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SC6.3 Planning scheme policy for development works

SC6.3.1 Purpose

- (1) The purpose of this planning scheme policy for development works is to:
 - (a) provide a uniform standard for works within the Bundaberg Regional Council local government area;
 - (b) facilitate the design of new works by the use of standard provisions; however, there is still an allowance for flexibility through the application of the relevant standards, policy documents and industry standards.
- (2) This policy cannot provide a solution for every proposal or for every situation encountered. Consequently, this policy does not prevent or discourage alternate solutions for individual development sites. Where this policy does not provide a solution the Developer/Applicant or their Consultant must demonstrate that the proposed solution is in accordance with industry standards.
- (3) Consultation with Council's development engineers is encouraged, especially early in the concept or design stages, as this will assist in the early identification and resolution of matters and issues that may cause delays in the approval and/or construction of subsequent works.

SC6.3.2 Application

- (1) This policy applies to development identified as requiring assessment against the **Planning scheme policy for development works**.
- (2) The policy provides supporting requirements to assist in achieving acceptable outcomes within the Bundaberg Regional Council Planning Scheme (planning scheme) and is read in conjunction with the planning scheme.

SC6.3.3 Roads, driveways, pathways, and cycleways

The purpose of this section is to support development assessment for the design and construction of roads, pathways and cycleways under the planning scheme.

SC6.3.3.1 Design standards and reference documents

The planning and design of developments within the Bundaberg Regional Council local government area must be undertaken in accordance with the current edition of the following key reference documents, unless specifically outlined in this policy or other Council references stated otherwise:

- (a) *Austrroads - Guide to Road Design* – at the time of writing this document the series was as listed below:
 - (i) AGRD01-10 Part 1: Introduction to Road Design
 - (ii) AGRD02-06 Part 2: Design Considerations
 - (iii) AGRD03-10 Part 3: Geometric Design
 - (iv) AGRD04-09 Part 4: Intersections and Crossings - General
 - (v) AGRD04A-10 Part 4A: Unsignalised and Signalised Intersections
 - (vi) AGRD04B-11 Part 4B: Roundabouts
 - (vii) AGRD04C-09 Part 4C: Interchanges
 - (viii) AGRD05-10 Part 5: Drainage Design
 - (ix) AGRD06-10 Part 6: Roadside Design, Safety and Barriers
 - (x) AGRD06A-09 Part 6A: Pedestrian and Cyclist Paths
 - (xi) AGRD06B-09 Part 6B: Roadside Environment
 - (xii) AGRD07-08 Part 7: Geotechnical Investigation and Design
 - (xiii) AGRD08-09 Part 8: Process and Documentation

- (b) *Austrroads - Guide to Pavement Technology* – at the time of writing this document the series, relating to development, was as listed:
- (i) AGPT02-12 Part 2: Pavement Structural Design
 - (ii) AGPT03-09 Part 3: Pavement Surfacing
 - (iii) AGPT04E-09 Part 4E: Recycled Materials
 - (iv) AGPT04G-09 Part 4G: Geotextiles and Geogrids
 - (v) AGPT04I-09 Part 4I: Earthworks Materials
 - (vi) AGPT06-09 Part 6: Unsealed Pavements (the primary document is the ARRB Unsealed Road Manual)
 - (vii) AGPT10-09 Part 10: Subsurface Drainage
- (c) *Austrroads - Guide to Traffic Management* – at the time of writing this document the series, relating to development, was as listed:
- (i) AGTM012-09 Part 1: Introduction to Traffic Management
 - (ii) AGTM02-08 Part 2: Traffic Theory
 - (iii) AGTM03-13 Part 3: Traffic Studies and Analysis
 - (iv) AGTM04-09 Part 4: Network Management
 - (v) AGTM05-08 Part 5: Road Management
 - (vi) AGTM06-13 Part 6: Intersections, Interchanges and Crossings
 - (vii) AGTM07-09 Part 7: Traffic Management in Activity Centres
 - (viii) AGTM08-08 Part 8: Local Area Traffic Management
 - (ix) AGTM09-09 Part 9: Traffic Operations
 - (x) AGTM10-09 Part 10: Traffic Control and Communication Devices
 - (xi) AGTM11-08 Part 11: Parking
 - (xii) AGTM12-09 Part 12: Traffic Impacts of Developments
 - (xiii) AGTM13-09 Part 13: Road Environment Safety
- (d) Other Austrroads Standards presented as follows:
- (i) AG-G34/06 Design Vehicles and Turning Path Templates
 - (ii) AP-G88-11 Cycling Aspects of Austrroads Guides
 - (iii) AP-T36-06 Pavement Design for Light Traffic – A Supplement to Austrroads Pavement Design Guide
 - (iv) AS1289.[0-7] Methods of testing soils for engineering purposes
- (e) Unsealed Roads Manual – Guidelines to Good Practice – ARRB ed Giummarra
- (f) The following Australian Standards:
- (i) AS1158 [1-6] Lighting for roads and public spaces
 - (ii) AS1289 [0-7] Methods of testing soils for engineering purposes
 - (iii) AS1428 Design for Access and Mobility
 - (iv) AS 2890.1 Parking Facilities – Off-street car parking
 - (v) AS 2890.2 Parking Facilities – Off-street commercial vehicle facilities
 - (vi) AS 2890.3 Parking Facilities – Bicycle parking facilities
 - (vii) AS 2890.5 Parking Facilities – On-street parking
 - (viii) AS 2890.6 Parking Facilities – Off-street parking for people with disabilities
 - (ix) AS3798 Guidelines on Earthworks For Commercial and Residential Developments
 - (x) AS4373 Pruning of Amenity Trees
 - (xi) AS4678 Earth-retaining Structures
 - (xii) AS4970 Protection of Trees on Development Sites
- (g) The following Department of Transport and Main Roads Standards:
- (i) Manual for Uniform Traffic Control Devices (MUTCD) Queensland

- (ii) MRS05/MRTS05 Unbound Pavements
 - (iii) MRS11/MRTS11 Sprayed Bituminous Surfacing
 - (iv) MRS12/MRTS12 Sprayed Bituminous Emulsion
 - (v) MRS17/MRTS17 Bitumen
 - (vi) MRS18/MRTS18 Polymer Modified Binder
 - (vii) MRS19/MRTS19 Cutter Flux Oils
 - (viii) MRS20/MRTS20 Cutback Bitumen
 - (ix) MRS22/MRTS22 Supply of Cover Aggregate
 - (x) MRS30/MRTS30 Dense Graded and Open Graded Asphalt
 - (xi) MRS35 /MRTS35 Recycled Materials for pavements (it is at Council’s discretion to use this standard in lieu of Austroads)
 - (xii) The Guide to Pavement Markings
- (h) The following Institute of Public Works Engineering Australia Queensland Division (IPWEAQ) guidelines:
- (i) *Complete Streets – Guidelines for Urban Street Design (2010)*–
 - (ii) *Lower Order Road – Design Guidelines (2016)*
- (i) Bundaberg Regional Council – Standard Drawings – See **Appendix SC6.3A (Standard drawings list)**.

SC6.3.3.2 Road hierarchy

The formalisation of a road hierarchy enables the safe and efficient development of the road system that caters for the movement of people and goods whilst maintaining the amenity of urban and rural areas.

SC6.3.3.2.1 Classifications

- (1) The road hierarchy structure is divided into two main categories:
- (a) Urban roads –the purpose, function and character for each urban road classification is shown in **Table SC6.3.3.2.1.1 (Urban road classifications)** and their respective cross sections are shown in standard drawing R2001 to R2008; and
 - (b) Rural roads – the purpose, function and character for each urban road classification is shown in **Table SC6.3.3.2.1.2 (Rural road classifications)** and their respective cross sections are shown in standard drawing R3001 to R3004.
- (2) The road hierarchy for all existing roads are shown on Council’s interactive mapping website (i.e., <http://www.bundaberg.qld.gov.au/services/interactive-mapping>). In addition, the road hierarchy for all future and existing trunk roads are shown in Schedule 3 (Local government infrastructure plan mapping and supporting material).
- (3) Extractive industry haul routes are a special case and the Developer/Applicant must nominate the design equivalent standard axles (ESA) for each road. Extractive industry haul routes must be designed to provide a road cross section in accordance with the following:
- (a) for urban areas, an Industrial Collector standard is required, and
 - (b) for rural areas, a Principal Rural Collector standard is required.

Table SC6.3.3.2.1.1 Urban road classifications

Classification	Purpose	Function & Character
Arterial	Arterial routes provide interregional connections between major activity and service centres and	It is intended that arterial routes will: <ul style="list-style-type: none"> • Be designed for efficient and safe movement of high volumes of people and goods • Serve as primary through and freight routes

Schedule 6 – Planning Scheme Policies

Classification	Purpose	Function & Character
	major urban areas within the city.	<ul style="list-style-type: none"> • Be designed to help present attractive landscaped entrances and routes through major urban centres within the Bundaberg Regional Council area • Incorporate design measures to minimise environmental impacts on surrounding land uses • Serve as bus and line haul public transport routes • Provide for off-road bicycle and pedestrian facilities • Typically have four or more lanes when fully developed • Ideally have no direct property access • Be designed for the estimated traffic loads derived from approved traffic studies with a minimum design traffic loading of 3.7×10^6 equivalent standard axles
Sub-arterial	Sub-arterial routes connect arterial routes through and around major urban areas.	<p>It is intended that Sub-arterial routes will:</p> <ul style="list-style-type: none"> • Be designed for efficient and safe movement of moderate volumes of people and goods • Provide connection between arterial roads and local areas and linkage between arterial roads for through traffic • Be designed to present attractive landscaped routes through major urban centres within the Bundaberg Regional Council area • Incorporate design measures to minimise environmental impacts on surrounding land uses • Serve as bus routes and provide access to public transport • Provide for on-road bicycle lanes and off-road pedestrian paths on both sides of the road • Typically have 4 or more lanes when fully developed • Ideally have no direct property access • Be designed for the estimated traffic loads derived from approved traffic studies with a minimum design traffic loading of 2×10^6 equivalent standard axles
Trunk Collector (Suburban)	Trunk Collector roads carry primarily inter-suburb traffic.	<ul style="list-style-type: none"> • It is intended that Suburban Trunk Collectors will: • Be designed to carry freight associated with the local or suburban area • Minimise environmental impacts on surrounding activities • Serve as bus routes and provide access to public transport • Provide for on-road bicycle lanes and off-road pedestrian paths on both sides of the road • Ideally have no direct property access • Be designed for the estimated traffic loads derived from approved traffic studies with a minimum design traffic loading of 1×10^6 equivalent standard axles
Collector (Neighbourhood)	Neighbourhood Collectors provide connection between residential access streets and primary traffic carrying roads.	<p>It is intended that Neighbourhood Collectors will:</p> <ul style="list-style-type: none"> • Provide direct access to properties • Provide on-road parking on both sides of the road • Minimise environmental impacts on surrounding activities • Be designed to provide safe use by cyclists and pedestrians and an off-road pedestrian path on one side of the road • Be designed for traffic loading of 3×10^5 equivalent standard axles
Local Access	Local Access streets provide direct access	<p>It is intended that Local Access streets will:</p> <ul style="list-style-type: none"> • Provide direct access to properties

Classification	Purpose	Function & Character
(Access Street / Access Place)	to adjoining residential properties.	<ul style="list-style-type: none"> • Provide on-road parking • Provide a safe and pedestrian / cyclist preferred environment • Be designed for traffic loading of 6×10^4 equivalent standard axles
CBD / Commercial Access	Commercial Access streets provide access to properties and businesses within the commercial centres of the city and surrounding towns.	<p>It is intended that Commercial Access streets will:</p> <ul style="list-style-type: none"> • Be designed to carry freight and other commercial goods associated with the Central Business District (CBD) and other commercial areas • Minimise environmental impacts on surrounding activities • Serve as bus routes and provide access to public transport • Provide on-road parking • Provide for on-road bicycle lanes and off-road pedestrian pathways on both sides of the road • Ideally have no direct property access • Be designed for the estimated traffic loads derived from approved traffic studies with a minimum design traffic loading of 5×10^6 equivalent standard axles
Industrial Collector	Industrial Collector streets provide connection between Industrial Access streets and connect directly to suburban Trunk Collectors and Sub Arterial routes.	<p>It is intended that Industrial Collector streets will:</p> <ul style="list-style-type: none"> • Be designed to carry heavy vehicles associated with the industrial development area • Minimise environmental impacts on surrounding activities • Provide direct access for heavy vehicles to properties • Provide on-road parking on both sides of the road • Provide for off-road cycle & pedestrian paths on both sides of the road • Be designed for the estimated traffic loads derived from approved traffic studies with a minimum design traffic loading of 5×10^6 equivalent standard axles
Industrial Access	Industrial Access streets provide direct access to individual properties.	<p>It is intended that Industrial Access streets will:</p> <ul style="list-style-type: none"> • Provide direct access for heavy vehicles to properties • Be designed to provide a safe environment for cyclists and pedestrians. • Be designed for the estimated traffic loads derived from approved traffic studies with a minimum design traffic loading of 5×10^6 equivalent standard axles

Table SC6.3.3.2.1.2 Rural road classifications

Classification	Purpose	Function & Character
Principal Rural Road	Principal Rural roads provide connection between rural villages/townships, other higher order regional roads and urban centres.	<p>It is intended that Principal Rural roads will:</p> <ul style="list-style-type: none"> • Be designed to carry freight and other heavy vehicles associated with rural and primary production activities • Minimise environmental impacts to adjoining properties • Provide direct access to properties • Be of sufficient width to accommodate on-road cycling • Be designed for a minimum traffic loading of 1×10^6 equivalent standard axles
Rural/Rural Residential Collector	Rural Collector roads provide connection between rural access roads and other higher order roads and	It is intended that Rural/Rural Residential Collector roads will:

