Non – frangible*	No	Yes	Yes	Yes
Medium trees *Non – frangible*	No	No	Yes	Yes
Large tree *Non – frangible*	No	No	Yes	Yes
Palms Not desirable. [4] - select locations only, minimum setbacks may also apply subject to species selection *Frangible or Non – frangible*	No	No	No[4]	No[4]

(i) Turf area requirements

(i) Turf areas may form part of clear zones, provided all other requirements are satisfied.

(ii) Turf areas must be a minimum 32 m clear width to allow for mowing access unless approved otherwise (noting minimum 2 m total widths are desirable for irrigation purposes).

(iii) Where the width of the medians exceed 6 m, it is desirable that turf areas are combined with other hard and soft landscape treatments to provide balance against the median width.

(iv) Turf species must be low maintenance (e.g.: Empire Zoysia or an approved equivalent species).

(j) Garden area requirements
Garden areas (planted or mulched only) shall be in accordance with all applicable council approved standard drawings for garden areas.

Editor's Note - Currently, no standard drawings are formally adopted for garden areas.

(i) all garden areas must be a minimum width of:

1. 1 m where combined with other soft and hard landscaping treatment; and
2. 1.5 m where provided as full width planting.

(ii) vegetation must be set back (from back of kerb, fence, footpath or other infrastructure) such that vegetation at maturity without hedging will not overhang footpaths, fences, or create visual obstructions;

(iii) where garden areas are within the sight triangle, plantings should only consist of ground covers and low shrubs with a maximum mature height of 600 mm or less in order to preserve sight lines;

(iv) where garden areas are outside the sight triangle, plantings expected to exceed 600 mm in mature height may be provided where all clear zone and frangibility requirements are satisfied and plantings are provided:

1. as screen planting or buffers along fence lines or acoustic barriers;
2. for functional reasons such as a visual barrier for headlight glare, a windbreak or a physical barrier to human movement; and
3. where screening or accent planting is desired.

(v) approval of full width planting may be provided:

1. for strategic locations only;
2. where the garden area will be a minimum width of 1.5 m; and
3. where garden areas will be located behind road safety barrier system; or

   where the road speed and required clearances between the edge of the traffic lane and the garden area complies with MUTCD (Queensland) requirements for work sites (Short-term Low Impact - Built Areas or Static Work Areas) and will not require the use of traffic control.

   Editor's Note - Approval for full width planting will only be for select locations, subject to the satisfaction of all safety and operational maintenance requirements. Approved locations will generally be associated with central median screening or buffering plantings, key entry gateways or high profile roads, and/or associated with centres or commercial precincts. Where the road speed is 40 km/h or less, full width plantings may be provided in medians between 2.5-3.5 m, subject to achieving the minimum garden area width and council approval.

(vi) all species selection should have regard to aesthetic, suitability, functional and ecological selection criteria and include consideration of:

1. appropriateness for the planting approach (e.g. structured or naturalistic);
2. mature spread dimension and required density, noting encroachment into road shoulder or onto adjacent turf or other surface must be avoided(offset planting by a

minimum of 0.5 – 1m depending upon species planted);

3. mature height and compliance with sight triangle requirements, noting reliance on frequent maintenance to maintain sight lines must be avoided;
4. frangibility requirements;
5. drought resistance/water requirements;
6. suitability for prevailing soil type;
7. lifespan, noting long-lived species are desired and annuals are not to be used unless approved otherwise;
8. salt tolerance;
9. pollution resistance;
10. environmental and habitat value of particular species;
11. ongoing care and maintenance requirements; and
12. the intended purpose of the planting and the species' suitability for this, including uses such as:
    a) headlight screen planting;
    b) buffer screening;
    c) visual screening;
    d) visual guidance planting;
    e) user perceptions of speed;
    f) shade and sunlight control;
    g) windbreak;
    h) physical barrier;
    i) erosion control;
    j) safety; and
    k) noise attenuation.
13. garden areas (mulched only) shall:
    a) be provided where shrubs and groundcovers are not desired or cannot be planted without impacting sight lines; and
    b) where tree planting is incorporated in the mulched garden area.

(k) Street tree requirements
Street trees should be provided at the following rate:

(i) a minimum of one tree per standard building lot or spaced at approximately 15m intervals.

(ii) a maximum of four trees per standard building lot or spaced at approximately 7 m intervals.

(iii) the above rates may be altered where:

1. there is insufficient available space based on safety and setback requirements; or
2. existing street trees will be retained; or
3. subject to council approval of the reduced rate.

Editor's Note - In locations where lot sizes are below the standard lot width, street tree provision rates will need to be assessed on a case by case basis. In these instances, a balance between provision rates, reduced setback requirements and appropriate mitigation measures to reduce potential damage to adjacent infrastructure must be sought.

(iv) street trees shall be planted in accordance with all applicable council approved standard drawings for tree planting.

Editor's Note - Currently, no standard drawings are formally adopted for landscape treatments.

(v) all setback requirements, being:

1. a minimum 5 m from an electricity pole or pillar box;
2. a minimum 7 m from a street light pole;
3. a minimum 2 m from side entry stormwater pits;
4. a minimum 2.5 m from either side of a driveway;
5. a minimum 1.05 m from back of kerb; and
6. a minimum 0.5 m from a footpath.

Editor's Note - The above requirements are based on cross sections outlined on Section SC6.4.3 Standarad drawings SD-015 Verge Service Corridors and other longitudinal setbacks intended to mitigate risk of conflict between street trees and other infrastructure. Setbacks from all utility services should be confirmed with the relevant asset owner/service provider. For setbacks on the approach and departure sides of bus stops, refer to Section SC6.4.3 Standard drawings (SD-515 Standard bus stop urban location layout details Type 1 and 2). For setbacks from intersections, refer to Austroads minimum gap acceptance and sight distance criteria. For setbacks on the approach and departure sides of pedestrian crossings and other designated crossing points, refer to crossing sight distance (CSD) requirements in *Traffic and Road Use Management Manual – Pedestrian Cross Facility Guidelines* and *Prioritisation System User Guide*.

(vi) in addition to the above, the following apply:

1. When street trees are to be planted in medians or roundabouts, extended planting setbacks (from back of kerb or adjacent hard surface treatments) apply, being:
   a) for small trees or large shrubs (mature canopy between 5 – 10 m in height or large shrubs greater than 3.5 m in height), setback at a distance of 2 m or half the mature canopy diameter, whichever is greater;
   b) for medium trees (mature canopy between 10 – 15 m in height), setback at a distance of 4 m or half the mature canopy diameter, whichever is greater; and
   c) for large trees (mature canopy greater than 15 m in height), setback at a distance of 6 m or half the mature canopy diameter, whichever is greater.
2. Where setbacks cannot be achieved, appropriate mitigation measures such as root barrier must be included. Minimum requirement for root barrier is 3m length per planting tree to a depth of 600mm.
3. Where species proposed have a known invasive root system, increased setbacks are required and mitigation measures such as root barrier are to be provided as per arborist advice.
4. Street trees will not be planted in clear zones, except where:

a) tree species are considered frangible and the mature trunk diameter will not exceed 100 mm; or

b) where non-frangible, tree species will be located behind road safety barriers.

5. When planted in the CBD, commercial zones, or where the planting area is completely surrounded by impervious surfaces, a minimum root development zone of 4 m^3 must be provided for each street tree. This may be achieved through the use of structural soils, root cell products. Tree plantings in these circumstance typically have a 1200mm x 1200mm planting area with heel proof grate (CBD), permeable paving or mulching.

6. Street tree species should be selected with consideration of suitability criteria, including:

a) whether there is an existing dominant species in the street or suburb that contributes to the streetscape or suburb character;

b) size of the available planting space as some tree species are better able to survive in restricted growing areas;

c) location of the new tree, the species growing habit and branch structure;

d) whether the new tree will be planted under power lines as only a limited number of species are suitable in this situation;

e) tree species water requirements and drought resistance;

f) suitability for prevailing soil type;

g) pollution resistance;

h) species with minimal fruit, leaf and limb drop;

i) species with high shade potential;

j) species with higher resilience to cyclone damage; and

k) environmental and habitat value of particular species;

l) be appropriate for the available planting space, accounting for all setback, offset and clearance requirements (overhead, longitudinally and horizontally across the road cross section);

m) only consist of trees that will achieve canopy clearance heights applicable to the streetscape situations outlined in Table SC6.4.12.3 Canopy Clearance Heights and exhibit a maximum “1/3 of height” clear trunk at the time of planting;

7. In established areas, the street trees species are to be species already established in the area unless nominated by Council.

8. In new development areas, the street trees species are to be nominated by the developer and approved by Council.

9. Palms shall not be planted in medians and will only be approved in select locations only where:

a) palm species are self-cleaning; or

b) sufficient area beneath the palms are is provided to mitigate risks from falling palms fronds; and

c) the plantings will not impose an unsustainable maintenance requirement.

10. Selection of the street tree stock size for planting should consider:

a) the planting location such as whether it is in a median, roundabout or on the footpath (e.g. more mature stock may be required in roundabout plantings where sight lines will be impeded by the foliage of a young tree);

b) street trees must have a strong leader and be maintained in a form to allow for the optimal growth of the particular species;

c) the optimal size to achieve best establishment (e.g. smaller stock typically establish better, larger stock may be required to meet visibility requirements at time of planting); and

d) the size of the original tree where replacing a removed tree (e.g. in instances were a large, significant tree is removed, a larger sized and/or increased quantity of replacement stock may be considered).

Table SC6.4.12.3 - Canopy Clearance Heights

Streetscape Situation	Minimum Vertical Clearance Height (at Maturity)
Standard pedestrian and car park environment	2.4m
Cyclist environment	2.7m
Main and arterial roads	5.4m
Other roads	4.6m
High clearance routes	5.9m
Very high clearance routes (with no alternative)	6.5m

Editor's Note - Above clearances are based on minimum vertical clearances detailed in Austroads *Guide to Road Design*, Part 3: Geometric Design.