Classification	Purpose	Function & Character
	provide direct access to adjoining rural and/or rural residential properties.	<ul style="list-style-type: none"> Be designed to carry heavy vehicles and other traffic associated with rural and rural residential land use zoning Minimise environmental impacts to adjoining properties Provide direct access to properties Be of sufficient width to accommodate on-road cycling Be designed for a minimum traffic loading of 5×10^5 equivalent standard axles
Rural/Rural Residential Access	Rural Access roads provide direct access to adjoining rural and/or rural residential properties.	<p>It is intended that Rural Access roads will:</p> <ul style="list-style-type: none"> Provide access to adjoining properties Be designed for a minimum traffic loading of 3×10^5 equivalent standard axles
Village/Township Collector	Village/Township Collector are primary traffic carrying streets within rural villages and townships and provide direct access to adjoining properties.	<p>It is intended that Village/Township Collector streets will:</p> <ul style="list-style-type: none"> Be designed to carry heavy vehicles and other traffic associated with rural and rural residential land use zoning Minimise environmental impacts to adjoining properties Provide direct access to properties Be of sufficient width to accommodate on-road cycling Be designed for a minimum traffic loading of 3×10^5 equivalent standard axles
Village/Township Access	Village/Township Access streets provide direct access to adjoining properties in rural villages and townships.	<p>It is intended that Rural Access roads will:</p> <ul style="list-style-type: none"> Provide direct access to properties Minimise environmental impacts on surrounding activities Provide a safe and pedestrian / cyclist preferred environment Be designed for traffic loading of 3×10^5 equivalent standard axles

SC6.3.3.3 Geometric design

Council has adopted the Complete Streets (IPWEAQ 2010) as the primary guide for its road layout (refer to standard drawings for the road cross sections). However, Complete Streets does not preclude cul-de-sacs and T-intersections in the mix of road and intersection layouts. Accordingly, it will be necessary, in some cases, to control vehicle speeds in residential streets through tight horizontal alignments - by providing curved alignment and limiting the 'road leg length'. The Design Criteria tables in this manual provide minimum values where speed controls are required. Therefore, Queensland Streets (IPWEAQ 1995) may be used to obtain values outside the minima.

SC6.3.3.4 Design elements and criteria

SC6.3.3.4.1 Layout design principles

- (1) The layout of minor roads should incorporate the following principles.
 - (a) Layouts should ensure strict geometric control of traffic speeds and volumes in residential areas. Council adopts Complete Street (IPWEAQ 2010), however, at the time of writing refer to Queensland Streets (IPWEAQ 1995) for the provision of speed controls outside those given in Council's standard drawings (Appendix SC6.3A);
 - (b) No more than three minor roads should be traversed from the most remote lot to the nearest accessible district access road;
 - (c) Travel time for a vehicle in a low speed residential environment (< 50 km/h) should be no greater than 90 seconds;

- (d) A pavement surface treatment may only be provided on the 50km/h minor road at the 60km/h major road interface. No other minor road intersections should be provided with pavement surface treatments;
- (2) Specific to industrial areas:
 - (a) Road loop layouts in industrial areas should ensure that the design vehicle can be accommodated around bends (without crossing the centreline);
 - (b) Pavement surface treatments are not required in industrial estates.
- (3) Designers are encouraged to consult with Council and other relevant authorities prior to and/or during the preparation of design.

SC6.3.3.4.2 Local area traffic management

- (1) A Local Area Traffic Management (LATM) involves the use of treatments like speed bumps and chicanes within a local residential area to improve residential amenity and reduce vehicle speed. Council believes such treatments should not be used in new residential developments as these treatments can affect parking, cycling and pedestrian activities. Developers should manage speed through applying good geometric design and speed control devices should only be proposed on existing roads where no other solution is viable.
- (2) LATM schemes have a major impact on residents and public involvement in their preparation is essential. Where speed control devices on existing roads are proposed, it should be in accordance with a scheme approved by Council. The Developer is to undertake consultation, with guidance from Planning and Development, with the Divisional Councillor, residents, property and business owners and community groups prior to submitting the functional layout for approval.
- (3) For network legibility, consistent forms of speed control treatment should be used along neighbourhood access roads.
- (4) Night time visibility of speed control devices should be enhanced by appropriate means including street lighting, raised retro-reflective pavement markers, white reflective road markings including white painted kerb faces.

SC6.3.3.4.3 Design vehicle

Design vehicles for Council roads must be in accordance with AP – G34/06 Austroads – *Design Vehicle Turning paths and Templates* with the exceptions as follows:

- (a) Trunk Collector/ Collector to Trunk Collector/ Collector /Industrial – Design Single Articulate Vehicle (19m);
- (b) Trunk Collector/ Collector to Access Street – Design Single Unit Bus (12.5m) unless specifically approved otherwise by Council's nominated officer;
- (c) Trunk Collector/Industrial –B-Double (25m), where applicable, refer also Transport Operations (Road Use Management) Act 1995 – Route Assessment Guidelines for Multi-Combination Vehicles in Queensland and National Transport Commission – Guidelines for Assessing the Suitability of Heavy Vehicles for Local Roads.

SC6.3.3.4.4 Design criteria

Council's standard drawings provide a summary of the design elements that are applicable to Council's road network (refer Guide to Road Design Part 3: Geometric Design (Austroads 2010) for additional guidance). It should be noted that some parts of the existing road network might not comply with all the specified design parameters and road widths may be adjusted in retrofit areas. Designers are encouraged to consult with Council during the preparation of designs if they plan to vary from standard drawings' specifications.

SC6.3.3.4.5 Kerb and channel details

The following design criteria are applicable to kerb and channel:

- (a) Survey - for new kerb and channel should extend a minimum of 50 m along the road beyond the frontage(s) of the subdivision or such greater distance as is required to join to the existing kerb and channel;
- (b) Extend - a minimum of 5 m onto the adjacent land. Note, the road pavements may not always need to be centrally located within the road reserve;
- (c) Grade - not be less than 0.3 percent;
- (d) Where roofwater drains to the street - at least one point of connection in the concrete kerb and channel per lot must be provided. This point of connection shall comprise a heavy duty galvanised steel kerb adapter located a minimum of one (1) metre from any property boundary. For verges where concrete footpath is to be provided, the Developer must install roofwater pipes (RHS downpipes or equivalent) to the property boundary.

SC6.3.3.4.6 Cul-de-sac, turning areas & allotment width

- (1) The minimum diameter for a cul-de-sac in all areas must be 20 metres. No other termination treatment is accepted by Council.
- (2) Allotments fronting a cul-de-sac must be of sufficient width at the property boundary to ensure that a driveway at the kerb invert (refer Standard Drawing R1010) can be accommodated with a minimum of 150mm clearance either side of the adjoining allotment driveways. The minimum lot size and dimensions are provided in **Table 9.3.4.3.2 (Minimum lot size and dimensions)**, **Table 9.3.4.3.3 (Access strip requirements for rear lots)**, and **Table 9.3.4.3.4 (Minimum width for irregular shaped lots)** of the reconfiguring a lot code.

SC6.3.3.4.7 Medians

Council may, solely at its discretion, allow the use of painted medians rather than raised medians. Medians must be a minimum width of 6.0 metres unless used for traffic islands (refer Section SC6.3.3.5.4) and pedestrian shelters.

SC6.3.3.4.8 Verges*SC6.3.3.4.8.1 General*

Verge is defined as that part of the road reserve between the carriageway and the boundary of adjacent lots. Verge widths are measured from property boundaries to invert of the kerb and channel. Verge widths in older established areas may vary.

SC6.3.3.4.8.2 Crossfall

Verge crossfalls will generally be no greater than 2.5%. Verge crossfalls in the older areas usually vary from the standard. Accordingly, it will be necessary to obtain approval, from the relevant Council development engineer, of the proposed crossfalls for each project.

SC6.3.3.4.8.3 Longitudinal grade

Longitudinal grades on any verge should aim to be in accordance with AS 1428 – *Design for Access and Mobility*. Using the aforementioned code accommodates people using mobile devices or in wheelchairs. The designer must seek guidance from a Council development engineer where it is not possible to meet the grade requirements of AS 1428.

SC6.3.3.4.8.4 Landscaping requirements

The verge will be landscaped with grass or turf. Any other verge landscaping (including the use of Water Sensitive Urban Design) must be specifically approved by the relevant Council development engineer. An example of a Water Sensitive Urban Design for an Access Street is shown in standard drawing R1002.

SC6.3.3.4.9 Driveways and access to developments

Council adopts the Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development (Section 3.3) and the Austroads Guide to Traffic Management Part 5: Road Management (Section 2) for access to developments. For large size developments that require internal roads also refer to **Section SC6.3.3.5 (Intersections)**.

SC6.3.3.4.9.1 Driveways

- (1) All residential developments must provide a concrete residential driveway slab in accordance with R1010 and R1014 or R1015.
- (2) All rural/ rural residential developments must provide a sealed rural driveway in accordance with R1012 or R1013 (i.e., Type A, B or C).
- (3) All commercial and industrial developments must provide a concrete driveway slab in accordance with R1011, a minimum width of 6.0 metres is nominated, however this width must be sufficient to accommodate at least the entering design vehicle and exiting car at the same time.
- (4) The standard of internal driveway and car park construction (including pavement surfacing) must provide for the proposed traffic vehicle loads and traffic movements. The pavement surfacing must, as a minimum, be equivalent to the road surface fronting the development.

SC6.3.3.4.9.2 Access handles

- (1) In all residential developments where access is through an easement or access handle, a driveway must be provided which is:
 - (a) Provided with a concrete residential driveway slab in accordance with R1010;
 - (b) Constructed and sealed with a minimum width of 3.5 metres with asphalt, concrete, bitumen or approved pavers for its full length (see **Table 9.3.4.3.3 (Access strip requirements for rear lots)** of the reconfiguring a lot code). Pavement shall be abutted by concrete edge strips (herein referred to as pavement construction);
 - (c) Provided with a 1.8 metre high screen privacy fence to each boundary of the Access Strip, including provision of a 300mm wide concrete mower strip;
 - (d) Provided with conduits and / or services for water supply, underground power, stormwater and telecommunications within the Access Strip prior to pavement construction.
- (2) In all rural/rural residential village/township developments where access is through an easement or access handle a driveway must be provided which is:
 - (a) Provided with a sealed residential driveway in accordance with R1012;
 - (b) Constructed and sealed with a minimum width of 3.5 metres for rural residential zone and 4 metres for rural zone. The driveway must be sealed with asphalt, concrete, bitumen or approved pavers for the full length of the access, or such lesser distance as would be required to ensure that a future residence on the adjoining lots would not experience nuisance (e.g., dust, noise) from passing traffic (see **Table 9.3.4.3.3 (Access strip requirements for rear lots)** of the reconfiguring a lot code);
 - (c) Provided with conduits and / or services where applicable for water supply, power (if not overhead), stormwater and telecommunications within the Access Strip.

SC6.3.3.4.10 Pavement tapers (including road widening for MCU/ROL)

- (1) For a lot reconfiguration where the roadway transitions to a different width pavement at the boundaries of the subject land, the Developer must provide a minimum 1 in 10 taper between new and existing pavements. The tapers commence:
 - (a) Where the surrounding pavement is less wide – the taper commences at the boundaries of the subject land;
 - (b) Where the surrounding pavement is wider than conditioned – taper commences within the subject land;

- (2) Pavement tapers must also be provided for road widening associated with an MCU (MCU tapers). The MCU tapers must commence at the boundaries of the subject land and must be of sufficient width to accommodate the turning manoeuvres (in and out) of the Design Vehicle from the through lane. Note the minimum turning speed for a design vehicle will be 40 kph and the design vehicle must not cross the centreline of the through pavement.

SC6.3.3.4.11 Staging – temporary sealed turn-around

A temporary sealed turn-around is to be provided for at the end of each internal roadway at the development stage boundaries. The temporary turn-around must provide with a minimum 20 metre turning circle measured from the edge of pavement. The turn-around may be a bitumen prime then single coat seal and must be fully located within the road reserve.

SC6.3.3.4.12 Alignment – horizontal and vertical

- (1) For trunk collector and rural roads the speed value of a curve as suggested by its geometry may not be able to be achieved if stopping sight lines is restricted by lateral obstructions. Where the angle of deflection is small, significantly larger radii should be used to achieve an adequate curve length and avoid the unappealing appearance of kinks. It is the radii achieved for the through lanes, not for the design centreline, which is important.
- (2) In a reverse curve situation, a length of tangent should be used between the curves to improve driveability and aesthetics and the curves should be of a similar radius. Broken back or compound curves, where the radius of the second curve is less than that of the first, should not be used. These, or higher, standards should be applied to deviations of through lanes which result from the introduction of turn lanes.
- (3) Intersection location is often dictated by vertical sightline considerations. The consideration of intersection-specific sight distance requirements can influence the vertical alignment adopted for the major road carriageway.

SC6.3.3.5 Intersections

SC6.3.3.5.1 Types

- (1) *Complete Streets (IPWEAQ 2010)* posits the use of 4-way intersections insofar as they improve permeability and legibility of neighbourhoods, however, *Complete Streets* does reaffirm the need to check the capacity of each 4-way intersection. Council has not developed heuristics for the appropriate number of allotments or road length that would be attributable to 4-way intersection to control road speeds and, hence, Council requires intersection adequacy checks (for all new developments) to demonstrate the efficacy of the *Complete Streets* doctrine. This information is to be included in the Transport Impact Study associated with a development approval.
- (2) The priority for intersections in Greenfield developments should be considered as: 4-way intersections, followed by T-intersection then roundabout or signalised (dependent upon the necessity to accommodate pedestrian movements and on-road bicycle movements).
- (3) Roundabouts should be used only where priority is equalised for all approaches. Consequently, this form of intersection should only be used with roads which are no more than one level apart in the road hierarchy and have reasonably balanced traffic flows to ensure that traffic on major road approaches is not unreasonably impeded by the minor approach traffic. On major junctions, roundabouts should only be used at the lowest end of the traffic volume range (subject to pedestrian and bicycle constraints) where single lane operation can suffice. There may be scope for a staged treatment with single lane approaches before widening to multi lane standard is required, at which time traffic signals may be installed.
- (4) Consideration is to be given to Council's road hierarchy and lower order roads are not to directly access higher order roads.

SC6.3.3.5.2 Location and intersection geometry

Council requires the horizontal geometry of T-intersections and 4-way intersections to present at 90 degrees (projection) to the major road, unless specifically approved otherwise in the development approval. The projection or horizontal geometry must continue for a minimum of 10 metres into the minor road.

SC6.3.3.5.3 Spacing/stagger

The stagger distance for T-intersections shall generally be in accordance with the Guide to Road Design Part 4A: Unsignalised and Signalised Intersections (Austroads 2010). Council has adopted the following minimum stagger lengths:

- (a) Right-left staggered T-intersection – stagger distance to be a minimum of 40 metres on Access Street/Access Street and 60 metres on all others,
- (b) Left-right staggered T-intersection stagger distance to be a minimum of 60 metres on Access Street/Access Street and 150 metres on all others.

SC6.3.3.5.4 Traffic islands

- (1) The function of islands is to effectively restrict vehicles to certain paths, providing safe refuges for pedestrians and locations for the erection of traffic control devices. They should be raised and constructed with semi mountable kerb. Pedestrian paths through islands should be flush with the road surface.
- (2) Raised island kerbs should be set back from traffic lanes and have larger offsets on approaches. The islands should be fully outlined by solid painted lines. Appurtenances and any landscaping on islands have to have adequate clearances to moving traffic and not obstruct visibility. Planting is normally restricted to clean trunk trees and low ground covers.

SC6.3.3.6 On-street parking

SC6.3.3.6.1 Parking provisions

On street parking will only need to be line marked in commercial areas or in accordance with development approvals. Refer to Council's standard drawings for on road parking provisions.

SC6.3.3.6.2 Parking at cul-de-sac and turning areas

Car parking within the cul-de-sac and turning areas is prohibited. In these cases special parking provisions such as indented bays or central island parking should be incorporated into the design that satisfies the requirements in Council's standard drawings.

SC6.3.3.7 Sight distance, sightlines and truncations

- (1) A principal aim in road design is to ensure that the driver is able to perceive any potential road hazards in sufficient time to take action and avoid mishap. Therefore, sight lines must be preserved within the road reserve.
- (2) "Safe Intersection Sight Distance", refer Austroads requirements, should always be met in both the horizontal and vertical planes. Special attention should also be given to Roundabout sight triangle requirements.
- (3) Truncations and road dedications to property boundaries must be provided as required to maintain intersection and corner sightlines, minimum verge and roadway widths at any point in the road networks. Particular notice must be given to: traffic calming devices, intersections, bends, cul-de-sac heads and roundabouts. All truncation areas must be included in road reserve and dedicated free of cost to Council.
- (4) Notwithstanding the truncations to maintain sight lines, as a minimum, a Developer must provide truncations to all intersections to a minimum of six (6.0) metre three (3) chord configuration.

SC6.3.3.8 Services

SC6.3.3.8.1 Alignments

- (1) Services must be in accordance with the standard drawings unless specifically approved by a Council development engineer.
- (2) Costs associated with relocation of services as a result of a development (e.g., due to clearance issue) will be met by the Developer.
- (3) Council will allow multiple services in a single trench if approval of a proposal is submitted from the relevant service providers.

SC6.3.3.8.2 Service pits and manholes

- (1) Service pits and manholes within the roadway or verge should be installed accurately, blending smoothly with the finished longitudinal and transverse grades of the verge. Where the Developer is retrofitting or developing a site it will be necessary to check with a Council development engineer if it is necessary to adjust an existing pit to accommodate the new works. Any modification to Council's network will be at the Developer's expense.
- (2) Any modification to Council's services within neighbouring private allotments will require the provision of an easement at the Developer's expense.
- (3) Service pits should not be placed in areas that would compromise the construction of kerb ramps to the relevant standards, refer standard drawing list.

SC6.3.3.8.3 Service conduits

- (1) Service conduits required by the relevant service authorities including water services should be installed prior to final trim of the subgrade.
- (2) Kerb markers (brass indicator discs) should be placed in the kerb and channel at service conduit crossings. In the case of interlocking paver, threshold treatments or mass concrete roads, developers should make provision for incorporating spare conduits (with markers) at the time of construction to alleviate the need for unsightly repair work in the future.
- (3) Note Council will not inspect the subgrade until the conduits have been placed and backfilled.

SC6.3.3.8.4 Conflict with council service

SC6.3.3.8.4.1 AC water mains

- (1) The Developer must replace the full length of an AC water main, with DICL class K9 mains, where the subgrade level of the approved pavement (usually associated with road widening) is within 200 mm of the top of the water main for 100 mm diameter mains or 300 mm for all other diameter water mains.
- (2) Water supply works performed on live water supply infrastructure will be required to be undertaken by Council at the Developer's expense. Council will provide a quotation at the written request of the Developer. The request must be accompanied by plans marked 'For Construction'.

SC6.3.3.8.4.2 PVC water mains

PVC water mains must have a minimum 600 mm clearance from the pavement subgrade.

SC6.3.3.8.4.3 Wastewater mains

Wastewater mains must have a minimum 600 mm clearance from the pavement subgrade.

SC6.3.3.9 Pedestrian pathways and cyclist facilities

- (1) Specific conditions relating to the provision of footpaths, shared pathways and cyclist facilities are provided in **Table SC6.3.3.9.1 (Pathway and cycleway requirements)**.

Table SC6.3.3.9.1 Pathway and cycleway requirements

Classification	Road Type or Land Use Zone	Footpath (FP) ⁽¹⁾ ⁽²⁾ Shared Pathway (SP) ⁽¹⁾ On Road Cycleway (ORC)	Desirable Width (M) ⁽⁴⁾
Non-trunk requirements			
Urban footpath network	Collector roads	FP one side ⁽¹⁾	1.5
	All roads in High Density Residential Zone	FP one side ⁽¹⁾	1.5
	All roads in Medium Density Residential Zone	FP one side ⁽¹⁾	1.5
	Industrial Access roads	FP one side ⁽¹⁾	1.5
	CDB/Commercial Access Roads	FP both sides	2
Trunk requirements (refer to the Local Government Infrastructure Plan and Plans for trunk infrastructure mapping LGIP-TNP-01 to LGIP-TNP-33)			
Urban multi-modal pathway network (as per LGIP) ⁽³⁾	Principal Pathway	SP both sides	3
	Distributor Pathway	SP one side ⁽¹⁾	2.5
	Collector Pathway	SP one side ⁽¹⁾	2.0
	On Road Principal Cycleway	ORC both sides	2.0
	On Road Distributor Cycleway	ORC both sides	1.5
	On Road Regional Recreational Cycleway	ORC both sides	1.5
	Off Road Regional Recreational Cycleway	Single SP (eg. on old rail alignment or through nature reserve)	3.0

Notes—

- (1) FP/SP one side will generally be on northern or western side of road.
- (2) Council may waive the necessity to provide a non-trunk footpath where there would be no chance that a contiguous pathway could be provided in the immediate area/block.
- (3) Where pathways and cycleways are located on State Controlled Roads, proposals must be approved by Department of Transport and Main Roads and comply with their standards.
- (4) Where preferred pathway widths are not achievable, Council may consider alternative pathway proposals (e.g., pathways with reduced widths on both sides of the roads; on-road cycle lanes).

- (2) Pathways will be designed in accordance with Austroads Guide to Road Design - Part 6A: Pedestrian and Cyclist Paths.
- (3) Kerb ramps will be required where a concrete footpath:
 - (a) Leads to a street intersection,
 - (b) At pedestrian crossings,
 - (c) At median islands.
- (4) Kerb ramps must be located clear of obstacles such as stormwater gullies, street sign posts and trees.

SC6.3.3.10 Traffic control signage and street names

The Developer must supply and erect all necessary street signs, traffic control signs and posts in accordance with the Standard Drawings R1040, R1041, R1042 and R1043. Signage should comply with the *Manual of Uniform Traffic Control Devices (MUTCD)* and with *Austroads' Guide to Traffic Management Part 10: Traffic Control and Communications Devices*.

SC6.3.3.10.1 Traffic control signage

Signs will not be used on minor roads in order to minimise maintenance commitments and improve visual amenity. However the following exceptions apply:

- (a) Roundabouts;
- (b) Entrances to low speed residential areas, where 'Local Traffic Area 40 km/h' signs are used;

- (c) Locations where isolated devices might be installed requiring signage to comply with the MUTCD.

SC6.3.3.10.2 Street names

- (1) The Developer must liaise with the Bundaberg Regional Council for determination of the names for new development roadways in accordance with the procedure outlined in **Appendix SC6.3B (Street and park naming procedure)**. Generally, it is expected that a Developer will submit three (3) names for each roadway for approval. Council will then provide the developer with a list of approved names.
- (2) The Developer is advised that the road name determination process takes a minimum of three (3) weeks.

SC6.3.3.11 Traffic impact assessments

All developments involving high trip generating land uses will require a traffic impact assessment (TIA) report. Council may also request an impact assessment for other developments if the proposed development is considered to have an impact on the safety and operational efficiency of Council's road network.

SC6.3.3.11.1 Report and modelling requirements

- (1) The report should be prepared in accordance with the Guide to Traffic Management Part 12: Traffic Impacts of Development (Austroads 2009) and/or Guide for Assessment of Road Impacts of Development (Queensland Government 2006).
- (2) All reports must be accompanied by the electronic SIDRA models.
- (3) Council maintains both Saturn and EMME transportation models. At Council's discretion, larger developments may be required to utilise these models as part of the Transport Study.
- (4) Developers are encouraged to consult with Council's Development Engineer and other relevant authorities prior to or during the preparation of TIA especially in respect to how the developer intends to resolve traffic issues.

SC6.3.3.11.2 Traffic volumes

- (1) Traffic volume on the individual minor roads should be determined based on the following generation rates:
 - (a) In residential areas intended to accommodate single detached housing, use 10 vehicles per day (vpd which is trip ends or cumulative trips out and back) from each dwelling unit,
 - (b) For multi-unit dwellings at 6 vpd,
 - (c) For rural residential and village/townships, assume 7.5 vpd from each allotment,
 - (d) Peak traffic generally is 1 vehicle per lot or 10 percent of AADT (appropriate lane factor applies),
 - (e) For other developments, use design data from approved traffic studies/guidelines.
- (2) For other development types refer to Roads Transport Authority or Institute of Transportation Engineers publications

SC6.3.3.11.3 Peak split

Intersection design must be based on an 80 in and 20 out split for all peak traffic, unless specifically approved otherwise.

SC6.3.3.11.4 Unsignalised intersection gap acceptance and follow-up headway

Intersection design must be based on a 5 second gap acceptance and 3 second follow-up headway, unless specifically approved otherwise.

SC6.3.3.12 Haul route management plan

Major development or extractive industry haul routes must comply with the following:

- (a) A designated haulage route will be required for the import and export of any significant quantities of earthworks or construction materials from the site (>5,000t) including gravel and concrete for example, to minimise the impact on Council roads and nuisance to residents;
- (b) An assessment of the road pavement for the haul route must be made by a Registered Professional Engineer of Queensland (RPEQ) to determine the suitability of the pavement for the intended traffic movements. Mitigation measures will be required where pavements are identified as being substandard;
- (c) A Haul Route Management Plan will be required to ensure that any spillage, pavement damage, or vehicle breakdowns can be addressed with minor impact to residents.

SC6.3.3.13 Pavement design

SC6.3.3.13.1 Design objectives and principles

The underlying principle of pavement design is to achieve a pavement that is functional, structurally sound, has good ride quality, and requires minimal maintenance over its design life (refer Austroads Guide to Pavement Technology).

SC6.3.3.13.2 Design procedure

SC6.3.3.13.2.1 Design life

The design life for flexible pavements is 20 years. This value may be increased by Council in certain circumstances for the higher order roads. The design life for rigid pavements is 40 years.

SC6.3.3.13.2.2 Traffic loadings

Traffic loading may be obtained from **Table SC6.3.3.13.2.1 (Road classification pavement details)** or derived using Austroads *Guide to Pavement Technology* and *Pavement Design for Light Traffic – A Supplement to Austroads Pavement Design Guide*.

SC6.3.3.13.2.3 Subgrade strength

- (1) The design parameter for the subgrade is the California Bearing Ratio (CBR – refer Laboratory Determination for more details). The pavement design should be based on the CBR tests being the lowest CBR representative of the subgrade over the various lengths of road at the box depth.
- (2) A design CBR should be determined for each identifiable unit defined on the basis of topographic, geological and drainage conditions at the site. In determining the design CBR, account should also be taken of the variation of the subgrade strength with depth below subgrade level. The critical layer of material should be established to ensure each layer has adequate cover.

SC6.3.3.13.2.4 Sampling frequency

- (1) Subgrade should be evaluated at the following frequencies:
 - (a) Road length \leq 120m: 1 test for every 60m or part thereof, but not less than 2 tests for each project (unless minor road widening associated with MCU then only one test);
 - (b) Road length $>$ 120m: 1 test for every 60m-120m, but not less than 3 tests for each project;
 - (c) One Dynamic cone penetrometer profile AS 1289.6.3.2 at each CBR location or stratum.
- (2) Notwithstanding the above frequencies, at least one sample should be evaluated for each soil type. Spacing of test sites should be selected to suit subgrade, topographic and drainage characteristics.