(l) Operational requirements

Streetscape designs must seek to minimise the ongoing costs and operational maintenance requirements by:

(i) ensuring that planting design at maturity (without hedging) will not overhang footpaths, fences, or create visual obstructions on roadways;

(ii) ensuring that mature height and spread must not rely on hedging or other intervention to maintain sight lines;

(iii) ensuring effective access for maintenance and to critical road infrastructure is integrated into the streetscape design to support easy, time efficient operations;

(iv) ensuring all turf areas are of the minimum specified width to facilitate safe and efficient operation of mowing vehicles and reduce the requirement for "on foot" maintenance;

(v) complying with all clearance and setback requirements to ensure maintenance can be safely undertaken without a reliance on traffic control;

(vi) use of appropriate mulching and planting densities to minimise weed growth and the reliance of regular maintenance;

(vii) identifying any traffic control requirements associated with ongoing maintenance operations in early design stages. This should include any lane or road closures, detours, and the ongoing cost to implement any such requirements. All options to reduce identified traffic control requirements should be explored in order to reduce ongoing operational costs;

(viii) use of appropriate species in streetscape planting to minimise damage to infrastructure; and

(ix) species selection requiring temporary irrigation for establishment only, with irrigation removal at off maintenance in line with Clause SC6.4.12.3(4)(vi) Economic value.

(m) In order to properly assess maintenance requirements associated with streetscape proposals, council may require the provision of a maintenance plan and approved traffic management plan as part of the development application, as per Section SC6.4.2 Development application guidelines, Clause SC6.4.12.7 Attachment D - Parks and Open Space Maintenance Service Level and Clause SC6.4.12.5 (7) Attachment E - Parks and Open Space Maintenance Costing Table.

(5) Open drains

Open drain landscape designs must typically seek to minimise the ongoing costs and operational maintenance requirements by developing systems that include required hydraulic capacity (Refer to Section SC6.4.9 Stormwater quantity), appropriate open space features (e.g. recreational pathway along a high bank and minor furniture elements) and a planting palette that seeks to emulate a natural watercourse as much as is practicable.

In cases where open drains are not able to be developed to emulate natural watercourses soil stability will typically be achieved through the application of a suitable hydromulch mix (refer to Section SC6.4.12.6 (20)) to establish grass cover including species *Bothriochloa pertusa* (Indian Blue Couch). Overall grass cover must be >80% with a minimum of >60% of that cover being *Bothriochloa pertusa* (Indian Blue Couch).

Open drain design outcomes will be achieved by;

(a) incorporating hardy trees and native grasses to provide soil stability and shading to the corridor;

(b) avoiding garden beds and mulch (which would require high maintenance when damaged by overland flow);

(c) ensuring all grass areas requiring mowing are a minimum of 2m wide to other infrastructure (including trees) to allow efficient mowing activities and avoid the need for “on foot” maintenance;

(d) complying with all clearance and setback requirements to ensure maintenance can be safely undertaken without reliance on traffic control;

(e) using planting design and appropriate species selection to progressively reduce the number of the maintenance interventions required over time; and

(f) avoiding any potential for any landscape elements to cause damage to other road infrastructure such as driveways, kerb and channel, road pavement and utility services, including by way of aggressive root growth or surface root proliferation.

(6) Car park planting

(a) Landscaping is to be provided to on-street and off-street car parking areas so as to improve the aesthetic and climatic properties associated with these sites. The prevailing climatic conditions in Townsville demand that shade is provided to car parking areas to improve the comfort and reduce the urban heat island effect from large areas of hard surface.

(b) Private car parking areas must conform to the minimum requirements for shade tree planting. As theses spaces are in many cases the front entry to a development, more planting may be used to create an entry to the development.

(c) Planting and shading

Dependent on site and safety considerations, shading of car parks can be in the following manner:

(i) in single sided, angle or parallel bays – 1 tree per 3 car parks;

(ii) in double sided – 1 tree per 6 car parks; and

(iii) shade structures may be used in conjunction with low shrubs and low groundcovers internal to the parking area; and trees, low shrubs and ground covers on the periphery of the car park.

(d) Tree planting in car parks
Trees planted within off-street car parking areas are provided with:

(i) a minimum surface planting area of 1.2 m^2, or are incorporated into continuous garden beds;

(ii) planting pits for trees in car parks surrounded by hardstand are to provide a minimum of 4 m^3 for root zone development, at no greater depth than 1 m. The use of structural soils or root cell type products is essential to achieve acceptable growth and form in shade trees;

(iii) trees planted within road reserve angle car parking areas are provided with garden bed areas between parking bays, which are to be kerbed and no less than 1.2 m wide internally;

(iv) trees must be planted in accordance with any approved standard drawings; and

(v) trees must be allowed to mature naturally and only pruned in accordance with AS4373.

Editor's Note - Currently, no standard drawings are formally adopted for tree planting. Refer also to Clause SC6.4.20.1 Footpath treatment for tree planting details in specialty footpaths.

(e) Landscape design and species

Selection All car parking plantings must satisfy the following landscape design and species selection requirements while incorporating WSUD principles to improve water quality and reduce the reliance on irrigation in public open space:

(i) ground cover and shrubs should have a maximum height of 600 mm to preserve sight lines;

(ii) tree canopies should achieve a minimum clearance above ground of 2.4 m above pedestrian and parking zones, or 4.6 m over vehicle movement zones;

(iii) in public parking areas, trees are to be a species as nominated by Council;

(iv) in private parking areas, trees species are to be nominated by the developer and approved by Council; and

(v) trees and garden beds within car parking areas are protected by raised kerbs, wheel stops or bollards.

(f) Green roofs and vertical gardens (refer to Clause SC6.4.10.2 Water sensitive urban design guidelines)

(i) Green roofs

Editor's Note - Due to the custom nature of green roofs, no design and construction standards are provided. Each site will be assessed on a case-by-case basis.

(ii) Green walls, vertical gardens and façade greening

Editor's Note - Due to the custom nature of green walls, vertical gardens and façade greening, no design and construction standards are provided. Each site will be assessed on a case-by-case basis. Generally, planting features these types are to be within private property and should be under the maintenance regime of the owner. All engineering and hydraulic certification must be provided with any structure proposed.

(7) Irrigation Profile Level (IPL) Hierarchy definition and matrix

(a) Irrigation Profile Level (IPL) Hierarchy definition

Refer to Clause SC6.4.13.1 (7) for details.

(b) Irrigation Profile Level Matrix

Refer to Clause SC6.4.13.1 (8) for details.

SC6.4.12.6 Landscaping construction standards

(1) Introduction

(a) Scope

This section sets out the standards and provides advice and guidelines for the construction of landscape works that will become a council asset.

Landscape works includes but is not limited to, site co-ordination, turfing, gardens, grass seeding, treeplantings, pathways, paved areas, concrete works, stormwater drainage and infrastructure.

This section consists of:

(i) the vegetation of cut and fill batters, median areas, pathway verges, open drains, and other areas withinthe site. Vegetation includes the initial surface preparation, topsoiling, fertilising, sowing of seed and may include surface protection works, hydroseeding, hydromulching, and straw mulching; and

(ii) the supply of plants, planting at locations fertilising, mulching, staking, watering, and maintenance ofplants.

Requirements for quality control and testing, including maximum lot sizes and minimum test frequencies, arecited in Section SC6.4.23 Construction management, quality management, inspection and testing.

(b) Reference and source documents

Reference and source documents that must be read in conjunction with this section are as follow:

(i) SC6.4 Development manual planning scheme policy sections:

Section SC6.4.7 Clearing, grubbing, and earthworks.

(ii) Australian Standards:

AS 1160	*Bituminous emulsions for the construction and maintenance of pavements*
AS 1289	*Methods of testing soils for engineering purposes – General requirements and list of methods*
AS 1672.1	*Limes and limestones – Limes for building*
AS 2507	*The storage and handling of agricultural and veterinary chemicals*
AS 3000	*Electrical installations (known as the Australian/New Zealand Wiring Rules)*
AS 3700	*Masonry structures*
AS 3798	*Guidelines on earthworks for commercial and residential developments*
AS 3972	*Portland and blended cements*
AS 4419	*Soils for landscaping and garden use*
AS 4454	*Composts, soil conditioners and mulches*
AS/NZS 4671	*Steel reinforcing materials*
AS 4843	*Synthetic weed blocking fabric*
AS 4970	*Protection of Trees on Development Sites*

(iii) Other:

Electricity Act 1994	
International Erosion Control Association (IECA)	*Best Practice Erosion and Sediment Control*

(c) Terminology

For the purposes of this document the following definitions apply:

Defects liability period	refer to Section SC6.4.24 Acceptance of completed works.
Gardens, garden beds andgarden areas	means a defined area of mulched “garden” containing various shrubs, trees,plants, or hedges.
Litter	means bottles, paper, cigarette packets, cigarette butts, drink cans, ice cream sticks, plastic, rubber, glass, milk and fruit juice cartons, paper platesand the like. Litter also includes fallen branches, palm fronds, waste, household rubbish, condoms, sharps/syringes, leaves where leaves are unsightly or cause damage to lawn or garden areas, or other dumped material.
Maintenance period	equivalent to the defects liability period and includes the plant establishment period.
Plant establishment period	coincides with the defects-liability period.
Planter box	means a transportable or in situ container designed specifically for containing a garden of trees and /or shrubs.
Sub grade	means the level at the underside of garden or turf topsoil or the level at theunderside of paving gravel base course.
Superintendent	means the nominated representative for council.

(2) Works management

(a) Qualified personnel

Personnel shall be suitably qualified and competent in all aspects of landscape works and shall be familiar with all relevant Australian Standards. All maintenance work to new and existing trees shall be carried out under the supervision of an Arborist with formal qualifications (Level 5 Australian Qualification Framework) or at least 5 years recognised experience in Arboriculture.

(b) Design approval

The design of the landscape works will be prepared by a qualified Landscape Architect.

(c) Contractor inspections

Inspections must be certified and documented by a Registered landscape Architect (the supervising landscape architect). All approved works are required to be inspected by Townsville City Council.

(d) Council inspections

(i) Council may inspect the following:

1. sub grade prior to placing fill;
2. sub grade prior to placing garden soil or turf soil;

3. sub grade prior to placing the gravel base course; (iv) sub grade prior to placing paving or concrete works;
4. installation of gypsum;
5. condition of plants after delivery to site and prior to planting, including planting holes prior to planting;
6. gardens prior to planting;
7. turf areas prior to laying turf;
8. areas to be hydro-mulched / seeded prior to treatment;
9. concrete structures (formwork) prior to placing concrete;
10. block work and reinforcing prior to placing core fill concrete; and
11. other elements considered necessary by the Superintendent.

(ii) Inspection of irrigation works shall be undertaken by the Superintendent and a council Irrigation Officer in association with the Landscape works and is detailed below:

1. all mainline to be inspected prior to covering;
2. drip tube layout prior to covering;
3. 240v power conduit from Ergon POS to controller for correct depth prior to covering;
4. all envelopers (conduits) work under hard surfaces prior to covering;
5. all envelopers (conduits) under hard surfaces must be continuous 100 mm PVC CL9, all conduitends must be sealed with expanding foam prior to covering; and
6. water meter assembly installation prior to covering to ensure correct installation of thrust blocksand copper protection.