SC6.3.3.13.2.5 *Laboratory determination of design CBR*

- (1) The design CBR should be based on the soaked condition in the subgrade at a compaction of 100% standard i.e., the design CBR is the 4-day soaked CBR as determined by testing in accordance with AS 1289.6.1.1 (single point test).
- (2) When the subgrade CBR is particularly sensitive to changes in moisture content, adequate testing of the CBR over a range of moisture contents and densities should be provided and CBR interpolated at the design moisture content and density conditions (i.e., 4-point test using QDMR Main Roads test Q113A).
- (3) Where a number of tests are taken use the 10th percentile (Mean - 1.3*SDV).

SC6.3.3.13.2.6 *Soft subgrades and sand*

- (1) If the CBR determined for the subgrade is less than the minimum CBR nominated in Austroad – *Guide to Pavement Design*; then one of the following subgrade treatment options is required:
 - (a) Remove unsuitable subgrade material and replace with minimum CBR 15 gravel or select material. The depth of subgrade replacement must be determined for each specific site, however, as a guide the depth would be expected to be in the vicinity of 300 mm;
 - (b) Carry out lime stabilisation treatment in accordance with Main Roads methodologies (this option should only be used in subgrades with high PI);
 - (c) Utilise other techniques such as rock spalls on geotextile, geogrids together with correctly sized gravel/rock blanket course, etc. These proposals need to be submitted to Council for approval.
- (2) After subgrade improvement, the pavement design should be based on subgrade CBR 3 for granular pavement and CBR 5 for concrete pavement. Also refer to Austroads – *Guide to Pavement Design* for further information.
- (3) Note, a 150 mm select fill trimming course will be required for roads constructed on sand. The trimming course must not be included in the pavement design.

SC6.3.3.13.3 **Pavement types**

SC6.3.3.13.3.1 *Pavement types/materials*

Pavement materials must be in accordance with MRS05 & MRTS05 - *Unbound Pavements* unless the pavement is associated with a lot reconfiguration of unsealed rural road where the land is associated with agricultural purposes where the ARRB *Unsealed Roads Manual – Guidelines to Good Practice* will apply. Refer **Section SC6.3.3.13.3.3 (Concrete pavements)** for concrete pavements.

SC6.3.3.13.3.2 *Pavement thickness*

- (1) The supervising engineer (or Superintendent) must provide a pavement design for approval by a Council development engineer for each new road or road widening. The pavement design must be carried out in accordance with Austroads *Guide to Pavement Technology* and/or *Pavement Design for Light Traffic – A Supplement to Austroads Pavement Design Guide*. Pavement Depths must be increased by 25mm to allow for tolerances (averaged maximum).
- (2) Council's minimum pavement depths are set out in accordance with **Table SC6.3.3.13.3.2.1 (Road classification pavement details)**. Pavement depths must be recorded in all pavement density checks and included in the information provided to Council at 'On Maintenance'.

Table SC6.3.3.13.3.2.1 Road classification pavement details

Classification	Road Type	Pavement Design ⁽¹⁾ (ESAs)	Minimum Sub Base (MRTS Class)	Minimum Base (MRTS Class)	Min Pavement Thickness (including Surfacing)	Pavement Surfacing (mm AC)
Urban Residential	Trunk Collector	1 x 10 ⁶	2.2	2.1	300	40
	Collector	3 x 10 ⁵	2.3	2.1	225	25
	Access Rd/Place	6 x 10 ⁴	2.3	2.1	225	25
Industrial	Collector	5 x 10 ⁶	2.2	2.1	275	40
	Access	5 x 10 ⁶	2.2	2.1	275	40
Commercial	CBD/Comm.	5 x 10 ⁶	2.2	2.1	275	40
Rural/ Rural Residential	Principal Rural Road	1 x 10 ⁶	2.2	2.1	225	Prime & 2 Coat ⁽²⁾
	Collector	5 x 10 ⁵	2.3	2.1	200	Prime & 2 Coat ⁽²⁾
	Access ⁽³⁾	3 x 10 ⁵	2.3	2.2	200	Prime & 2 Coat ⁽²⁾
Village/ Township	Collector	3 x 10 ⁵	2.3	2.1	200	Prime & 2 Coat ⁽²⁾
	Access	3 x 10 ⁵	2.3	2.2	200	Prime & 2 Coat ⁽²⁾

Notes—

- (1) ESA may be determined by traffic study
- (2) Minimum depth does not include subgrade replacement and prime must be place independently of the seal and must be allowed 48 hours to cure prior to the placement of the seal. Note for boney surfaces the minimum spray rate of 0.82 l/m² must be increased. The final rate must be approved by the relevant Council development engineer prior to application.
- (3) Where road is to unsealed use gradings specified by ARRB *Unsealed Roads Manual – Guidelines to Good Practice*

SC6.3.3.13.3.3 Concrete pavements

- (1) Full depth concrete roads are generally used only in heavily trafficked situations. These roads must be designed in accordance with the Austroads *Guide to Pavement Design* and submitted to Council for approval.
- (2) A full depth concrete road can be designed for urban streets subject to the following requirements:
 - (a) The pavement must have a minimum 100 mm thick unbound granular sub-base consisting of Class 2.1 granular material (MRS 05);
 - (b) The flexural strength of the concrete must be a minimum 4.0 MPa;
 - (c) The Load Safety Factor (LSF) must be 1.3;
 - (d) Integral or structural concrete shoulders are not required;
 - (e) Special attention should be paid to the jointing details in regard to ride quality and the provision of additional conduits for future services;
 - (f) The design, detailing and construction of concrete pavements for residential streets should be in accordance with the publication *Guide to Residential Streets and Paths* (Cement & Concrete Association of Australia, C&CAA T51, February 2004).

SC6.3.3.13.4 Pavement widening (specific requirements)

- (1) The pavement design for road widening must be in accordance with **Section SC6.3.3.13.3.2 (Pavement thickness)**. However, where the design pavement depth is less the existing pavement, the existing pavement depth must be adopted to provide for pavement drainage.

- (2) Existing pavement must be cut back in 150 mm steps for each layer of the new pavement widening.
- (3) Seals must overlap a minimum of 300 mm.

SC6.3.3.13.5 Subsoil drainage

- (1) Subsoil Drainage, refer Austroad Part 10 and Figure 5.2 - Pavement Drain Type 2 Austroads Part 5: Drainage Design (2008, p.58), must be provided in the following locations:
 - (a) Under all kerb, kerb and channel or edge restraint (where underground drainage is available);
 - (b) Under all traffic islands containing landscaping;
 - (c) In all locations where the wet weather water table is above the subgrade or where natural springs may wet the pavement;
 - (d) In any location where there is insufficient side drainage (table drains) or where the pavement materials are not free draining.
- (2) Subsoil drainage should only be used in rural areas where table drains will not adequately protect the pavement from wetting (i.e., springs).

SC6.3.3.14 Pavement construction

- (1) The technical requirements for the construction of unbound pavements are defined in the Guide to Pavement Technology Part 8: Pavement Construction (Austroads 2009).
- (2) When constructing a new road, a Developer must operate under a Quality Management System (QMS). Generally this would be associated with an ROL involving more than 3 new residential allotments and MCU having more than 4 car parks.
- (3) Geotextile Filters are the preferred subsoil for all Bundaberg Regional Council roads, unless specifically approved otherwise by the relevant Council development engineer. See also Figure 5.2 Pavement Drain Type 2 (Austroads Part 5: Drainage Design 2008, p.58)
- (4) Unbound granular pavement materials must be supplied in accordance with DTMR standards,

SC6.3.3.15 Road surfacing

SC6.3.3.15.1 Asphalt pavements

- (1) Asphalt is the required surfacing material for all roads within the urban, CBD/commercial and industrial road hierarchy. Asphalt must be supplied and placed in accordance with MRS30 and MRTS30.
- (2) For all new construction, i.e., previously unsealed surfaces, the surface must be primed with AMC00 or AMC0 (MRTS20) sprayed at a rate of 1 - 0.82 l/m². The prime must be allowed to cure for a period of 48 hours prior to the tack coat and application of the Asphalt surfacing.
- (3) For boney unbound pavement surfaces (low fines) Council reserves the right to increase the minimum application rate and/or request an application of single coat sprayed seal. The necessity for a revised application rate and/or bitumen seal will be determined by the relevant Council development engineer prior to the inspection of the base.
- (4) Note: all recycled pavements require a single coat 10 mm sprayed seal and a minimum of 40 mm asphalt.

SC6.3.3.15.2 Bitumen seals

SC6.3.3.15.2.1 Supply of bitumen

Bitumen and associated materials must be supplied in accordance with MRS11 and MRS 17 – 20.

SC6.3.3.15.2.2 Cover aggregate

Supply of pre-coated aggregate must be in accordance with MRS22.

SC6.3.3.15.2.3 Surfacing

Bitumen surfacing must be in accordance with MRS11 with the seal consisting on a prime and then two coat seal.

SC6.3.3.15.2.4 Typical application rates for double/double seal

The typical application rates are provided in **Table SC6.3.3.15.2.4.1 (Typical rates for prime and seal road surfacing)**.

Table SC6.3.3.15.2.4.1 Typical rates for prime and seal road surfacing

Surfacing	Spray Rate (l/m ²)	Cover Aggregate Rate (m ³ to m ²)
Prime	1 - 0.82 AMC00 or AMC0	Na
<i>Allow 48 hours between prime and seal</i>		
First Coat ⁽¹⁾	1.35 Aggregate 16 mm	1 to 88
Second Coat	0.72 Aggregate 7 mm	1 to 175

Note—

- (1) The spray rate must be confirmed by the Superintendent or Supervising Engineer prior to its application.

SC6.3.3.15.3 Threshold treatments**SC6.3.3.15.3.1 Stamped asphalt**

Council's preferred treatment for entrance thresholds is stamped asphalt as it combines a decorative appearance with a strong and low maintenance asphalt base. Council recommends "StreetPrint" or similar at these locations. For more information on "StreetPrint" refer to <http://www.bricknpave.com.au/StreetPrint.htm>.

SC6.3.3.15.3.2 Concrete surfacing to full depth pavement

- (1) Exposed aggregate surface is permitted in local traffic area threshold treatments provided that the crushed aggregate finish:
 - (a) Achieves a minimum Polished Aggregate Friction Value (PAFV) value of 45
 - (b) Complies with the skid resistance requirements of the Guide to Pavement Technology Part 3: Pavement Surfacing (Austroads 2009) and the Guide to Residential Streets and Paths – 2nd Ed (Cement & Concrete Association of Australia 2004).
- (2) Stamped concrete is not permitted as the surface texture can cause a potential hazard for cyclists.

SC6.3.3.15.3.3 Coloured threshold treatments

- (1) Coloured surface treatment must serve a traffic management function such as thresholds at local traffic areas and to visually enhance school zones. The use of coloured surface treatment as an aesthetic enhancement to the streetscape is not permitted. For further details and particular requirements on coloured treatments, texturing, decorative, and high friction coatings on asphalt and concrete surfaces, refer to the DTMR *Guideline to pavement markings (June 2013)*.
- (2) The colour of the threshold treatment must be approved by Council.

SC6.3.4 Water and wastewater

The design and construction standard for Council's water and wastewater networks are stated in the WBBROC Water Services Design and Construction Code. This code is consistent with the SEQ Design and Construct Code which in turn reflects the various, nationally accepted WSAA codes. Further reference documents and requirements are included in the remainder of this section.

SC6.3.4.1 Design standards and reference documents

The planning and design of development within the Bundaberg Regional Council local government area must be undertaken in accordance with the current edition of the following key reference documents, unless specifically outlined in this section or other Council references dictate otherwise:

- (a) WBBROC Water Services Design and Construction Code (including relevant WSAA codes and Australia Standards)
- (b) DERM – Planning Guidelines for Water and Sewerage, (DERM, Queensland Government 2010)
- (c) Fire Hydrant and Vehicle Access Guidelines for Residential , Commercial and Industrial Lots (Queensland Fire and Emergency Services, , Queensland Government 2015)
- (d) Bundaberg Regional Council – Standard Drawings – See **Appendix SC6.3A (Standard drawings list)**.

SC6.3.4.2 General design considerations

SC6.3.4.2.1 Easements

- (1) Council's requirements for easements are listed in WBBROC Water Services Design and Construction Code.
- (2) Council has a standard instrument of easement, for use by Developers. A copy of the document can be made available upon request.

SC6.3.4.2.2 Building over or near water or wastewater infrastructure

- (1) Developers and designers are advised that Council will not allow dwellings to be constructed over water and wastewater infrastructure.
- (2) Permissible clearances are given in WBBROC Water Services Design and Construction Code.
- (3) Part 1.4 of the Queensland Development Code (QDC MP 1.4) provides a mechanism for initial assessment of potential impact a building or structure may have on infrastructure assets and provide some acceptable solutions. These should be consider in association with the WBBROC Water Services Design and Construction Code.

SC6.3.4.2.3 Connection to existing water or wastewater infrastructure

- (1) Any works performed on live water or wastewater infrastructure will be undertaken by Council at the Developer's expense.
- (2) Council will proved a quotation to undertake the works at the written request of the Developer (FM-7-467 "Notice to Service Provider Application for Water & Sewer" is available at www.bundaberg.qld.gov.au/council/forms). The request must be accompanied by plans marked 'For Construction'.

SC6.3.4.2.4 Alignment of water or wastewater mains

- (1) The alignment of water or wastewater mains shall be in accordance with WBBROC Water Services Design and Construction Code with further clarification as follows:
 - (a) *Road Reserve* – Refer Council's standard drawing number R1050,

- (b) *Allotments* – except where perpendicular to or intersecting with a property boundary, a water or wastewater main shall not be situated closer than 1.5 metres to a property boundary (fenceline).

SC6.3.4.2.5 Water or wastewater mains within parks and reserves

- (1) Water or wastewater mains within parks and reserves must be contained within an easement as outlined in WBBROC Water Services Design and Construction Code.
- (2) A Developer will be required to negotiate with DERM to obtain an easement over proposed water or wastewater infrastructure where the aforesaid infrastructure traverses an existing reserve. All costs associated with obtaining and registration of the easement will be at the Developer's expense.

SC6.3.4.2.6 Replacement of existing water mains

The Developer must replace existing water mains with ductile iron where:

- (a) Trench - it is necessary to trench under the main,
- (b) Subgrade - refer also section 11 of the Roads and Pathways chapter of the development manual.

SC6.3.4.2.7 Flushing and sterilisation of water mains

- (1) The Developer must provide flushing and sterilisation points as per WBBROC Water Services Design and Construction Code. The Council's preferred sterilisation point is a hydrant.
- (2) Council will undertake sterilisation of the water main prior to connection to the water infrastructure. Works will be conducted at the Developer's expense.

SC6.3.4.3 Design programs for sizing mains

The following computer programs are accepted for design of main sizing (also refer Table 3.2 of WSA 03):

- (a) SewGEMS, and
- (b) WaterGEMS

SC6.3.4.4 Partial Water Services

For greenfield development, Council requires the provision of partial water services in accordance with WBBROC standard drawing WBB-WAT-1109-2. The Developer/Applicant is to coordinate the tag and bagging of these services during Operational Works (see SC6.3.13.8)

SC6.3.5 Stormwater

- (1) The Queensland Urban Drainage Manual (QUDM) Fourth Edition, 2016 shall be the basis for the design of stormwater drainage, except as amended by this manual.
- (2) The design of the proposed drainage system and earthworks for a development commences with establishing a lawful point of discharge for the site. Once the lawful point of discharge has been established to the satisfaction of Council's development engineers then the Applicant/Developer must provide a drainage solution that does not adversely affect the upstream or downstream drainage systems. If the downstream system is not capable of carrying the increased discharge the Applicant/Developer must indicate what measures are proposed to mitigate the impact. The Applicant/Developer must also consider any trunk drainage identified in the Local Government Infrastructure Plan that is required to support future upstream or downstream developments.

SC6.3.5.1 Design standards, reference documents and acceptable programs

The planning and design of the developments within the Bundaberg Regional Council local government area must be undertaken in accordance with the current edition of the following key reference documents, unless specifically outlined in this chapter or other Council references dictate otherwise:

- (a) Queensland Government – at the time of writing this document the series was as listed below:
- (i) State Planning Policy - state interest guideline Water quality,
 - (ii) Urban Stormwater Quality – Planning Guidelines (2010),
 - (iii) Environmental Protection (Water) Policy 2009 – Burrum, Gregory, Isis, Cherwell and Elliott Rivers environmental values and water quality objectives – Basin 137 at <https://www.ehp.qld.gov.au/water/policy/pdf/documents/burrum-river-ev-2010.pdf>, and Plan WQ1371 at <https://www.ehp.qld.gov.au/water/policy/pdf/plans/burrum-river-ev-plan-2010.pdf>.
- (b) IPWEA – Queensland Urban Drainage Manual Fourth Edition, 2016
- (c) Environment Protection Agency’s (EPA) – Guideline – EPA Best Practice Urban Stormwater Management – Erosion and Sediment Control <http://www.derm.qld.gov.au/register/p02301aa.pdf>
- (d) Engineers Australia – at the time of writing this document, the series relating to development was as listed :
- (i) Australian Rainfall and Runoff (ARR) – 1987 and 2016,
 - (ii) Australian Runoff Quality – A guide to water sensitive urban design.
- (e) *EDAW – Ecological Engineering Practice Area* – Urban Stormwater – Queensland best practice environmental management guidelines 2009
- (f) *Water by Design* – at the time of writing this document, the series relating to development was as listed:
- (i) Music Modelling Guidelines (2010),
 - (ii) Construction and Establishment Guidelines – Swales, Bioretention Systems and Wetlands.
 - (iii) Bundaberg Regional Council Urban Stormwater Quality Management Plan (BMT WBM 2013).
- (g) The following Australian Standard:
- (i) AS1554 Structural Steel Welding
 - (ii) AS1597 Precast Reinforced Concrete Box Culverts
 - (iii) AS3725 Design for Installation of Buried Concrete Pipes
 - (iv) AS 4058 Precast Concrete Pipes
 - (v) AS4139 Fibre Reinforced Pipes
 - (vi) AS4671 Steel Reinforcing Materials
- (h) Austroads – Waterway Design – A Guide to the Hydraulic Design of Bridges, Culverts and Floodways
- (i) *Austroads - Guide to Pavement Technology* – at the time of writing this document, part relating to development was AGPT10-09 - Part 10: Subsurface Drainage
- (j) *Australian Institute for Disaster Resilience – Managing the floodplain – a guide to best practice in flood risk management in Australia – Handbook 7 - Floodplain Management in Australia: Best Practice Principles and Guidelines*
- (k) *John Argue – Storm Drainage Design in Small Urban Catchments – A handbook for Australian Practice – Special Report 34 Australian Road Research Board*
- (l) International Erosion Control Association – Best Practice Erosion and Sediment Control
- (m) *Lewis Rossman – Stormwater management model User’s Manual Version 5 – United States Environmental Protection Agency*
- (n) *Bundaberg Regional Council – Standard Drawings – See Appendix SC6.3A (Standard drawings list).*

SC6.3.5.2 Environmental requirements

SC6.3.5.2.1 Water quality

- (1) Designs must incorporate the principles of Water Sensitive Urban Design (WSUD) into the development at all stages of the development.
- (2) For urban catchments, the Bundaberg Regional Council Urban Stormwater Quality Management Plan (USQMP) has identified the Environmental Values (EVs) and Water Quality Objectives (WQOs) and key opportunities for implementing stormwater best management practices.
- (3) Developments are classified as being either high or low risk.
- (4) Developments are high risk if they:
 - (a) fall within the urban catchments identified in the USQMP, and
 - (b) have and a site area 2500m² or greater, and
 - (c) have 6 or more lots/dwellings, or an impervious area greater than 25% of the net developable area.
- (5) All other developments are low risk unless the development is deemed to be of a size and scale that is inconsistent with the planning scheme by the assessment manager. If in doubt, the catchment risk will be determined at the pre-lodgement meeting.
- (6) High risk developments trigger the necessity to identify Environmental Values (EVs) and Water Quality Objectives (WQOs) and demonstrate how they are achieved through the provision of site-based stormwater management plans (SBSMP).
- (7) SBSMP must aim to :
 - (a) address both quality and quantity control issues at pre-development (approval) stage;
 - (b) integrate permanent stormwater management features into overall development landscape plan;
 - (c) identify legal point(s) of discharge (these need to be identified before development approval is given);
 - (d) address ecological protection issues that are influenced by the management of stormwater (e.g., waterway corridor vegetation and habitat management issues);
 - (e) identify clearly pollutants of concern and their sources for both the construction and operational phases of development
 - (f) be updated and submitted for post-approval (operational works) stages, which will include Sediment and Erosion Control Plans (ESCP);
- (8) The format of SBSMP is to be determined along with the WQOs at a pre-development meeting, however, they can be generally in accordance with Brisbane City Council Subdivision and Development Guidelines Part C – Water Quality Management Guidelines.
- (9) The water quality objectives for low risk developments are usually achieved by best practice standards. Low catchment risk developments would provide controls such as in pit silt traps (e.g., Ecosol RSF 100 or equivalent) and sediment and erosion control measures pre- and post-construction.

SC6.3.5.2.2 Erosion and sediment control

Erosion and Sediment Control must be designed in accordance with the recommendations contained within the Environment Protection Agency's (EPA) – *Guideline – EPA Best Practice Urban Stormwater Management – Erosion and Sediment Control* and International Erosion Control Association's (IECA) – *Best Practice Erosion & Sediment Control* and *'Queensland Urban Drainage Manual' (QUDM)*.

SC6.3.5.3 Lawful point of discharge

SC6.3.5.3.1 General

- (1) QUDM defines the lawful point of discharge as:

'A point of discharge of stormwater from an allotment that is considered to satisfy the requirements specifically outlined with the Queensland Urban Drainage Manual'
- (2) Council's criteria for determining the lawful point of discharge are based on the QUDM. The criteria are as follows:
 - (i) Will the proposed development alter the site's stormwater discharge characteristics in a manner that may substantially damage a third party property?
 - a. If not, then no further steps are required to obtain tenure for a lawful point of discharge (assuming any previous circumstances and changes were lawful);
 - b. If there is a reasonable risk of such damage, then consider issue (ii) or (iii);
 - (ii) Is the location of the discharge from the development site under the lawful control of Council or other statutory authority from whom permission to discharge has been received? This will include a park, watercourse, drainage or road reserve, stormwater registered drainage easement, or land held by local government (including freehold land). Council will require information about the potential impact of the site's stormwater discharge characteristics on third party properties (particularly those downstream of the proposed discharge point) before it will consent to the discharge entering its land;
 - a. If so, then no further steps are required to obtain tenure for a lawful point of discharge;
 - b. If not, then consider issue (iii). A land owner or regulator may require that the developer obtain an authority to discharge as described in (iii) in order for the stormwater to ultimately flow to a location described in (ii);
 - (iii) An authority to discharge over affected properties will be necessary. In descending order of certainty, an authority may be in the form of:
 - a. Dedication of a drainage reserve or park;
 - b. A registered easement for stormwater discharge/works;
 - c. Written discharge approval via a formal agreement.
- (3) Developer/Applicant should refer to Section 3 of QUDM when assessing the potential damage and nuisance that may be caused by the proposed development. It is the Developer/Applicant's responsibility to not cause nuisance, rather than the regulator's responsibility to assess and condition works to prevent a nuisance. Further, as outlined in QUDM any assessment of the potential adverse impacts of stormwater changes on other properties should not only consider the current usage of the land, but also the value and/or potential of the land to be developed for future uses.

SC6.3.5.3.2 Due Diligence Assessment

- (1) The Developer/Applicant must submit to Council the Due Diligence Assessment undertaken as per Section 3.5 of QUDM. This will include determining the pre-development drainage situation. Clearly identifying proposed drainage works and determining the changes in volume, rate, frequency, duration, velocity, location and quality of the stormwater runoff. The assessment will also provide evidence that the post-development discharge can be managed without causing an actionable nuisance.
- (2) The Developer/Applicant is to notify Council where the pre-development drainage analysis has identified deficiencies in the existing drainage system. Older design standards and changes in modelling techniques (i.e., ARR87 to ARR16) may have resulted in parts of the drainage network no longer being able to cater for the design storm flows. Council will consider these issues as per Section 13.1 of QUDM.

SC6.3.5.3.3 Easements

- (1) The extent of an easement is determined by the necessity to obviate an actionable nuisance. Hence, this issue needs to be determined early in the development process.

Accordingly, it is beneficial to have a pre-submission meeting to determine the likelihood of a nuisance issue.

- (2) Generally, where an easement is required over downstream properties, Council will require the Developer/Applicant to obtain an in-principle agreement from effected property owners. The in-principle agreement would note the characteristics of the flow, the proposed solution, and the necessity for registration of easement(s) (prior to submission of the operational works approval).
- (3) Council has a standard instrument of easement for use by developers for Drainage (pipes) and Open Cut Drainage (open drains) for use by developers; a copy of the instrument can be made available upon request.

SC6.3.5.4 Flood studies

- (1) Development within the Flood Hazard Area will require a Flood Hazard Assessment and Mitigation Report as described in Section SC6.5.3.5. To aid in the development of this report and/or the Due Diligence Assessment (see SC6.3.5.3.2), Council has the following flood studies and their respective models:
 - (a) Burnett River Flood Study (GHD, 2013) – 1D/2D TUFLOW model;
 - (b) Kolan River and Gin Gin Creek (GHD, 2014) – 1D/2D TUFLOW model;
 - (c) Baffle Creek Flood Study (O2, 2014) - only draft report available;
 - (d) Burrum, Cherwell, Isis, Gregory River Flood Study – (GHD, 2015) – 1D/2D XPSWMM Model;
 - (e) Saltwater Creek Flood Study (Cardno, 2010) – 1D/2D XPSWMM Model;
 - (f) Bundaberg Creek Flood Study (Cardno, 2013) – 1D/2D XPSWMM Model;
 - (g) McCoys Creek Flood Study (GHD, 2015) - 1D/2D XPSWMM Model;
 - (h) Bundaberg Coastal Small Streams (BMT WBM, 2014) - 1D/2D XPSWMM Model;
 - (i) Apple Tree Creek Flood Study (Cardno 2004) – HEC-RAS Model;
 - (j) Palmer and O’Connell Creeks Drainage Study (GHD, 1997) – HEC-RAS Model;
 - (k) Non-urban Creeks and Overland Flow Path Flood Study – 2D TUFLOW Model; and
 - (l) Storm Tide Flood Study (BMT WBM, 2013) – only report available.
- (2) Copies of the flood studies and models are available on request.
- (3) New flood studies are commissioned regularly by Council. The Developer/Applicant should check for the availability of new flood studies prior to undertaking any modelling works.

SC6.3.5.4.1 Design programs

- (1) Council prefers the submission of major drainage studies undertaken by the following programs: XPSWMM, XPRAFTS, TUFLOW and HEC_RAS.
- (2) The preferred hydrology for the major storm event involving larger catchment is the listed in **Section SC6.3.5.8.3 (Infiltration factors initial and continuing losses)**.

SC6.3.5.4.2 Minor Hydraulic Designs

Council has the ability to check design’s undertaken in: 12D, XPDRAINS and XPSTORM. Refer also to Section **SC6.3.5.10.10 (Drainage calculation presentation)** for standard of presentation.