(e) Inspection results

(i) Work inspected that complies with the section and/or the design plans will be accepted by Council.

(ii) Any work inspected that does not comply with the section and/or the design plans, will not be accepted by Council. Items not acceptable will be noted for rectification.

(iii) The contractor is required to rectify these items prior to proceeding to the next construction phase andshall apply for a re-inspection by Council on completion of the rectification work.

(f) A minimum of 24 hours' notice' by the Contractor is required for notification of an Inspection. Failure by the Contractor to notifycouncil of any inspections required, will result in the works being excavated at the Contractors cost to allow aninspection to be carried out.

(g) Inspection documentation.

Editor's note - This section relates to Inspection Test Plans and is currently under development.

(3) Supply of materials

(a) Materials supply - general

(i) Substitutions

The Contractor shall notify the council immediately if an item is unavailable for inclusion in the works andshall provide alternative supply details if appropriate. Substitutions of any materials or products shall not be made unless approved by the Superintendent in writing.

(ii) Material samples

In certain instances, Council may request the Contractor to provide samples of materials to be installedor used for work under the development approval.

(iii) Materials testing

In certain instances, Council may request the Contractor to provide results of materials testing. Whereapplicable, testing requirements will be set out in the conditions of approval.

(iv) Materials warranty

Where requested, the Contractor shall provide to Council all relevant warranty details for the materials nominated in any conditions of approval.

(b) Supply of plants

(i) Plant specifications

1. All plants supplied shall be in a healthy condition free from weeds, pests, and diseases. Plants shall be well foliated, showing signs of active growth, true to type and of a form and shape considered typical for the species or variety.
2. Leaves shall be of normal size, shape, colour, and texture with no physical or insect damage ordisease lesions.
3. The plant roots shall be fibrous, well developed and not root bound, with no kinking, knotting, girdling, or spiralling and shall be free of any pests or diseases or any other root defects.
4. All plants supplied shall be hardened off and in a condition suitable for planting in the Townsville climate.
5. Trees supplied (unless required to be multi-stemmed) shall have a single leading stem and shall be self-supporting and unstacked.
6. Root bound plants, deformed plants and plants showing recent signs of root pruning will not be accepted.
7. At time of delivery to the site, each group of plant species shall be clearly and accurately labelledaccording to botanical nomenclature. Labels shall be water resistant and tied securely to one plant in every 20 for each species.
8. Plants which are above the minimum size requirements may be accepted for inclusion within theworks.

(ii) Container stock

Plants grown in containers shall have a root system firmly established with no large roots growing out ofthe container, shall be of such a size that the roots have penetrated to the bottom of the container and occupy 95-100% of the soil volume and/or have sufficient roots to hold the container soil together afterremoval of the plant from the container.

(iii) Ex-ground stock plants

1. Where plants are growing in ground prior to delivery to the site, the necessary root pruning and/or preparation procedures in accordance with accepted transplanting practice shall be commenced insufficient time to ensure that, at the time of planting the plant is ready and will meet the specifiedrequirements. Transplanting of ex-ground stock should be conducted under the supervision of a qualified (Level 3 Australian Qualification Framework) horticulturalist or arborist.
2. Refer to Table SC6.4.12.4 – Acceptable Root Ball Sizes for minimum acceptable root ball sizes for ex-ground stock plants.

Table SC6.4.12.4 - Acceptable Root Ball Sizes

Small Trees		**Large Trees**	
Height of Tree (mm)	Root Ball Diameter (mm)	Approximate Tree Trunk Diameter (mm) (300 mm above ground)	Root Ball Diameter (mm)
600 - 900	300	40	500
900 - 1200	350	50	550
1200 - 1500	400	65	600
1500 - 1800	450	75	800
1800 - 2100	550	100	950
2400 - 2700	600	125	1200
2700 - 3000	650	150	1450
3000 - 3600	750	175	1600
3600 - 4200	800		
4200 - 5000	900		

(iv) Substitutions

Substitutions of plants shall not be permitted unless approved in writing by council. In the event that a plant is unavailable the Contractor may request to provide a substitution. Substituted plants shall be of the same specified type, quality and size unless otherwise agreed to by Council.

(c) Supply of imported soil mix

(i) Imported soil mix shall be organic soil, soil blend or top dressing in accordance with the Australian Standard AS 4419 Soils for landscaping and garden use.

(ii) The Contractor shall note the requirements of AS 4419.

(d) Supply of turf

(i) Turf shall be the species nominated on the drawings and shall be supplied by a specialist grower of cultivated turf.

(ii) The soil of the turf sod shall be an even thickness of 25 mm minimum.

(iii) Turf shall be free from any matter toxic to plant growth and shall be free from roots, weed or weed seeds.

(e) Supply of hydro seeding/mulching

The specific mix/blend of hydro seeding/mulching required shall be nominated on the drawings and supplied by specialist supplier of hydro seeding/mulch.

(f) Supply of mulch materials

(i) All mulch materials supplied shall be in accordance with the current relevant AS 4454 Composts, soilconditioners and mulches.

(ii) Organic and inorganic mulch shall be of the type and quality as noted on the drawings.

(iii) Organic mulch derived from vegetation cleared on site may only be used where it is free from deleteriousmaterials such as rock, soil and weed material.

(g) Tree stakes and ties

(i) Unless otherwise noted on the drawings or approved by council, tree stakes shall be durable hardwood, straight, free from knots or twists and pointed at one end.

(ii) Small plants may only require 1 stake where required.

(iii) For trees up to 45 litre 2 stakes – 50 mm x 50 mm x 1800 mm long.

(iv) For trees over 45 litre 3 stakes – 50 mm x 50 mm x 2400 mm long.

(v) Ties shall be 50 mm wide furniture grade hessian webbing or similar.

(vi) Supply of proprietary items

Timber/concrete garden edging, soil conditioners, root barrier, furniture items, play equipment and other project specific items shall be supplied to the requirements and details noted on design and/or construction drawings.

(h) Supply of gypsum

Gypsum application rates shall be supply in accordance with AS 4454 and as required by soil types specific tothe site.

(i) Supply of fertiliser fertilisers supplied shall be:

(i) delivered to the site in sealed bags clearly marked to show the manufacturer or vendor, weight, fertiliser type, N:P:K. ratio, recommended uses and application rates; and

(ii) applied at the locations and frequencies in accordance with the manufacturer's recommendations.

(4) Earthworks

(a) General

Earthworks relates to gardens, grass areas, pathways and paved areas and includes:

(i) site clearing;

(ii) stripping of existing vegetation;

(iii) stripping of existing topsoil;

(iv) excavation to sub grade level;

(v) filling to sub grade level; and

(vi) cultivation of the sub grade surface.

(b) Quality management

All materials supplied and work carried out shall be in accordance with the current, relevant Australian Standards:

AS 1289 *Methods of testing soils for engineering purposes*; and

AS 3798 *Guidelines on earthworks for commercial and residential developments.*

(c) Existing services

Per Section SC6.4.7 Clearing, grubbing and earthworks, the Contractor is required to locate all existing and newly installed services prior to commencement of any earthworks. Care shall be taken in areas to be excavated, filled or cultivated not to unearth or damage services. Any damage to services caused by the Contractor shallbe reinstated by the Contractor at no cost to Council.

(d) Site preparation

(i) Clearing/demolition

1. Clearing shall mean the removal of trees, shrubs, scrub and undergrowth and other vegetation above ground level and includes the removal of artificial obstructions such as fences, concrete slabs rubbish, timber, boulders, rubble. and other man-made products.

2. Clearing shall be carried out in accordance with Section SC6.4.7 Clearing, grubbing and earthworks.

(ii) Grubbing

Grubbing shall mean the removal from below ground level of trees, roots, stumps, rocks and artificialobstructions as defined and specified by Section SC6.4.7 Clearing, grubbing, and earthworks.

(iii) Stripping of existing vegetation

Areas to be excavated or filled shall be stripped of all vegetation to a depth just sufficient to include theroot zone (nominal 50 mm). All stripping of vegetation is to be in accordance with Section SC6.4.7 Clearing, grubbing, and earthworks and must not affect trees/vegetation to be retained, as per AS 4970 – *Protection of Trees on Development Sites.*

The striped material shall be removed from site or may be stockpiled on site for later reuse, if approvedby council and in accordance with Clause SC6.4.23 (4) (q) Stockpiling of materials.

(iv) Existing topsoil

Existing topsoil excavated on site may be reused provided that the material conforms to the AS 4419 requirements and is approved for reuse by the Superintendent. The material may be stockpiled on site, inaccordance with Clause SC6.4.23 (4) (q) Stockpiling of materials.

(e) Excavation (down to sub grade level)

(i) General

The existing surface of areas to be excavated shall be stripped of all vegetation prior to excavating. Care shall be taken not to unnecessarily expose subsoils through the area of construction by over excavation,to prevent any potential for the development of acid sulphate conditions.

(ii) Excavation in gardens

1. Garden beds shall be excavated down to subgrade level as required to suit the finished surfacelevels, the depth of garden mix soil and the depth of mulch.

2. The subgrade shall be shaped and graded evenly to fall towards subsoil drains (if present) and thetopsoil shall be shaped to fall from the centre of the bed outwards in all directions.

3. Excavation in gardens shall be in accordance with council's approved standard drawings.

Editor's note - Standard drawings for these works are under development.

(iii) Excavation in grass areas

1. Grass areas shall be excavated down to subgrade level as required to suit finished surface levels,the depth of turf topsoil and the depth of turf.

2. The subgrade shall be shaped and graded evenly to fall towards subsoil drains (if any) and shall begraded evenly to follow the finished surface profile.

3. Excavation in grass areas shall be in accordance with council's approved standard drawings.
Editor's note - Standard drawings for these works are under development.

(iv) Excavation for pathways and paved areas (paving)

1. Pathways and paved areas shall be excavated down to subgrade level as required to suit finishedsurface levels, the depth of the gravel base course, bedding sand, pavers, or concrete. The subgrade shall be shaped and graded evenly to the falls shown on the drawings and/or to fall to stormwater pits or subsoil drains.

2. Excavation for pathways and paved areas shall be in accordance with council's approved standarddrawings.
Editor's note - Standard drawings for these works are under development.