SC6.3.5.5 Design storms

Table SC6.3.6.5.1 (Design storms for major and minor drainage systems) provides the design storms for developments within the Bundaberg Regional Council local government area.

Table SC6.3.6.5.1 Design storms for major and minor drainage systems

Major Drainage System		Design Storm
		100 year ARI (1% AEP) plus Climate Change
Minor Drainage System		
Development Category (QUDM)	BRC Planning Scheme – Zone	ARI (AEP)
Central business and commercial	Principal centre zone, Major centre zone, district centre zone, Local centre zone, Neighbourhood centre zone, Specialised centre zone	10 year ARI (10% AEP)
Industrial	Industry zone, High impact industry zone	10 year ARI (10% AEP)
Urban residential high density/High Density	High density residential zone	10 year ARI (10% AEP)
Urban residential low density	Medium density residential zone, Low density residential zone, Emerging community zone, Limited development zone, Community facilities zone	5 year ARI (18% AEP)
Rural Residential	Rural residential zone, Sport and recreation zone	2 year ARI (39% AEP)
Open space – parks, etc.	Rural zone, Open space zone, Environmental management and conservation zone	1 year ARI (63% AEP)
Roadway Criteria		ARI (AEP)
Major Road (i.e., Arterial, Sub-arterial, Trunk Collector (Suburban), Industrial Collector, Principal Rural Road)	Table Drain/Kerb & Channel	10 year ARI (10% AEP) ⁽¹⁾
	Cross Drainage (Culverts)	50 year ARI (2% AEP) ^(2,3)
All other Roads	Kerb and Channel	Use relevant Development Category above
	Cross Drainage (if Rural Culverts ⁽⁴⁾)	10 year ARI (10% AEP) ⁽³⁾

Notes—

- The design storm for Major Road overrides the Development Category design storm
- Designer must ensure that the 100 year ARI (1% AEP) backwater does not enter properties upstream. In addition the downstream face of the causeway embankment may need protection where overtopping is likely to occur and d*v checks must still be below maximum levels
- may change if the Roadways is deemed to be part of Council's emergency evacuation route
- Rural cross drainage requirement may be reduced to 2 year ARI (39% AEP) where risk level is medium in 50 year ARI (2% AEP) flood event as defined in SCARM 73. See also Section SC6.3.5.10.7.2 for further guidance on emergency evacuation routes.

SC6.3.5.6 Catchment hydrology – rainfall intensity

- Rainfall intensity-frequency-duration (IFD) data used must be in accordance with the following:
 - The IFD data stated within an adopted flood study from SC6.3.5.4 are to be used for developments utilising these existing adopted flood models. These IFD data will generally be consistent with ARR 1987; or
 - Where a new flood model is required the IFD data is to be obtained from the Bureau of Meteorology and is to utilise ARR 2016. These IFD are available here: <http://www.bom.gov.au/water/designRainfalls/revise-ifd/>.

SC6.3.5.7 Catchment Hydrology – rational method design details

SC6.3.5.7.1 Coefficient of runoff

The fraction impervious for various development types must be in accordance with QUDM except as specifically mentioned in **Table SC6.3.6.7.1.1 (Fraction impervious – QUDM Table 4.5.1 exceptions)**.

Table SC6.3.6.7.1.1 Fraction impervious – QUDM Table 4.5.1 exceptions

Development Category	Fraction impervious (<i>f_i</i>)
Urban Residential –	
High Density	0.9
Medium Density	0.75
Low Density	0.5

Note—refer to the planning scheme for the definition of the development category.

SC6.3.5.7.2 Time of concentration

- (1) The standard inlet times depicted in Table 4.6.1 QUDM may be used or alternatively sheet flow times are to be determined using Friend's Equation with the addition of pipe and channel flow times determined in accord with sections 4.6.7 and 4.6.8 of QUDM.
- (2) For sheet flow lengths outside the limitations of the Friend's Equation and for rural catchments, the time of concentration shall be calculated using the Bransby Williams or modified Friend's Equation (refer QUDM 4.6.11).

SC6.3.5.8 Catchment hydrology – runoff method – design details

SC6.3.5.8.1 Temporal patterns – ARR 1987

The temporal patterns stated within an adopted flood study from SC6.3.5.4 are to be used for developments utilising these existing flood models. These temporal patterns will generally be consistent with ARR 1987.

SC6.3.5.8.2 Ensemble temporal patterns - ARR 2016

Where a new flood model is required the 10 ensemble temporal patterns from ARR 2016 are to be analysed (see Book 2, Chapter 5, Section 5, ARR 2016). These ensemble temporal patterns have been chosen to represent the variability in observed patterns. The median temporal pattern (i.e., 6th highest flow rate out of 10 ensemble temporal patterns) is to be used for design.

SC6.3.5.8.3 Infiltration factors initial and continuing losses

- (1) Hydrological data modelling should be based on the following:
 - (a) Routing Method – Laurenson (do not calculate B unless specifically approved),
 - (b) Infiltration Method – Uniform Loss –generally will be as follows:
 - (i) *Urban and Rural Impermeable* – initial 0 mm/h, absolute continuing 0 mm/h;
 - (ii) *Urban permeable* – initial 0 mm/h, absolute continuing 2.5 mm/h;
 - (iii) *Rural permeable* – initial 0 mm/h, absolute continuing 2.5 – 3.5 mm/h;
 - (c) Manning Roughness – impermeable 0.014, permeable 0.025 – 0.035 (this value may be adjusted to suit).
- (2) The above values allow for an embedded critical rainfall event occurring within a saturated catchment – which anecdotally represents the critical event within Bundaberg.

SC6.3.5.9 General design considerations

SC6.3.5.9.1 Minimum grade on allotments

For minimum grade on allotments see section SC6.3.10.1.

SC6.3.5.9.2 Overland flow paths

- (1) An overland flow path is defined as follows:
 - (a) Where a piped drainage system exists, the path-of-travel of the floodwaters which exceed the capacity of the underground drainage system,
 - (b) Where no piped drainage system (or the outlet to the system) or other form of defined watercourse exists, the path taken by surface runoff from higher parts of the catchment. This does not include a watercourse or gully with well defined banks.
- (2) Overland flow paths must have velocity*depth not greater than 0.4 m²/s in high risk areas and 0.6 m²/s elsewhere.
- (3) Any proposed development, especially those involving filling, needs to take account of existing or created overland flow paths and make due provision in the design. Overland flow paths must be clearly indicated on the drawings and supported by calculations, cross sections and plan layouts shown on the approved engineering drawings with due consideration of freeboard.
- (4) Developments within any overland flow paths are generally not permitted unless the Developer/Applicant can satisfactorily demonstrate compliance with all the flood immunity freeboard and trafficability (especially d*v issues and emergency evacuation routes) requirements set out in this document.
- (5) In residential subdivisions, overland flow paths must be located in roadways, parks (in a combined park and drainage reserve) or pathways.
- (6) No overland flow paths will be permitted through urban allotments – unless specifically approved by Council. Where the overland flow path is approved such path must be covered by an easement with the preferred tenure i.e., easement or reserve, to be determined by Council.
- (7) In site developments such as apartment buildings or townhouses where the sites are filled to provide suitable falls to the roadway, the Developer must pay particular attention to the preservation of existing overland flow paths, the obstruction of which may cause flooding or ponding of stormwater on adjoining properties.
- (8) Where Overland flow paths should be located through commercial/industrial development such paths must be located along and through the car park/driveways and must be protected by an easement.

SC6.3.5.10 Outlets – point of discharge – under control of Council

- (1) The Developer/Applicant should not assume that drainage channels, overland flow paths, drainage outlets, energy dissipaters or stormwater detention/polishing basins will automatically be permitted in public space (newly created Council asset or existing Council asset).
- (2) Prior to the design of any stormwater discharge facility into Council controlled land, the Developer/Applicant should consult with the Council's development engineers to ensure that Stormwater outlets in any public space (existing or newly created Council asset) must be addressed at the development approval (conceptual design) stage.

SC6.3.5.10.1 Tidal Effects

Tidal levels must be in accordance with Council's storm tide model and QUDM.

SC6.3.5.10.2 Pipe Considerations*SC6.3.5.10.2.1 Standard Alignment*

The standard alignment for stormwater drainage lines is given in Council Standard Drawing R1050 – Public Utilities Typical Service Conduit Alignment.

SC6.3.5.10.2.2 Standard Requirements

Pipes used may be either reinforced concrete or fibre reinforced concrete type and have the following properties:

- (a) Minimum pipe sizes:
 - (i) Low flow pipes 300mm diameter (unless inter-allotment drainage);
 - (ii) Other 300mm diameter – refer QUDM - Minimum pipe sizes;
 - (iii) Between manholes - 375mm diameter;
- (b) Minimum desirable grade refer QUDM;
- (c) Minimum Class 3 within roadways,
- (d) Minimum clear cover shall be 600mm to subgrade in all instances, unless approved otherwise by a Council development engineer;
- (e) Box culverts shall be precast reinforce concrete and shall have cast in-situ bases with subsurface drainage outlets at 15-10m intervals.

SC6.3.5.10.2.3 Start HGL and Maximum Flows

- (1) Start HGL will be, the maximum of, 150 mm below the invert of the kerb and channel (when entering an existing pit) otherwise, in accordance with QUDM – Tailwater levels.
- (2) Where a Development Approval promulgates a point of discharge into an existing inlet pit, the capacity of the pipe up to 100 year ARI (1% AEP) must be limited to the development’s proportional area percentage of the inlet capacity of the pit at 5 year ARI (20% AEP) (or value given in **Table SC6.3.6.5.1 (Design storms for major and minor drainage systems)**).

SC6.3.5.10.3 Access Chambers

- (1) Manhole or access chamber spacing shall be in accordance with Section 7.6 of QUDM.
- (2) Where a pre-cast gully pit is provided as an access chamber the chamber shall be constructed to the invert of the pipe.
- (3) Combined access chamber/gully pits shall only be used up to a 600mm RCP.
- (4) Chambers may be pre-cast or cast insitu concrete boxes, or pre-cast FRC or RCPs. Chambers may only be used for inter-allotment drainage below 300 mm diameter. Minimum dimensions of the pits are provided in **Table SC6.3.6.10.3.1 (Inter-allotment chamber pit dimensions)**. For inter-allotment drainage pits, junctions or changes in direction for pipes over 300 mm refer standard drawings for further details.

Table SC6.3.6.10.3.1 Inter-allotment chamber pit dimensions

Minimum Depth to Invert	Boxes – Internal Dimensions (mm)	FRC or RCP Systems
< 900 mm	600*600 ⁽¹⁾	600 mm Diameter
> 900 mm	600*900 ⁽¹⁾	750 mm Diameter

Note—⁽¹⁾ Minimum wall thickness 100 mm all cast insitu boxes

- (5) FRC and RCP systems shall be constructed by embedding the lower precast shaft section into a wet cast-insitu concrete base. Cut outs of pipe penetrations shall be made using concrete saws/drills in such a manner as to minimise damage to the adjacent pipe materials.
- (6) Lids to cast-insitu manholes shall be light duty in allotments, gardens etc., and heavy duty elsewhere. Close fitting cast iron galvanised steel or concrete infill type (Gatic Light Duty, Polycrete Broadstel or similar) of approximately the same internal dimensions as the manhole.
- (7) Lids to FRC and RCP manholes shall be the manufacturers’ proprietary concrete or concrete infill type.
- (8) Infill concrete shall be 25 MPa.
- (9) Lids must match finished surface ground slope and level.

SC6.3.5.10.4 Pipe junctions – instead of access chambers

Branch pipe connections are allowed without an access chamber subject to the following:

- (a) Branch size 150 mm on 450 – 900 mm pipe,
- (b) Branch size 300 mm on 900 – 1500 mm pipe,
- (c) Rocla (or equivalent) saddle slope junction is to be used,
- (d) Intercept angle is to be not less than 45 degrees in the direction of flow and always in direction of flow.

SC6.3.5.10.5 Stormwater inlet pits

- (1) Field inlet pits are to be constructed in accordance with the Standard Drawings all pits must be designed to accommodate a 50 percent blockage factor on the inlet calculations, unless the field inlet has a depression on all four sides as indicated on Council Standard Drawing D1002.
- (2) Council has approved the use of lip in line (with grate) drainage pits unless the pit is located in or near a bus crossing, refer Standard Drawings for further pit details.

SC6.3.5.10.6 Floodways/open channels

- (1) Floodways and open channels should generally be designed in accordance with section 9 of QUDM. Unless specifically approved otherwise Council requires open channels and floodways to be designed in accordance with the following:
 - (2) Concrete low flow invert 1.2 metres wide falling to a type 3 MRD drive over kerb or equivalent (ignore effect on manning n),
 - (3) Side slopes not greater than 1 in 6 unless approved by a Council development engineer,
 - (4) Fall towards invert of 1 in 100 minimum in trapezoidal cross section,
 - (5) Minimum fall of the channel is 0.1 percent, however, isolated seepage/French drains will be required at not less than 250 metre intervals,
 - (6) Landscaping and tree planting to facilitate minimal visual impact of the open drain.
- (7) An open channel with critical or supercritical conditions is not acceptable. The velocity should be limited to less than 90% critical velocity in the major storm event (or Froude less than 0.8). The maximum velocity allowed in an unlined channel is set out in QUDM Section 8.07 for earth and vegetated channels and should not exceed 2 m/s unless approved by the relevant Council development engineer.
- (8) Have velocity*depth not greater than 0.4 m²/s in high risk areas and 0.6 m²/s elsewhere.
- (9) Channel velocity checks should assume that downstream undersized drainage structures, such as culverts, will be upgraded to current design standards at some time in the future. The afflux caused by any roadway crossing over a watercourse should not affect the adjoining properties.