(v) Excavation near existing trees

Excavation near existing trees shall be undertaken in accordance with AS 4970 – *Protection of Trees on Development Sites.*

(vi) Spoil

1. Spoil material resulting from excavation shall be reused on site wherever practicable, provided thatthe material conforms to the specified requirements for its intended use (e.g., filling or topsoil) as per AS 4419.

2. Spoil material to be reused may be stockpiled on site as per Clause SC6.4.23 (4) (q) Stockpiling of materials.
After the excavation process has been completed, the sub grade surface shall be inspected forsprings, soft soil areas and other structural weaknesses. Where such weaknesses are encountered the following remedial works may be required:

a) excavation and replacement of unsuitable material;

b) surface drainage blankets of sand; and

c) subsoil drains.

(f) Filling (up to sub grade level)

(i) Existing surface treatment

The existing surface of areas to be filled shall be stripped of all vegetation prior to placing any fill. The existing surface shall then be scarified to a depth of 200 mm. If required, water shall be added to bringthe existing surface up to optimum moisture content prior to placing any fill.

(ii) Unsuitable existing surface

After the stripping process has been completed, the existing ground surface shall be inspected for springs, soft soil areas and other structural weaknesses in the naturally occurring soil. Where such weaknesses are encountered, the following remedial works may be required:

1. excavation and replacement of unsuitable material;

2. surface drainage blankets of sand; and

3. subsoil drains.

(iii) Acceptable types of fill material for gardens and grass areas

Fill material to garden and grass areas shall be either:

1. "general purpose soil" to AS 4419 Clause 4.1; or

2. "natural soil" to AS 4419 Clause 4.3; or

3. spoil from onsite excavations if approved by the Superintendent, with a maximum particle size 25mm.

(iv) Acceptable types of fill material for pathways and paved areas

Fill material to pathways and paved areas shall be:

1. crusher dust, free from organic matter and lumps of clay; or
2. crushed rock gravel uniformly graded, nominal particle size 25 mm; or
3. other granular material approved by the Superintendent.
4. All material used shall have a linear shrinkage - 0 - 8%, Soaked California Bearing Ratio – 15 minimum.

(v) Fill in gardens

Gardens shall be filled up to sub grade level as required to suit the finished surface levels, the depth of garden mix soil and the depth of mulch. The sub grade shall be shaped and graded evenly to fall towardssubsoil drains (if any).

(vi) Fill in grass areas

Grass areas shall be filled up to sub grade level as required to suit finished surface levels, the depth ofturf topsoil and the depth of turf. The sub grade shall be shaped and graded evenly to fall towards subsoil drains (if any) or gully pits and to mirror the finished surface profile.

(vii) Fill to pathways and paved areas

Pathways and paved areas shall be filled up to subgrade level as required to suit the finished surfacelevels, the depth of the gravel base course, bedding sand, pavers, or concrete. The subgrade shall be shaped and graded evenly to the falls shown on the drawings and/or to fall to stormwater pits.

(viii) Fill around existing trees

For information regarding placement of fill and compaction issues refer to AS 4970 *Protection of Trees on Development Sites.*

(g) Placing and compacting fill

(i) Fill material shall be placed and compacted in successive horizontal layers to the dimensions, levels, grades, and cross sections as shown on the drawings and so that the surface is always self-draining. Refer to Table SC6.4.12.5 for Fill Compaction Standards. Care shall be taken to ensure that fill to gardenareas is not excessively compacted.

(ii) Each fill layer shall be scarified, and/or harrowed and processed to a finely divided condition, uniformly watered or aerated as the case may be, to obtain moisture content within the range of 80% - 90% of the optimum moisture content. The loose depth of the material in each layer shall be not more than 150 mm.

(iii) Fill shall be placed in layers simultaneously on both sides of structures, culverts, and pipe work to avoid differential loading. Fill shall not be placed against concrete or masonry structures, walls and the like until the concrete or masonry work has been in place for a minimum of 14 days.

Existing works and structures shall be protected from damage due to compaction operations. Compaction by mechanical means shall not be carried out within 300 mm of paths, kerbs, or structures. Compaction in these locations shall be carried out by hand or the size of compaction equipment shall belimited to ensure no damage is caused. Commence compaction of each fill layer at the structure and proceed away from it.

Table SC6.4.12.5 - Fill Compaction Standards

Location	Compaction Standard
Gardens and Grassed Areas.	85% Relative Dry Density Standard Compaction.
Pathways, Paved Areas and Structures.	95% Relative Dry Density Standard Compaction.

(h) Grading

(i) Runoff from impervious surfaces such as roofs, driveways and car parks, and overland flows from turf and garden beds is to be captured and allowed to infiltrate into subsoils by reshaping existing landforms through the use of swales, contour banks, soaks, percolation pits and basins, rain gardens and bioretention filters.

(ii) To reduce runoff and erosion and encourage rainwater infiltration into soil, a landscape embankment isnot to exceed grades of 1 in 5.

(iii) The regrading of land is not to occur within the tree protection zone of existing trees to be retained. 30 mm at any location.

(i) Cultivation

(i) Applies to gardens and grass areas (if directed or if noted on the drawings).

(ii) Where shown on the drawings, the sub grade of Gardens and Grass Areas shall be cultivated prior toplacing garden mix soil or turf topsoil.

(iii) The sub grade shall be thoroughly cultivated by ripping parallel to the final contours to loosen the compacted ground and to the depths nominated in Table SC6.4.12.6.

Table SC6.4.12.6 - Cultivation Depths

Location	Cultivation Depth
Garden Areas	200 mm
Grass Areas	100 mm

(iv) In areas of heavy clay natural soil, granulated gypsum shall be spread over the entire area of all gardensat a minimum rate of 2 kg per square metre and shall be thoroughly blended and incorporated into the subgrade during cultivation.

(v) In areas of heavy clay natural soil, granulated gypsum shall be spread over the entire area of all grassareas at a minimum rate of 2 kg per square metre and shall be:

1. thoroughly blended and incorporated into the subgrade during cultivation if cultivation is to becarried out; or

2. spread prior to placing turf soil.

(vi) Any soil additives and/or imported materials other than gypsum, that may be required to be applied tothe natural soil shall be thoroughly blended with or spread over the subgrade.

(vii) Cultivation shall not be carried out when the soil is wet or plastic.

(viii) The Contractor shall ensure that no damage occurs to tree roots, underground services, kerbing and the like during the cultivation process. Cultivation by mechanical means shall not be carried out within thedrip line of trees to be retained or within 300 mm of pathways, paved areas and/or structures. Cultivation in these locations shall be carried out by hand. Refer to AS 4970 – *Protection of Trees on Development Sites.*

(ix) After cultivation soil lumps shall have a maximum dimension of 50 mm. Stones exceeding 25 mm, clodsof earth exceeding 50 mm, weeds, roots, sticks, rubbish, and any other deleterious material brought tothe surface during cultivation shall be removed. Any depressions caused by the removal of these materials shall be filled with topsoil or on-site spoil material approved by the Superintendent.

(x) After cultivation the surface shall be graded smoothly and evenly and trimmed to the required levels allowing for placing the specified depth of imported soil to achieve the finished surface levels as noted onthe drawings. Care shall be taken to prevent areas of excessive compaction being caused by construction equipment.

(j) Backfilling trenches

(i) Backfill to trenches up to sub grade level under pathways and paved areas shall be clean sand or crusher dust compacted to 95% relative dry density standard compaction.

(ii) Backfill to trenches up to sub grade level in gardens and grass areas shall be imported soil mix or material excavated from the trench or may be other on-site material approved by the Superintendent.

(iii) Trenches excavated in gardens within the imported garden mix soil shall be backfilled with imported garden mix soil mix as specified.

(5) Vegetation of slopes and drains

(a) Execution and timing of work

(i) The work to be executed under this clause includes the vegetation of cut and fill batters, pathway verges,median areas, open drains, and other areas within the site. Vegetation includes the initial surface preparation, topsoiling, fertilising and either sowing of seed or turfing as shown on the drawings.

(ii) Exposed ground shall be vegetated before the area exceeds one hectare or lesser area in compliance with council requirements.

(b) Materials

(i) Topsoil

The Contractor shall use topsoil stockpiled on site under the Section SC6.4.7 Clearing, grubbing and earthworks. Where imported topsoil is required, it shall comply with AS 4419 and shall:

1. be of a friable, porous nature;
2. be free of weeds and weed seeds, bulbs, corms, and vegetable propagules;
3. contain no refuse or materials toxic to plant growth;
4. contain no stumps, roots, clay lumps or stones larger than 50 mm in size;
5. have an organic content of at least 3 per cent by mass;
6. have a pH neither less than 5.5 nor more than 7.5; and
7. have a soluble salt content not exceeding 0.06 per cent by mass.

(ii) Seed

1. All seed used shall be in accordance with the accepted design outcome for the slope and/or drain to be vegetated. Examples of species and varieties are listed in Clause SC6.4.12.6(20) Landscaping materials and shall be sown at the application rates specified therein.
2. The Contractor's attention is drawn to the lead time that may be required to procure some native seed species. The native seed shall be delivered to the site in separate lots for each species andvariety, clearly labelled to show species, variety, and weight.

3. All seed must be accompanied by a "Certificate of Authenticity" which shall be furnished by the Contractor to the Superintendent upon request at any stage of the work. Grass and clover seed shall be pre-packed commercially with an accompanying certificate of germination.

4. The Contractor shall not take possession of the seed more than 7 days before sowing is to occur.The seed shall be stored in clean, airtight containers and kept away from direct sunlight. It shall not be exposed to the elements at any stage during storage.

5. The Contractor shall replace at his own expense any exotic seed batch found not true to type.

(iii) Turf

Turf shall consist of 25 mm depth of dense, well rooted, vigorous grass growth with 25 mm depth of topsoil. The type of grass turf to be used shall be selected from Clause SC6.4.12.6 (20) Landscaping materials and in accordance with the drawings. Unless specified, Kikuyu grass shall not be used. Turf shall be free of weeds, soil pests and diseases. The turf shall be supplied as rolls in long lengths of uniform width, notless than 300 mm, and shall be in sound unbroken condition.

(iv) Vegetable mulch

Vegetable mulch used in hydromulching shall consist of straw, chaff, wood fibre, paper pulp or similar material all finely shredded to a maximum dimension of 10 mm. Meadow hay or weeds shall not be usedand paper pulp if used shall not exceed 50 per cent by mass of the total mulch.

(v) Water

Water used shall be potable.

(vi) Binder

The binder used in hydro mulching and straw mulching shall be Grade ASS, slow setting anionic bitumenemulsion, complying with AS 1160.

(c) Vegetation of slopes 3 to 1 or flatter

(i) Preparation of surface

1. Slopes shall be sprayed with herbicide applied at the rate specified in by the manufacturer to kill weed infestation. Sprayed areas shall remain undisturbed for two weeks.

2. The surface shall then be tyned to a depth of 200 mm to produce a loose surface and all large stones, rubbish and other materials that may hinder germination shall be removed before topsoiling.

(ii) Topsoiling

Topsoil shall be uniformly applied to provide an average compacted thickness of 50 mm with a minimum compacted thickness of 30 mm at any location. The topsoiled area shall be cultivated to a depth of 50mm to provide a roughened surface with soil lumps not exceeding 50 mm dimension.

(iii) Mixing of seed

The Contractor shall give the Superintendent 2 days' notice before each sowing operation. Seed shall be sown on the day of mixing with pesticide.

(iv) Sowing

1. Sowing shall be carried out with an appropriate mechanical spreader. Where practicable, passes shall follow finished surface contours. Seed shall be sown at a depth of 5 mm or shall be raked or harrowed to provide 5 mm cover.

2. Seed shall be evenly distributed over the areas to be sown at the rates specified in Clause SC6.4.12.6 (20) Landscaping materials. Fertiliser shall be applied concurrently with the seeding operation.

(v) Turfing

1. Turf shall be placed on the prepared topsoiled surface. Runs of turf shall butt hard against each other and be placed perpendicular to the direction of water flow. Turf seams shall then be top dressed with topsoil.

2. Four to six weeks after placement, the turf shall be lightly top dressed with topsoil to correct anyundulations or unevenness in the established turf.

(vi) Watering

The Contractor shall water areas to be sown to a moist condition and shall rewater areas to a moist conditionwithout surface runoff on a daily basis for a minimum of 15 days after sowing, or as otherwise directed by theSuperintendent, to promote and maintain growth.

(d) Vegetation of slopes steeper than 3 to 1

(i) General

Where required or directed by the Superintendent, slopes shall be vegetated by one of the following methods:

1. topsoiling and hydromulching; or

2. topsoiling, hydroseeding and straw mulching; or

3. hydroseeding.

(ii) Preparation of surface

1. Weeds shall be killed by spraying with herbicides.

2. No more than 7 days before seeding all loose material shall be removed from fill batters and cut batters, which are not stepped, by dragging a heavy steel chain of minimum weight of 30 kilograms per metre of length or by other methods approved by the Superintendent.

(iii) Topsoiling

Where batters have been stepped, the steps shall be loosely filled with topsoil. Elsewhere, topsoil shallbe uniformly applied to provide an average thickness of 50 mm with a minimum compacted thickness of 30 mm at any location.

(iv) Hydromulching or hydroseeding

1. The hydro mulch or hydroseed shall comprise the materials shown in Clause SC6.4.12.7 Attachment D – Parks and Open Space Maintenance Service Level. The materials shall be applied at the application rates shown in Clause SC6.4.12.6 (20)– Landscaping materials.

2. Dry surfaces shall be watered by a fine spray before the application of the hydro mulch.

3. Storage tanks, containers, and equipment to be used in hydro mulching or hydro seeding of slopes shall be clean and free of contamination from previous operations.

4. A slurry mixture shall be produced by addition of the specified materials in the tank and agitatedto maintain a uniform consistency during application. It shall be applied uniformly over the whole surface.

5. Hydro mulch or hydro seed shall not be applied under the following weather conditions at the site:

a) when temperature is higher than 35 ºC; and/or

b) when winds exceed 15 km/hr; and/or

c) where, in the opinion of the Superintendent, the surface is too wet; or

d) during rain periods or when rain appears imminent.

(v) Straw mulching

The mulch to be applied after hydroseeding shall comprise a matrix of straw and an anionic slow setting bitumen emulsion binder. Meadow hay shall not be used. The straw mulch shall be uniformly applied by a suitable blower unit at a rate of 250 bales (each of 20 kilograms) of straw per hectare of surface. Thebitumen emulsion shall be incorporated as a spray into the air stream of the mulch blower at a rate of notless than 2,500 litres of bitumen emulsion per hectare of surface. The finished straw mat shall have a minimum thickness of 20 mm at any location.

(e) Vegetation of open drains

(i) Preparation of surface

The Contractor shall so execute the work that the excavation of open drains to the specified profiles isfollowed within 7 days by the vegetation of the surface as specified in this clause. Topsoil shall be spread to provide an average compacted thickness of 50 mm with a minimum compacted thickness of30 mm at any location.

(ii) Sowing

Before sowing, the surface shall be watered. Seed shall then be applied uniformly at the rates specified in Clause SC6.4.12.6 (20) Landscaping materials. by one of the following procedures as directed by the Superintendent:

1. mechanical sowing or

2. hydromulching or hydroseeding.

(iii) Surface protection - general

Where shown on the drawings or directed by the Superintendent, one of the following protectivetreatments shall be applied immediately to all or part of the sown surface.

(iv) Surface protection - spraying with bitumen emulsion

An anionic slow setting bitumen emulsion, conforming with Grade ASS of AS 1160, shall be sprayedover the surface at a rate of 1 litre of bitumen emulsion per square metre of surface.

(v) Surface protection - lining with organic fibre mat

1. The channel surface shall be lined with an organic fibre mat listed in Clause SC6.4.12.6 (20) Landscaping materials. The runs of matting shall be laid along the direction of water flow. The matting shall be laid looselyon the soil surface and not stretched.

2. The upstream end of the matting shall be slotted into a trench 150 mm wide by 150 mm deep andpinned to the base of the trench at 200 mm centres. The trench shall be backfilled with soil and compacted by foot.

3. The pins shall be `U' shaped, 4 mm gauge wire, 50 mm wide and 150 mm long legs.

4. Adjacent runs of matting shall be overlapped 100 mm with the higher run lapped over the lower run.The matting shall be pinned along the sides of each run at 500 mm centres and along the middle of each run at 1 m centres. End overlaps shall be 150 mm wide with the higher run end lapped over the start of the lower run and pinned at 200 mm centres.

(vi) Turfing

1. Turf shall be as specified under Clause SC6.4.12.6 (20) Landscaping materials. Runs of turf shall butt hard against each other and be placed perpendicular to the direction ofwater flow in the drain and pinned into position at 500 mm centres.

2. Seams of turf shall be top dressed with topsoil.

(vii) Watering

The Contractor shall water treated areas in order to promote and maintain growth.

(6) Garden construction

(a) Scope

The following work activities relate to the construction of garden beds, garden areas and mass planting areas:

(i) earthworks (excavation, filling and cultivation);

(ii) supply and application of soil improvement additives;

(iii) supply and placing garden mix soil;

(iv) supply and placing mulch;

(v) supply and planting of trees, shrubs, ground cover plants and the like including stakes and other plantsupports;

(vi) supply and application of fertiliser;

(vii) supply and installation of garden edging; and

(viii) supply and installation of subsoil drains.

Editor's Note - All garden construction shall be in accordance with the current relevant Australian Standards:

- AS 4419 - *Soils for landscaping and garden use*; and
- AS 4454 - *Composts, soil conditioners and mulches*.

(b) Co-ordination

The sequence for placing garden mix soil, installing irrigation, placing mulch and planting will vary according tothe type of plants and irrigation system. The Contractor is required to liaise with other Contractors and the Superintendent to ensure the best possible method of construction is undertaken.

(c) Earthworks

Gardens may require Excavation or Filling to achieve the finished surface levels nominated on the drawings.After excavation or filling, all gardens may require cultivation.

(d) Garden bed dimensions

Planting bed dimensions are in accordance with the following:

(i) garden beds have an average minimum width of 1.2 m, provided that the bed is no less than 0.5 m wide; and

(ii) root zone depths for plants are at least that of the root ball of the plant at planting.

(e) Soil Condition

(i) Priority is to be given to using existing site soil as imported soil is a limited resource.

(ii) Existing topsoil is conserved by either not disturbing the soil during construction or by stockpiling it prior to construction commencing, in accordance with Clause SC6.4.23 (4)(q) Stockpiling of materials.

(iii) Subsoil is to be cultivated to a minimum depth of 200 mm for garden beds and 100 mm for turfed areasunless this will adversely affect the roots of established trees.

(iv) The minimum topsoil depth is:

1. 100 mm for non-irrigated turf areas;.

2. 200 mm for irrigated turf areas; and

3. 300 mm for garden beds.

(v) If additional soil is required to meet these minimum depths, soil is to meet AS4419 *Soils for landscaping and garden use.*

(vi) The soil quality is sufficient to allow plants to grow effectively. Soil amelioration measures to improve theinfiltration of existing soils, the soil's macropore and micropore balance and ensure a stable soil ecosystem, include the following:

1. scarification of crusted topsoil layers;

2. aeration of topsoil layers;

3. deep ripping of subsoil layers;

4. using hand tools only within the tree protection zone of a tree identified for retention;

5. the application of gypsum to sodic clay topsoils and subsoils;

6. installing a 50 mm layer of lucerne hay between the topsoil and mulch layer;

7. adding worms to the topsoil;

8. applying soil rhizobia in solution to the topsoil;

9. inoculating plants with Mycorrhizal fungi; and

10. incorporating soil wetters, crystals, and wettable foams.

(f) Soil improvement additives

Any soil additives to be applied shall be as required/recommended by soil test results.

(g) Placing imported soil in gardens

(i) Garden mix soil shall be an imported "Organic Soil".

(ii) Garden mix soil shall be a minimum depth of 300 mm after consolidation.

(iii) Garden mix soil shall be placed, spread, and graded evenly in maximum 150 mm thick layers to finish ata level which allows the surface of the mulching material after consolidation to be flush with adjacent finished levels. Care shall be taken to prevent areas of excessive compaction being caused by construction equipment.

(iv) Garden mix soil shall be graded evenly to form a gentle crowned appearance at the centre of the gardenbed and/or shall conform to the finished levels detailed on the drawings.

(v) The surface of the garden mix soil shall be smooth and free from stones or lumps of soil prior to planting.

(h) Placing mulch

(i) Mulch shall be placed as soon as practicable after planting and shall be placed progressively as plantingproceeds along the length of the garden or planting area.

(ii) Mulch shall be spread smoothly and evenly over the entire garden so that after initial consolidation thefinished level of the mulch is flush with adjacent finished levels.