SC6.3.5.10.7 Flow depths (freeboard) and flooded width limitation**SC6.3.5.10.7.1 Urban (including industrial and commercial)**

- (1) The flow depth and width limitations given in QUDM are adopted. However, the lower value of 0.4 m²/s must be adopted for all lateral drainage conditions or where loss of life situation occurs for longitudinal drainage conditions.
- (2) Freeboard given in Figure 7.3.1 for QUDM is also adopted, however, where an existing situation has a freeboard greater than the value given in QUDM the existing freeboard must be maintain, unless specifically approved by the relevant Council development engineer.

SC6.3.5.10.7.2 Emergency evacuation routes

At least one identified emergency exit route must be designed to the following considerations - derived in accordance with SCARM 73 (CSIRO 2000):

- (a) Medium Level Hazard – Adjusted Hazard Estimate for the 100 year ARI (1% AEP) event,
- (b) Low Level Hazard – Adjusted Hazard Estimate for the 50 year ARI (2% AEP) event.

SC6.3.5.10.8 Detention basins

- (1) It should be noted that *ad hoc* detention basins in public land are not a preferred drainage solution and may not be used without the prior approval of Council.
- (2) Detention basins shall be designed in accordance with Section 5 of QUDM and to criteria nominated by Development Approval.
- (3) Other conditions pertaining to the design and construction of detention basins are given as follows:
 - (a) Basins must be visually and physically integrated into the parkland. Landscape plans are to be supplied as part of the operational works approval,
 - (b) All batter slopes less than 1(V):6(H),
 - (c) Provision of concrete invert connecting all inlets to outlets – designed to accommodate the load of Council’s maintenance equipment,
 - (d) Provision of 1.5% crossfall to detention basin floor and 0.7% if pipes or underground storage,
 - (e) Provision of appropriate signage and depth markers,
 - (f) Provision of safety grilles on outlets,
 - (g) All outlet structures shall be designed to allow egress by small children.
- (4) Major detention systems, as determined by Council, on private land (on-site stormwater detention basin) will only be permitted in developments pertaining to material change of use such as Community Titles Scheme, commercial and industrial developments where such basin is covered by an appropriate easement and maintenance plan.
- (5) The detailed design submission must be prepared and certified by an RPEQ suitably qualified in the field of drainage/hydraulic investigations. The following information must be included in the submission:
 - (a) Calculations for each storage – major basins must be undertaken by an approved program using the documented runoff routing method described in this development manual,
 - (b) Where WSUD components are proposed the water depth must be limited to under 500 mm with maximum extended detention depth of not greater than 300 mm,
 - (c) Calculations verifying that the flow paths/floodways, drainage systems and any overflow weirs have sufficient capacity – to cater for the design storm event,
 - (d) Design plans and engineering plans.
- (6) Underground detention facilities are not a preferred drainage solution and may not be used without the prior approval of Council. However, in the event that an underground detention storage system is required, the design should address a number of public health, maintenance and pollution issues. The storage should be self-cleaning, well ventilated, does not cause accumulation of noxious gas, and facilitate easy maintenance and inspection. The design should incorporate the following requirements:
 - (a) The base has a suitable fall to the outlet (minimum grade 0.7%) and is appropriately shaped to prevent permanent ponding;
 - (b) Provision of a minimum 600 mm x 1000 mm maintenance access opening. The lifting weight of the grated lid should not exceed 20 kg;
 - (c) Installation of step irons to storage pits greater than 1.2 m depth;
 - (d) Where the storage is not sufficiently deep (< 1.2 m), access grates should be placed at the extremities of the tank and at intervals not exceeding 3 m. This should allow

any point in the tank to be flushed or reached with a broom or similar implement, without the need to enter the tank;

- (e) The minimum clearance height for accessible tanks is 1.2 m. Tanks less than 0.75 m high must be precast to avoid difficulties with removing formwork;
- (f) To enable visual observation of the entire base of the storage pit, at least 30% of the roof surface area should be grated. Grates should be a minimum of 600 mm wide by 1000 mm long, and arranged in a continuous lengths along the storage pit. Both the access point and the grated areas should be secured to prevent public access.

SC6.3.5.10.9 Scour protection

SC6.3.5.10.9.1 General

All outlets shall be designed to incorporate scour protection or energy dissipaters in accordance with QUDM.

SC6.3.5.10.9.2 Energy dissipaters

Energy dissipation shall be designed in accordance with QUDM section 8.6.

SC6.3.5.10.9.3 Outlet channel

- (1) Deemed to comply criteria for energy dissipation in outlet channels are as follows:
 - (a) Slope between 0.3% and 0.6%,
 - (b) Minimum length of outlet channel 10 metres long,
 - (c) Outlet channel velocity to conform to QUDM,
 - (d) Outlet channel to discharge to a quiescent water body or spread out evenly over flat well grassed ground with a slope no steeper than 3%.
- (2) Detailed hydraulic calculations are required for outlet channel that do not satisfy the above criteria.

SC6.3.5.10.10 Drainage calculation presentation

- (1) Calculations for rational method pipe design are to be presented in accordance with QUDM. Care must be taken to ensure that partial area effects are determined in the programs and that the dynamic values are calculated in accordance with QUDM.
- (2) All calculations are to be accompanied with catchment plans and other manual calculation sufficient to facilitate checking and approval of plans for minor and major storms.
- (3) The design hydraulic grade line is to be shown on the pipe longitudinal sections and where the pipes are flowing part full the grade line shall be adjusted to the upstream obvert of the part full pipe.

SC6.3.5.10.11 Drainage reserves and easements

The minimum widths of drainage reserves and easements are presented in **Table SC6.3.6.10.11.1 (Drainage reserve and easement considerations)**.

Table SC6.3.6.10.11.1 Drainage reserve and easement considerations

Description	Title	Minimum Widths
Inter-allotment drainage	Easement	Min 3.0 metres, where pipe is > 300 mm and shared with sewerage increase to 3.5 metres
Road drainage piped through private property without an overland flow path	Easement	The greater of - 3.0 metres or pipe(s) width plus 1.0 metre either side
Overland flow path – either with or without underground drainage component	Reserve or Easement	The greater of – 4.0 metre or sufficient drain width to contain 100 year ARI (1% AEP) plus freeboard in accordance with Table 9.03.1 of QUDM plus minimum 2.5 metre for linear access roads where requested

SC6.3.5.11 Inter-allotment Drainage

- (1) Inter-allotment drainage must be provided to:
 - (a) Residential/Rural Residential/Village and Township lots where land is developed on the high side and any part of the lot does not drain to the kerb frontage, refer **(Figure SC6.3.2 (Inter-allotment Drainage (stormwater shown as green lines))**.
 - (b) Residential/Rural Residential/Village and Township lots where developed land is the lower land and upper land has been developed prior to lower land, refer **Figure SC6.3.3 (Inter-allotment Drainage - Lower Land Development (note new lots were 2, 4, 6))**.

Figure SC6.3.2 Inter-allotment Drainage (stormwater shown as green lines)

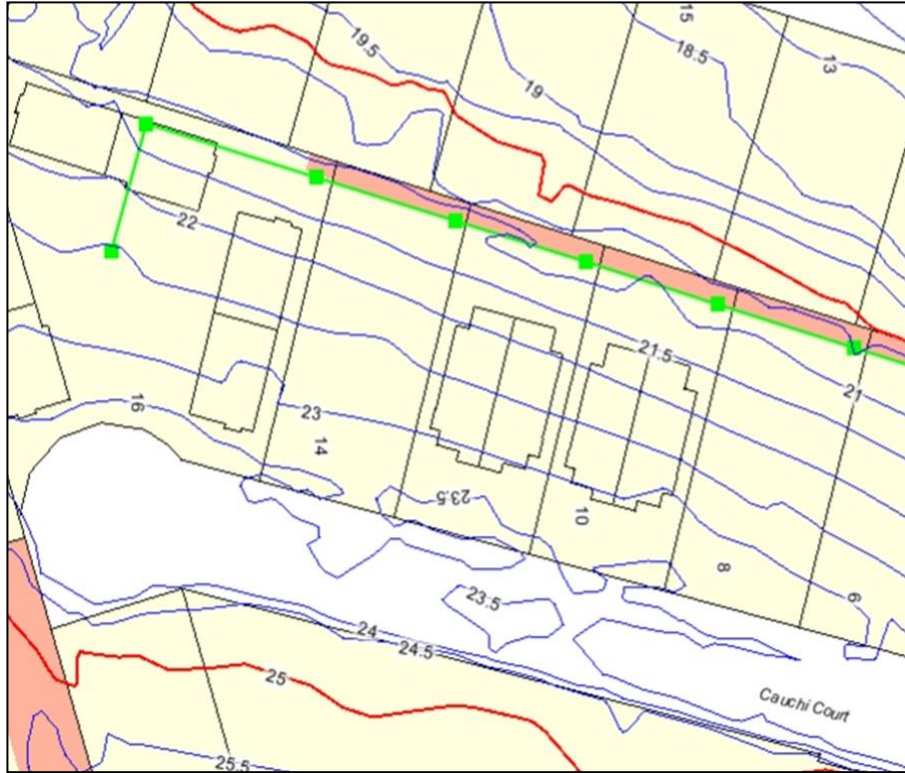
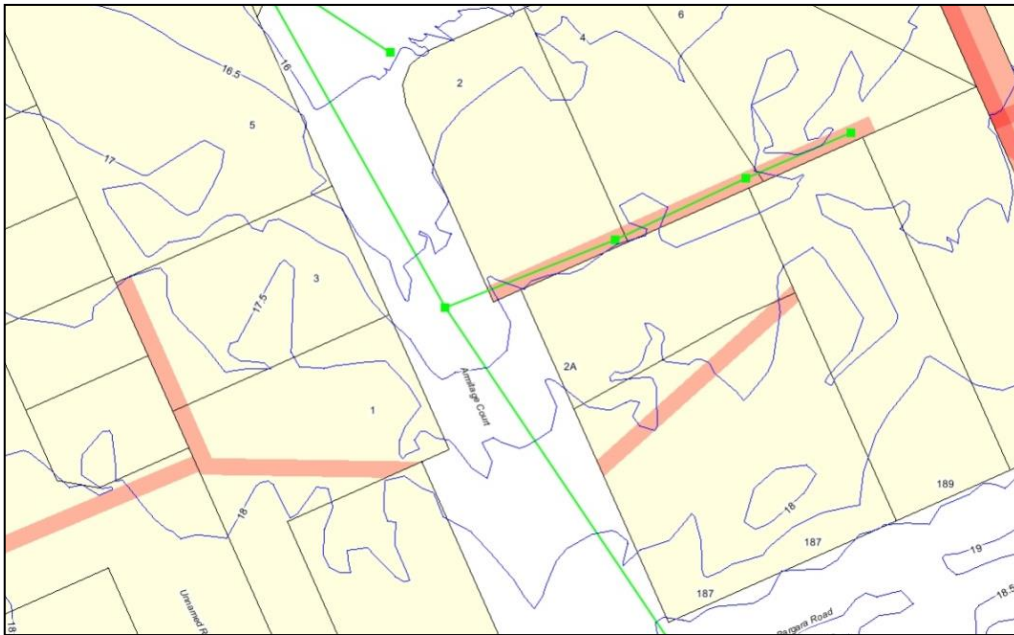


Figure SC6.3.3 Inter-allotment Drainage - Lower Land Development (note new lots were 2, 4, 6)



- (2) Inter-allotment drainage systems must be designed to cater for 100 year ARI (1% AEP) (with Climate Change) flows unless specifically approved otherwise by Council's development engineer.

SC6.3.5.12 Construction

SC6.3.5.12.1 Backfilling and bedding

- (1) Backfilling and bedding will be in accordance with AS 3725. Guidance is also given in Austroads Part 5: Drainage Design.
- (2) Where backfill is 5mm spalls taken to a minimum 150mm above the pipe, every third EB may be replaced with geotextile band.

SC6.3.6 Open space, public parks and land for community facilities

This section defines the technical requirements for design and construction/preparation of the open space, public parks and land for community facilities. This section should be read in conjunction with Section 4.3 of the Planning Scheme which lists the desired standard of service for trunk public parks and land for community facilities. This policy is based on the Bundaberg Regional Council Parks and Open Space Study (Ross Planning, 2012).

SC6.3.6.1 Reference documents

The planning and design of open space, public parks and land for community facilities within the Bundaberg Regional Council local government area must be undertaken in accordance with the current edition of the following key reference documents, unless specifically outlined in this section or other Council references dictate otherwise:

- (a) The following Australian Standard:
- (i) AS4685:2004 (Part 1 to 6) sets out the general and specific requirements for playground equipment;
 - (ii) AS/NZS 4422: 1996 Playground Surfacing – Specifications, Requirements and Test Methods;
 - (iii) AS/NZS 4486.1: 1997 Playgrounds and Playground Equipment - Part 1: Development, Installation, Inspection, Maintenance and Operation;
 - (iv) AS2155: 1982 Playgrounds: Guide to Siting and to Installation and Maintenance of Equipment;

- (v) AS2555: 1982 Supervised Adventure Playgrounds - Guide to Establishment and Administration;
 - (vi) AS 1428: 1992 Design for Access and Mobility;
 - (vii) AS1158.3.1 Prime Public Lighting Code;
 - (viii) AS4282 Control of Obtrusive Effects of Outdoor Lighting;
 - (ix) AS1798 Lighting Poles;
 - (x) AS3000 & 3008 Cabling.
- (b) Crime Prevention through Environmental Design: Guidelines for Queensland, Part A: Essential features of safer places, Queensland Government, 2007.
- (c) Bundaberg Regional Council – Standard Drawings – **Appendix SC6.3A (Standard drawings list)**.