(iii) Mulch shall be shaped around plants to slope into the plant and shall be kept a minimum of 50 mm clearof plant stems to avoid collar rot.

(iv) Organic mulch

Organic mulch shall be placed to a depth not greater than 100 mm and as a minimum shall be maintained to a depth of 75 mm after consolidation.

(v) Inorganic mulch

Not less than 14 days prior to the placing of inorganic mulch, herbicide shall be applied to the entire areato be mulched and prior to placing the mulch.

(vi) Inorganic mulch shall be placed to a minimum depth of 100 mm unless noted otherwise on the drawingsfor the type of mulch specified.

(7) Planting

(a) General

(i) Planting shall be carried out in accordance with the best horticultural practices.

(ii) Plants shall be installed at the spacings, and locations detailed on the drawings to avoid existing servicesor to cover an area uniformly.

(iii) In feature planting areas at least 25% of tree plantings are to be provided as larger advanced stock, witha minimum 25 litre pot size.

(iv) The Contractor is required to locate all existing services prior to planting.

(v) Planting shall not be carried out if the soil is very wet or waterlogged or during periods of extreme weather conditions such as extreme heat, cold wind or rain.

(vi) Plant supplies are to be healthy, attractive, and a general high standard of stock in order to ensure long-term viability of the specimen. The stock will be free from disease, pests and weeds and structural defects.

(b) Planting procedure – container stock

(i) A planting hole with vertical sides shall be excavated to a width of twice the diameter of the root ball ofthe plant and to a minimum depth of 100 mm deeper than the height of the plant container.

(ii) The depth of the planting hole shall allow for the clearance specified and shall be in relation to the finished surface level where applicable.

(iii) The sub grade material at the bottom of the planting hole shall be loosened to a depth of at least 50% ofthe root ball depth and the compacted sides of the planting hole shall be loosened to prevent confinement of root growth to the hole. Additional excavation of the base of the planting hole may be required to ensure that the plant has sufficient sub grade drainage.

(iv) Plants shall be thoroughly watered in the pot prior to planting so that when removed from the pot the rootball is moist. Plants shall be removed from their pots without damage to the root system. Plants shall not be removed from pots until the planting hole is complete and ready for planting.

(v) The plant shall be placed in the centre of the hole with the stem vertical and shall be set at a height suchthat the top of the potting material is level with the surrounding soil. Plants placed on a slope shall be setin the centre of the hole with the top of the potting material level with the lowest side of the planting hole and the plant stem vertical.

(vi) Fertiliser tablets or granules shall be placed in the planting hole at the time of planting in accordance with the manufacturers recommended rates of application. The fertiliser shall be placed around the plant at half the depth of the planting hole and shall be covered with backfill soil to ensure no direct contactwith the plant roots.

(vii) Plants other than container stock trees placed in gardens shall be backfilled with garden mix soil as specified for the entire planting hole. The garden mix soil shall be lightly tamped around the plant andthoroughly watered to eliminate air pockets.

(viii) During planting care shall be taken to ensure that soil is not mixed with the mulch. Mulch that is contaminated with soil shall be replaced.

(ix) Container stock trees shall be backfilled in 150 mm layers up to within 200 mm of the top of the plantinghole. The backfill soil shall be tamped around the tree and thoroughly watered to eliminate air pockets. Backfill the top 200 mm with garden mix soil.

(x) In areas other than heavily planted borders, shrubs or tuft plants, each individual plant shall have a watering basin for the extent of the planting hole formed with garden mix soil around the base of the plant.

(xi) Individual container stock trees located in irrigated grassed areas shall have a 150 mm high watering basin for the extent of the planting hole formed with garden mix soil around the base of the tree.

(xii) Plants placed on a slope shall have a small horizontal terrace formed for the extent of the planting hole.

(xiii) Immediately after planting, the plants shall be watered to thoroughly water the root ball and the backfill. Watering shall be carried out progressively as planting proceeds to ensure that plants do not dry out andas a minimum, plants shall be watered within a maximum of 1 hour from planting.

(xiv) All identification labels, nursery ties and the like shall be removed from the plants immediately after planting.

(c) Planting procedure - ex ground stock plants

Editor's note - Content under development.

(d) Transplanting trees

(i) Trees to be transplanted will be noted on the construction drawings prior to the commencement of construction.

(ii) Preparation of the tree prior to transplanting shall be carried out in accordance with accepted transplanting practice and any requirements provided by council to suit the particular species and project.

(iii) Preparation of the tree for transplanting shall be commenced in sufficient time to ensure that at the timeof planting the tree is adequately prepared and will meet the specified requirements.

(iv) All transplanting work shall be carried out under the direction of a suitably qualified horticulturist or arborist.

(v) Planting of the transplanted tree shall be generally in accordance with the details shown on the drawings.

(vi) The resulting excavation after the tree has been removed shall be backfilled with compacted fill material suitable for the location.

(e) Root barrier

(i) Locations and type of root barrier shall be noted on the drawings or shall be as directed by the Superintendent.

(ii) Root barrier shall be installed as per the manufacturer's recommendations and with particular attention tothe location of any underground services and service pits.

(iii) Root barrier must be installed in all situations where it is likely that tree roots may interfere or adversely affect infrastructure - such as driveways, kerbs, pathways and other street furniture and buildings, e.g. where species such as Ficus are to be planted in reasonable proximity to pathways.

(8) Staking, ties and guying

(a) Every container stock tree shall be staked and tied unless otherwise approved by the Superintendent.

(i) Tree stakes shall be:

1. a minimum of 2 stakes per tree;
2. placed outside of the tree root ball;
3. driven into the ground a minimum one third of their length;
4. for smaller trees (trees up to 45 litre), at least 1.0 metre apart; and
5. for columnar trees, spaced to avoid excessive root ball damage.

(ii) Care shall be taken to avoid damage to the tree root system and any services when installing stakes.

(iii) All stakes shall remain in place for the entire “maintenance period” unless otherwise instructed by theSuperintendent.

(b) Ties

Ties shall be fixed securely with staples to the stakes in a figure eight pattern around the tree stem. As aminimum one tie at half the height of the main stem shall be provided with additional ties as necessary tostabilise the tree.

(c) Guying

(i) Trees requiring the installation of guying shall be noted on the construction drawings or shall be as directed by the Superintendent.

(ii) Guying consists of a minimum of three heavy duty stakes of either steel or timber driven into solid ground, with heavy duty galvanised wire ties firmly fasten to the stakes and looped around the tree trunk with suitable wrapping to protect the trunk.

(iii) Underground guying where required to be used, shall be positioned for stability purposes, placement of the guy wires shall away from the tree trunk to avoid girdling issues as the tree matures. Such tree guying practices shall be removed prior to Off Maintenance inspection and acceptance by Council.
Editor’s note - Underground guying is accepted where suitable for the tree in question.

(9) Sub soil drains construction

(a) Sub soil drains in gardens may be required in areas of heavy clay soils and in roadway medians, roundabouts, and the like. Sub soil drains shall be installed at the locations and to the details shown on the drawings.

(b) Pipes and fittings shall be perforated plastic Type 1 Class 200 to AS2439: Part 1. Sub soil drain filter fabricsshall be approved geo fabric material in accordance with the relevant Australian Standards.

(c) Pipe surround shall be a coarse washed river sand complying with the grading requirements given in Table SC6.4.12.7 - Recommended Grading for Sub-Soil Drain Sand and shall completely surround the perforated pipe.

(d) The subsoil drainpipe shall be laid to grade continuously to the outlets nominated on the drawings at a minimum grade of 1:100.

(e) Sub soil drains may be inspected by the Superintendent prior to placing any garden mix soil or backfill.

Table SC6.4.12.7 - Recommended Grading for Sub-Soil Drain Sand

A.S. SIEVE	% PASSING
9.5 mm	100
4.75 mm	98-100
2.36 mm	70-100
1.18 mm	30-78
600 µm	2-15
300 µm	0-4
150 µm	0-1

(10) Garden edging

(a) Supply and installation of concrete or recycled plastic proprietary garden edging shall be in accordance with the details on the drawings and the manufacturer's recommendations where applicable. Garden edging must be specified and installed in accordance with council standard drawing SD-641 in Section SC6.4.3 Standard drawings for landscape and open space.

(b) Supply and installation of concrete kerbing shall be as specified in Clause SC6.4.12.6 (15) Concrete kerbs.

(11) Planter boxes

(a) Planter boxes shall be constructed at the locations and to the details shown on the construction drawings.

(b) Planter box soil shall be an imported soil mix (Potting Mix). Refer to project specific specifications where applicable.

(c) Planter boxes must have appropriate drainage (see Clause SC6.4.12.6 (9) Sub-soil drains construction) provided that it is connected to a lawful discharge point. The drainage discharge is not permitted to cause nuisance, such as staining or sediments, to adjacent areas.

(12) Grass area construction

(a) General

The following work activities relate to grass areas construction:

(i) earthworks (excavation, filling and cultivation);

(ii) supply and application of soil improvement additives;

(iii) supply and placing turf soil;

(iv) supply and lay grass turf;

(v) supply and lay grass seeding;

(vi) supply and installation of hydro-seeding/mulching; and

(vii) supply and application of fertiliser.

All grass area construction shall be in accordance with the current relevant Australian Standards:

AS 4419 *Soils for landscaping and garden use*; and

AS 4454 *Composts, soil conditioners and mulches.*

(b) Co-ordination

The sequence for placing turf soil, installing irrigation, and placing turf will vary according to the type of plantsand irrigation system.

(c) Earthworks

Grass areas may require excavation or filling to achieve the finished surface levels detailed on the construction drawings. Refer to Section SC6.4.7 Clearing, grubbing and earthworks.

(d) Placing turf soil

(i) Turf soil shall be an imported soil mix Type 2 “Soil Blend”.

(ii) Turf soil shall be a minimum depth of 100 mm after light compaction.

(iii) Turf areas shall be graded to fall evenly between the finished surface levels detailed on the drawingsand/or shall be graded to drain freely to stormwater inlets without causing ponding. As a minimum turfed areas shall be graded to fall at 1:100.

(iv) Turf soil shall be spread evenly and shall be lightly compacted to finish at a level which allows for the finished turf surface to be flush with adjacent surfaces such as paved areas, pathways mowing strips andthe like. Care shall be taken to prevent areas of excessive compaction being caused by construction equipment.

(v) The surface of the turf soil shall be smooth and free from stones or lumps of soil prior to laying the turf.

(e) Turf material

(i) Turf shall be the species nominated on the drawings and shall be supplied by a specialist grower of cultivated turf approved by the Superintendent.

(ii) Where turf areas are provided within centre medians, round-abouts and other identified areas of roadreserve where edging/mowing may require traffic control, all turf is to be Empire Zoysia or approved similar turf and of a minimum width of 1.6 m to allow for clear mowing access.

(f) Laying turf

(i) Prior to laying turf, fertiliser shall be thoroughly mixed into the turf soil. Refer to Table SC6.4.12.13 - Recommended Grading for Sub-Soil Drain Sand forapplication rates.

(ii) Areas to be turfed shall be divided into sections that can be prepared and completed (including adequate watering) in the same day.

(iii) Turf shall be laid in straight lines in a stretcher bond pattern across the fall of the slope or parallel withthe long side of level areas. Cross joints shall be staggered with a maximum gap of 5 mm between adjacent sections of turf.

(iv) Immediately after laying the turf shall be rolled with a roller weighing not more than 90 kg/m of width.

(v) As soon as practicable after rolling turf shall be watered thoroughly with a fine spray to a depth of 150mm. Watering shall continue as necessary to maintain moisture to this depth and to maintain the turf ina healthy condition.

(vi) Where levels have deviated from the design levels after placing and watering the turf shall be lifted and the section regraded with turf soil to achieve design levels prior to replacing the turf.

(vii) Turf shall be protected from pedestrian traffic until established and shall be protected from vehicle traffic at all times.

(13) Hydro seeding/mulching

(a) General

(i) Excavation, filling, cultivation and placing imported soil mix for hydro seeding/mulching areas shall be as specified for turf areas.

(ii) Details for hydro seeding/mulching supply and sowing shall be as noted on the drawings and/or asspecified under separate cover.

(iii) Organic mulches are to be applied to landscaped garden beds and trees which:

1. meet AS 4454 *Composts, soil conditioners and mulches*;

2. are applied to a depth of 75 – 100 mm;

3. are of a coarse texture to allow water penetration to prevent nitrogen drawdown of the soil;
a) are aged prior to application;

4. do not use plastic sheeting for weed suppression, as it prevents rainwater from infiltrating soils and inhibits gaseous exchange between the soil and air; and

5. use a biodegradable mulch mat on any waterway embankment.

(iv) Inorganic mulches, such as recycled concrete or brick cobbles, are limited to feature or themed landscapes, or in windy areas where organic mulches may be blown away.

(b) Supply of mulch materials

(i) Mulch materials supplied shall be free of deleterious and extraneous matter such as soil, weeds, seeds,rubbish, vermin, insects, pests, fungus, sticks, disease, declared plants or noxious weeds and shall be free of any matter toxic to plant growth or germination.

(ii) All mulch materials supplied shall be in accordance with AS 4454 *Composts, soil conditioners and mulches.*

(iii) Organic mulch

Organic mulch may be either:

1. tea tree mulch from an approved supplier; or

2. wood chip produced by the chipping of native and other approved vegetation removed during theclearing and grubbing process on site (max 50 mm size); or

3. wood chip obtained from a council stockpile as directed by the Superintendent or his delegated site supervisor; or

4. other material as noted on the drawings.

(iv) Inorganic mulch

(v) Inorganic mulch shall be of the type and quality and noted on the construction drawings.

(c) Surface preparation

(i) Level sites

Prior to hydro seeding/mulching the area to be treated shall be graded to fall evenly between the finishedsurface levels detailed on the drawings and/or shall be graded to drain freely to stormwater inlets without causing ponding.

(ii) Embankments and slopes (1 on 5 maximum slope)

Prior to hydro seeding/mulching the area shall be lightly cultivated across the slope to minimise surfacerun-off and erosion. After cultivation, soil crumb size shall not exceed 20 mm.

(iii) The surface of the area to be treated shall be free from weeds, stones, roots, sticks or other

deleteriousmaterial and have a general moisture content of around 10% just prior to applying the hydroseed/mulch.

(d) Irrigation

An approved temporary above ground irrigation system shall be installed to ensure establishment of the hydro seeding/mulching is achieved within the timer frame specified. Refer to Section SC6.4.13 Irrigation.

(14) Paving construction

Refer to Section SC6.4.6 Road works and traffic control, Clause SC6.4.6.10 Segmental paving.

All areas of road reserve fronting a subject site must be assessed against and treated in accordance with Section SC6.4.20 Footpath treatment and outdoor diningdesign, Clause SC6.4.20.1 Footpath treatment where specified.

(15) Concrete kerbs

This section contains specific details for construction of concrete kerb in landscape and open space situations. Concrete kerb is most commonly used for garden edge or as a restraint for softfall areas in playgrounds.

All concrete garden edge kerb or similar structure shall have minimum rectangular profile dimensions of 150 mm wide x 200 mm deep with edges rounded to a radius of 20 mm (minimum) and constructed in accordance with Section SC6.4.18 Concrete works. Where the concrete garden edge kerb abuts grass areas, the surface of the kerb must finish level with the surface level of the grass area.

(16) Concrete works

For all concrete works associated with Landscaping activities refer to Section SC6.4.18 Concrete works.

(17) Masonry work

This section covers the supply of all materials, placing and finishing of all masonry blockwork including concrete core-filling and clay brickwork. Masonry Work includes walls, retaining walls, free standing piers, structures, and the like. All masonry work shall conform to the requirements of AS 3700.

(a) Materials

(i) Blocks - Hollow load bearing masonry blocks shall conform to the requirements of AS 3700 - Section 2and shall have a characteristic unconfined compressive strength of 15 MPa unless nominated otherwise agreed.

(ii) Masonry blocks shall be sound, dry, clean, and crack free and shall have been cured for not less than 14days before delivery. The correct type of block shall be used to make provision for all lintels, pilasters,bond beams, openings, etc.

(iii) Clean out blocks shall be used in the first course of all reinforced cores and/or where cores are to beconcrete filled.

(iv) Cement - for mortar shall be Portland Cement Type A and shall conform in all respects with the requirements of AS 3972.

(v) Sand - for mortar shall be clean, sharp, and free from organic impurities and excess fines and efflorescing salts.

(vi) Water - used in mixing concrete shall be clean and free from injurious amounts of oil, acid, alkali, organic matter, or other deleterious substances.

(vii) Hydrated lime shall conform to the requirements of AS 1672.1.

(viii) Admixtures - no air entraining additives or other admixtures shall be incorporated in the mortar unless specifically approved by the Superintendent.

(ix) Reinforcement - shall comply with AS/NZS 4671 as applicable.

(x) Clay bricks - and brickwork shall conform to AS 3700. Clay brick shall have a characteristic unconfinedcompressive strength of 40 MPa unless otherwise agreed.

(b) Mortar for blockwork

(i) All mortar for blockwork shall consist of a homogeneous mixture of the ingredients and shall be classified as M4 in AS 3700. The following proportions by volume shall be used unless the minimum compressive strength of mortar at 28 days has been nominated on the drawings. Cement 1: Lime 0 to0.25: Sand 3.

(ii) The mortar components shall be properly volume batched using calibrated volume boxes. Batching by shovel will not be permitted.

(iii) Mortar shall be mixed in an approved mixing machine for not less than 3 minutes. Hand mixing shall not be permitted unless specifically approved by the Superintendent. The dry ingredients shall be thoroughly mixed prior to the addition of water, which shall then be worked thoroughly through the mixture.

(iv) Mortar shall be transported in a covered container such that excessive evaporation will be prevented.Retempering of mortar shall not be permitted.

(c) Core fill concrete

(i) Core fill concrete shall comply with the relevant requirements of AS 3600 *Concrete Structures*. Readymixed concrete from an approved supplier shall be used. As a minimum and unless shown otherwise onthe drawings, core fill concrete supplied shall have the following properties in Table SC6.4.12.8 – Core Fill Concrete Characteristics.

Table SC6.4.12.8 – Core Fill Concrete Characteristics

Property	Design Value
Characteristic strength F'c at 28 days	N 20
Nominal maximum size of aggregate	10 mm
Slump	230 mm +/-30 mm

(ii) Testing of core fill concrete supplied shall be carried out by the Concrete Supplier as part of the suppliers Quality Assurance System. The Contractor is required to provide the Superintendent with copies of the suppliers Test Certificates relating to the particular batch of core fill concrete supplied.

Core fill concrete supplied that does not meet the requirements of this specification shall be liable to rejection by the Superintendent. If directed by the Superintendent, the Contractor will rectify any masonry wall which has been filled with rejected core fill concrete.

(d) Laying blocks

(i) All work shall be carried out by experienced tradesmen to the general requirements of AS 3700 - Section 8. Blockwork shall be laid in lifts or not more than 2400 mm in height.

(ii) All blocks shall be laid dry and wetting of the blocks shall not be permitted under any circumstances.

(iii) Cutting of blocks shall be reduced to an absolute minimum by setting out to avoid irregular or brokenbond.

(iv) Blocks shall be stacked on planks or other supports free from contact with the ground and shall be covered at all times to ensure that the blocks remain dry.

(v) Blocks shall be laid in straight uniform courses of running bond unless noted otherwise on the drawings.Intersecting walls shall be bonded as shown on the drawings.

(vi) The surface of the concrete footing, floor slab, beam, etc. on which the base course is to be laid shall bethoroughly cleaned prior to laying the base course to ensure all laitance is removed.

(vii) The base course shall incorporate clean out blocks at every reinforced core, with the clean out openingon the inside face of the wall.

(viii) Reinforcement starter bars shall be checked for alignment prior to laying the base course. Starter barsshall be vertical. Bending starter bars to allow the laying of the base course is not acceptable. Any starter bars out of position shall be rectified by the Contractor as directed by the Superintendent.

(ix) For unreinforced and reinforced masonry walls, horizontal joints shall have full mortar coverage on theface shells and on the webs.

(x) For unreinforced masonry walls all vertical joints shall have full mortar coverage. For reinforced masonrywalls all vertical joints shall be buttered only for the thickness of the face shells.

(xi) All horizontal and vertical joints shall be 10 mm in width with a maximum mortar intrusion into the coresof 6 mm. Mortar droppings into cavities or cores shall be avoided.

(xii) Tooling of the joints shall be done when the mortar is partially set but still sufficiently plastic to bond. Alltooling shall be done with a V-shaped or round bar in a manner that will compact the mortar rather than drag it out. Raked joints shall not be permitted to encroach more than 5 mm in depth.

(xiii) If it is necessary to move a block after it has been set in place with mortar, then the block shall be removed from the wall, the mortar removed, and the block shall be reset in fresh mortar.

(xiv) Capping blocks shall be fixed with a suitable flexible external grade adhesive as detailed on the drawings. Laying capping blocks in mortar only is not acceptable.

(xv) Where new blockwork is to be laid on top of an existing masonry block wall, the existing core concreteshall be cleaned to expose all aggregate and treated using an adhesion enhancer such as bondcrete orapproved equivalent before block laying is commenced.

(xvi) Extreme care shall be exercised to prevent mortar adhering to the face of blockwork. Acid shall not beused to clean down masonry walls.

(e) Reinforcement

(i) Steel reinforcement shall be supplied and bent in accordance with AS 3700. Re-bending of reinforcement with or without heating is not permitted unless approved by the Superintendent.

(ii) Steel reinforcement shall be free from rust, oil, varnish, mud or any other coatings, cracks, scale blisterand other defects and shall comply in all respects with AS/NZS 4671.

(iii) All horizontal reinforcement shall be laid into the wall as the block laying progresses. Galvanised wire loops shall be cast into the horizontal joints prior to placing the reinforcement to ensure correct positioning of the reinforcement.

(iv) Vertical reinforcement shall be placed after the wall has been laid and shall be placed in the core withthe correct cover to the face of the blocks as detailed on the drawings. Unless noted otherwise on thedrawings vertical reinforcement shall be placed in the centre of the core.

(v) Splice lengths for both horizontal and vertical reinforcement shall not be less than 45 bar diameters forplain round bars or 30 diameters for deformed bars or 450 mm, whichever is the greater.

(vi) All reinforced block walls shall have vertical reinforcement in the core at the ends, corners, sides ofopenings, adjacent to control joints, at unbonded intersections and at the maximum centres betweenthese points.

(f) Cast in elements

(i) The Contractor shall co-ordinate with all other trades as necessary to ensure that all conduits, fitments,penetrations, and the like are incorporated in the masonry as detailed on the drawings and as specified.

(ii) All bolts, anchors and other steel fittings shall be accurately set into the walls as the work progressesand positioned such that they shall be thoroughly embedded in mortar or core filling concrete as required.

(iii) Where items to be cast into the blockwork are found to be out of position and cannot be satisfactorily corrected, then the section of blockwork shall be completely demolished, and then reconstructed toallow correct positioning.

(g) Joints in blockwork

(i) Joints in blockwork shall be the type and at the locations detailed on the drawings. Joints with steel dowels shall have the dowels securely supported to ensure that the dowel remains in the correct positionduring the placing of core fill concrete.

(ii) Construction joints shall be located as detailed on the drawings or shall be located where agreed withthe Superintendent to suit specific site requirements.

(iii) Joint filling compounds shall be as detailed on the drawings and shall be installed in accordance with themanufacturers' recommendations, with particular attention to the preparation of the blockwork surface to suit the application of the joint filling compound.

(h) Placing core fill concrete

(i) Masonry walls shall cure for at least 3 days before core fill concrete is placed.

(ii) The cores to receive core fill concrete shall be cleaned of all mortar protrusions by rodding from the top ofthe wall. All mortar droppings and foreign matter shall then be removed via the clean out openings at the base of the wall, the vertical reinforcement positioned, and formwork fixed in place to seal the clean outblock opening.

(iii) Core filling shall not proceed until the reinforcement and cores have been inspected by the Superintendent. Clean out openings shall not be sealed until the inspection has been carried out.

(iv) Core fill concrete shall be thoroughly compacted into place as it is poured with the aid of small immersion vibrators or rodding. Block cores shall be topped up after settlement occurs.

(v) Core fill concrete shall be placed for the full height of the blockwork in lifts of not more than 2400 mm inheight. A minimum delay period of 1 hour and a maximum delay period of 3 hours shall be observed between lifts.

(vi) Proprietary core plates shall be used to confine the core fill concrete to the reinforced cores.

(vii) Placing of core fill concrete in bond beams shall be done in one continuous operation for the full length of the bond beam. Construction joints in bond beams other than control joints, are not acceptable.

(viii) Extreme care shall be exercised to prevent slurry adhering to the face of blockwork. Acid shall not beused to clean down masonry walls.

(i) Mortar for clay bricks

(i) All mortar for clay bricks shall consist of a homogeneous mixture of the ingredients and shall be classified as M3. Refer to AS 3700.

(ii) The following proportions by volume shall be used unless the minimum compressive strength of mortar at 28 days has been nominated on the drawings. Cement: 1, Lime: 1, Sand: 6.

(j) Laying clay bricks

(i) Clay bricks shall be fully bedded and fully faced. Bed joints shall be 10 mm nominal height.

(ii) Clay brick masonry walls shall be laid with galvanised brick ties at 600 mm maximum centres each wayand at 300 mm centres adjacent to openings in accordance with manufacturer's specifications.

(k) Protection of walls

(i) During construction and after the wall is laid and prior to placing core fill concrete; under no circumstances shall masonry blocks be wetted or allowed to become wet.

(ii) At the completion of a day's work and during wet weather the top and sides of all walls shall be coveredto prevent rain penetrating the cores and wetting the blocks.

(iii) During the construction of masonry walls and prior to the core fill concrete having gained its full strength,the Contractor shall protect the wall by suitable means such as bracing to ensure that the wall is not damaged and to ensure the safety of workers on the site.

(l) Tolerances

(i) All masonry shall be built true and plumb such that the maximum "out-of-plumb" in a 3 m height does notexceed 10 mm.

(ii) The bed joint at any level shall be within ± 3 mm.

(m) Surface finishes to masonry

(i) Surface finishes, such as painting, rendering or textured finishes shall be as detailed on the drawings oras nominated in the Finishes Schedule.

(ii) Prior to applying any surface finish, the substrate shall be free from dirt, dust, oil, grease, mould, fungi, efflorescence, release agents, bond breakers, scaling and laitance or any other contaminants or foreignmaterial that may affect adhesion. Remove all traces of loosely adhering material by scraping, grinding,wire brushing or air blowing as necessary.

(iii) Preparation of the surfaces to be treated, application of the surface finish and curing after application if required, shall be carried out in strict accordance with the manufacturer's recommendations. Particular attention shall be made to application during suitable weather conditions.

(iv) Gap fill and/or sealant material used for joints or cracks in walls shall be checked for compatibility with the proposed surface finish.

(v) Anti-vandal coatings shall be used in circumstances where walls are exposed (I.e., not screened by softlandscaping) and prone to graffiti.

(vi) Dissimilar materials adjacent to surfaces to be treated shall be masked to avoid contact, (E.g., capping and flashings).

(vii) The Contractor shall provide the Superintendent with all warranty details of the surface finishes.

(18) Stormwater drainage

Reference should be made to Clause SC6.4.5 (5) Open drains.

(19) Infrastructure items

Supply and installation of infrastructure items such as timber decking, timber and steel fencing, seats, picnic sets,barbeques, play equipment and signage shall be as detailed on the drawings and constructed in strict accordance with the manufacturers' specifications. The Contractor shall provide the Superintendent with all warranty details.

Concrete for footings, plinths and the like for infrastructure items shall be in accordance with Section SC6.4.18 Concrete works.

(20) Landscaping materials

Material *(sample only - to be completed by compiler)*	**Type**	**Minimum Application Rate**
SEED - Open Drain	Cynodon dactylon (hulled) Cynodon dactylon (unhulled) Indian Blue Cooch (Bothriochloapertusa) Japanese millet n.b. application of Indian Blue Cooch(and other tropical grasses) must consider daily minimum temperaturesfor germination requirements. Typical planting for tropical grass seed is September to March	20kg/ha 20kg/ha 15kg/ha 10kg/ha
SEED - Native	Acacia buxifolia Acacia decurrens Acacia pravissima Leptospermum lanigerum Hardenbergia violacea Kennedia prostrata Acacia implexa Banksia marginata Bursaria spinosa Callistemon pallidus Dodonaea viscoca N.b., the species noted are indicativeonly. Native seed selection must consider the location (including surrounding vegetation and soil condition), purpose and maintenance outcomes. All native seed mixes must be accepted by council prior toapplication.	1 kg/ha 1 kg/ha 1 kg/ha 1 kg/ha 500 g/ha 500 g/ha 200 g/ha 200 g/ha 200 g/ha 200 g/ha 200 g/ha
ORGANIC FIBRE MATTING	E.g., Organic coir matting, minimum700gsm. N.b., products must be selected basedon specific purpose and design life required. Dry tropic UV radiation significantly reduces the life of many lightweight matting products.	N/A
TURF/GRASS – Medians	Cynodon dactylon (Green Couch) A-grade Zoysia japonica (Empire Zoysia)	

TURF/GRASS – Verges/Footpaths	Cynodon dactylon (Green Couch) A-grade Zoysia japonica (Empire Zoysia) N.b., grassing verges other than typical urban roadsides, where slopeor other maintenance considerations are present, requires a case by case assessment.	
TURF/GRASS – Parks & Formal Open Space	Cynodon dactylon (Green Couch) A-grade Zoysia japonica (Empire Zoysia) Zoysia macrantha (Nara Native) for salt tolerance	

SC6.4.12.7 Attachments

Attachments	**To obtain a copy of the document**
Attachment A - Public Open Space Embellishment Framework	Click here
Attachment B - Permeable Paving Colour Guide	Click here
Attachment C1 - Acceptable Plant Species List - Street Trees in Road Reserve	Click here
Attachment C2 - Acceptable Plant Species List - Trees in Public Parks and Open Spaces	Click here
Attachment C3 - Acceptable Plant Species List - Trees in Private Open Spaces	Click here
Attachment C4 - Acceptable Plant Species List - Understorey Plants	Click here
Attachment D - Parks and Open Space Maintenance Service Level	Click here
Attachment E - Parks and Open Space Maintenance Costing Table	Click here

Editor's Note (Attachments C1, C2, C3 and C4) -

(1) Nomenclature generally based on Census of the Queensland Flora 2013, edited by Peter D. Bostock and Ailsa E. Holland found on theQueensland Government data website = indicates where plant name differs from Australian Plant Name Index at http://www.anbg.gov.au/cgi-bin/apclist. Synonyms included where superseded name is still in common use in trade.

(2) Refer streetscape design and treatments section for location and setback requirements. Case by case assessment of species suitability will be required dependent on location (verge, central median etc.).

(3) Refer public open space section for requirements in these locations.

(4) Species with a natural distribution within North Kennedy Pastoral District. Distribution checked against Census of the Queensland Flora 2010.

(5) Refer to development codes for offset distances from property boundaries.