SC6.3.6.2 Hierarchy and classifications

- (1) The open space hierarchy is divided into two main categories:
- (a) Trunk public parks and land for community facilities that caters for higher order recreation, sport and community facilities.
 - (b) Non-trunk open space that caters for lower order recreational uses, cultural uses and nature reserves.
- (2) The classifications are shown in Table SC6.3.7.2.1 (Open space hierarchy).

Table SC6.3.7.2.1 Open space hierarchy

Classification	Sub-type	Description
Trunk		
Recreation Park	Local	These parks provide a limited range of recreation opportunities for local residents. These parks contain basic infrastructure for recreation use, but generally cater for short visits only.
	Neighbourhood	Larger sized recreation parks providing a significant range of facilities and activity spaces for recreation. These parks have facilities to cater for large groups and are appealing to a range of users. They can service several suburbs or a whole town depending on population density and are fairly well known destinations for those people living within their catchment.
	Regional	Major recreation parks that offer a wide variety of opportunities to a broad cross-section of the local government area's population and visitors. These parks are generally large in size, embellished for recreation and/or sport, well-known amongst residents and are major destinations.
Sport Park	Neighbourhood	Neighbourhood sports parks are suitable for local fixtures but may not have the quality of playing surface or amenities of a Regional-level facility. The facilities would be of a significant standard but may not comply with State regulations for the sport.
	Regional	Regional sports facilities could comfortably host regional (or potentially State) competitions. Factors such as quality of playing surface, amenities and canteen availability and lighting standards (where lights are provided) have been considered.
Land for Community Facilities	Neighbourhood and Regional	Land for community buildings such as libraries, public pools and halls.

Classification	Sub-type	Description
Non-trunk		
Linear Park	Local	Local linear parks are most commonly used to link residential areas to neighbourhood scale pedestrian links (either in linear parks or major pedestrian multi-modal routes). The land contains infrastructure to facilitate recreation use, primarily a formed path. Drainage
	Neighbourhood	These linear corridors are embellished to provide pedestrian linkages that connect recreation facilities, other types of open space, residences, community infrastructure and commercial areas or form a circuit. The land contains infrastructure to facilitate recreation use, including a formed path and offers an attractive recreation setting. Drainage
Iconic/Civic Park	Neighbourhood	Local civic parks are either landscaped areas such as town entrance statements or offer some amenity in terms of function such as monument/memorial parks and lookouts. They provide little, to no, recreation opportunities.
	Regional	An iconic landmark property used for general purpose, recreation or civic ceremony, which features high use by the neighbourhood community and its visitors. Assessed on values including iconic representation, recreational appeal, visibility, location and heritage significance. These properties may include a monument and provide unique facilities for civic events, festivals, major community events, families and people of all ages, and are considered significant landmarks in their own right.
Nature Park	Neighbourhood	These properties are planned and managed to protect environmental values, but may also include basic facilities that enable passive use, including seating, pathway or cycleway.
	Regional	A property primarily used for an ecological or conservation purpose, usually being the protection of an area of significant environmental value, protecting and enhancing biodiversity by providing habitat for flora and fauna, including wildlife movement corridors and riparian zones.

SC6.3.6.3 Trunk open space infrastructure desired standards of service

Desired Standards of Service (DSS) is the level of open space that Council strives to provide as a minimum to all residents across the local government area. DSS can be categorised under four broad measures and are explained in more detail in the LGIP tables listed below:

- (a) Rate of land provision for public park and land for community facilities (see LGIP Table 4.4.5.2);
- (b) Accessibility standard (see LGIP Table 4.4.5.3);
- (c) Land characteristics (see LGIP Table 4.4.5.4);
- (d) Standard facilities/embellishments for parks (see LGIP Table 4.4.5.5).

SC6.3.6.4 Waterways and foreshore land

- (1) The Developer must provide land for open space purposes along all waterways, wetlands, natural drainage lines and foreshores to protect environmental processes and natural drainage systems and facilitate public access.
- (2) Any Reconfiguration of Lot within the Central Coastal Urban Growth Area (as shown in Figure 7.2.1 (Central Coastal Urban Growth Area Structure Plan Concept)) must dedicate open space along the foreshore to provide a continuous linear park from the Burnett

Heads to Elliott Heads. This important recreational corridor will provide any missing links in the coastal Principal Pathway as shown in the LGIP mapping (i.e., LGIP-TNP-14, LGIP-TNP-17, LGIP-TNP-21 and LGIP-TNP-26). In addition, Council requires a road between this open space and development.

SC6.3.6.5 General treatment and preparation of site

The following treatment and preparation of the site is required by Council:

- (a) All existing structures and associated fixtures are removed from the site;
- (b) Wells are filled and sealed;
- (c) Bores are registered and upgraded and maintained for future use;
- (d) Clearing of part or entire site as directed by Council's representative. No clearing of vegetation is to be carried out before a Council representative has inspected the site and approved such works.
- (e) Levelled as directed by Council to provide a final landform suitable for ease of maintenance and practical use by the public. Earthworks may be required to:
- (f) Re-profiling of existing dam/s, filling of minor depressions or, as a batter to approved roadworks:
- (g) Provide a 1 in 80 cross-fall on playing areas/ovals, 1 in 6 maximum batter slopes, catch drains and scour protection.
- (h) Sufficient topsoil is provided in order to support the growth of flora that is compatible with the proposed use of the site;
- (i) Turf grass used within the parkland areas is cut from a weed free environment and is to have no viable weed seed within the turf grass.
- (j) Installation of an extruded concrete hard edge to all planted/revegetated areas which adjoin turfed/grass seeded areas;
- (k) All declared and noxious weeds and trees are removed from the site as directed by Council's representative.

SC6.3.6.6 Bollards

- (1) Bollards are to be provided along road frontages to open space to limit vehicular access. Bollards may also be required in association with infrastructure such as playground equipment as directed by a Council representative.
- (2) Bollards are to be constructed as per Council's standard drawing R1061 (see **Appendix SC6.3A (Standard drawings list)**). Where bollards are not incorporated within a footpath, an edge restraint is to be used between the posts (see ER2 on standard drawing R1020). The maximum spacing between bollards is as follows:
 - (a) 1.5m when used to limit vehicular access,
 - (b) 3m for all other areas (must be approved by Council's development engineer).

SC6.3.7 Landscaping

SC6.3.7.1 General requirements

- (1) Landscaping should be designed to be environmentally responsive and enhance the appearance of the development by:
 - (a) Being of an appropriate scale relative both to street reserve width and to the size and nature of the development;
 - (b) Incorporating significant existing vegetation, where possible being sensitive to site attributes such as streetscape character and natural landform;
 - (c) Maintaining existing vegetation (where possible);

- (d) Taking into consideration views, micro-climatic conditions and drainage;
 - (e) Maximising areas suitable for on site infiltration of stormwater;
 - (f) Allowing adequate lighting and pedestrian and vehicular safety;
 - (g) Effectively screening storage and service areas, such as garbage collection areas, from views outside the site, and provided with a suitable irrigation system fitted with an approved backflow prevention device.
- (2) In addition, where possible landscaping for residential development should:
- (a) Improve privacy and minimise overlooking between dwelling and/or rooming units,
 - (b) Provide an adequate screen to incompatible development on adjoining land,
 - (c) Integrate and form linkages with parks, reserves and transport corridors.

SC6.3.7.2 Landscape Plans

- (1) The local government's standards are—
- (a) for applications seeking a preliminary approval for a material change of use or reconfiguring a lot—a *Landscape Concept Plan* is to be submitted;
 - (b) for applications seeking a development permit for reconfiguring a lot resulting in an increase in the number of lots—a *Limited Landscape Plan* is to be submitted; and
 - (c) for applications seeking a development permit for a material change of use—a *Full Landscape Plan* is to be submitted.
- (2) The local government may require the information to assess the application or in approving the application, subject the approval to a condition requiring that landscaping be carried out in accordance with satisfactory landscaping plans.

Table SC6.3.8.2.1 Landscape plan standards

Specific Information Required	Type of landscape plan		
	Concept	Limited	Full
Landscape areas defined	✓	✓	✓
Existing vegetation identified		✓	✓
Growth form and purpose of vegetation identified	✓	✓	✓
Surface treatments, fencing and other hardscape elements identified		✓	✓
Locations and species to be planted – plotted to scale		✓	✓
Additional details as shown in Section SC6.3.7.3			✓

SC6.3.7.3 Additional information for full landscape plans

- (1) General information:
- (a) date;
 - (b) scale (1:100 is preferred);
 - (c) north point;
 - (d) project description and location;
 - (e) client's name, address and contact number;
 - (f) designer's name, address and contact number.
 - (g) General site and design information:
 - (h) extent of landscape areas;
 - (i) existing and proposed building and landscaped areas (where applicable);
 - (j) property boundaries, adjacent allotments, roads and street names;

- (k) location of drainage, sewerage and other underground services and overhead power lines;
 - (l) location and name of all existing trees, clearly nominating those trees which are to be removed;
 - (m) soil type (e.g., sand, clay, loam) and condition (e.g., well drained, low lying);
 - (n) locality plan, showing site boundaries in relation to adjacent properties and streets;
 - (o) vehicle movement areas, bin storage areas, vehicle and bin washdown areas, and service and utility areas.
- (2) Landscape area calculation:
- (a) calculation of the area of landscaping (measured in square metres) proposed as a means of complying with any applicable code;
 - (b) calculation of the area of landscaping (measured in square metres) disaggregated into component parts, including:
 - (i) garden beds;
 - (ii) turfed or grassed areas;
 - (iii) paved pedestrian areas;
 - (iv) nature conservation areas;
 - (v) effluent land application areas; and,
 - (vi) water areas.
 - (c) calculation of the square metre area of landscaping actually provided broken down into turfed and planted areas.
- (3) Detail design information:
- (a) surface treatment e.g. paving, mulch, turf, roadway;
 - (b) edge treatments, particularly garden edges;
 - (c) plant schedule including botanical name, quantity and staking;
 - (d) location and species of proposed plants;
 - (e) planting bed preparation;
 - (f) subgrade treatment of planting beds in areas of compaction, particularly involving vehicle parking areas.
 - (g) details and soil depths of planter boxes and podiums;
 - (h) mounding, contouring, levelling or shaping of the surface levels, particularly around areas of changes of levels;
 - (i) surface and subsurface drainage and collection points;
 - (j) method of erosion control on slopes steeper than 1:4;
 - (k) position of external elements, e.g. seats, bollards, bins, lights, walls and fences;
 - (l) fence height, material and finish;
 - (m) irrigation systems;
 - (n) paving type if area includes public footpaths;
 - (o) the arrangements proposed to be made for the future maintenance of the landscaping.

SC6.3.7.4 Acceptable plant species

The list of approved:

- (a) Street trees are shown in **Appendix SC6.3C (Approved street trees)**.
- (b) Coastal trees are shown in **Appendix SC6.3D (Approved coastal trees)**.

- (c) Open forest and woodland species are shown in **Appendix SC6.3E (Approved open forests and woodland species)**.
- (d) Shrubs and vines forest species are shown in **Appendix SC6.3F (Approved shrubs and vine forests species)**.
- (e) Species for banks of saltwater watercourses are shown in **Appendix SC6.3G (Approved species for banks of saltwater watercourses)**.
- (f) Species for banks of freshwater watercourses are shown in **Appendix SC6.3H (Approved species for banks of freshwater watercourses)**.
- (g) Small tree and tall shrub species are shown in **Appendix SC6.3I (Approved small trees and tall shrubs species)**.

SC6.3.7.5 Unacceptable plant species

The unacceptable plant species are shown in **Appendix SC6.3J (Unacceptable plant species)**.

SC6.3.7.6 Composts and mulches

The use of composts and mulches must comply with the following standards to ensure weeds and weed seed are not spread:

- (a) Australian Standard AS 4454 (2012). Composts, Soil Conditioners and Mulches.
- (b) Australian Standard AS 4419 (2003). Soils for Landscaping and Garden Use.

SC6.3.7.7 Landscaping within road or drainage reserves

Landscaping works that are not triggered in accordance with the Landscaping Code but are associated with road construction; including acoustic fences, or associated with drainage reserves must be prepared by a registered landscape architect and be approved as part of the Operational Works process.

SC6.3.7.7.1 Planting areas and street trees

SC6.3.7.7.1.1 Planting areas

- (1) Planting areas (or garden beds) on the verge/footpath will only be approved at feature locations or where the design of the site lends itself to a planting area or landscaped area. High maintenance plants will not be accepted. The planting area will usually consist of a tree, shrub and ground cover layer and must not impede important sight lines and be designed with CPTED (Crime Prevention Through Environmental Design) guidelines in mind.
- (2) Planting areas within the verge must usually not exceed 1.0 metre in width. All planting areas are to be contained within an approved garden edge.

SC6.3.7.7.1.2 Plant characteristics

Form, texture and colour of plants play an essential role in creating character and a unified landscape theme. Plant selection is to take into account location and site specific environmental conditions, such as soil type. The selection of plants should also reflect the purpose/function required, e.g., to screen an undesirable feature such as a pump station. The inclusion of indigenous species as the core element is promoted with remainder of planting made up of appropriate native species with inclusion of some non invasive exotic species for colour and interest considered.

SC6.3.7.7.1.3 Maintenance aspects

Maintenance aspects which would need to be considered within the design process would generally include:

- (a) The provision of long life plants;

- (b) Species chosen must be appropriate for the location and planting area provided. Adequate space must be provided to allow for root growth within the space, and not into adjacent surfaces /structures;
- (c) Minimum water and pruning;
- (d) No interference with existing services (above or below ground), signage, street lighting, footpaths, kerb and channel, structures, road pavement surfaces etc;
- (e) Sub-surface drainage from medians and traffic islands are to discharge into a sealed pipe system.

SC6.3.7.7.1.4 *Street trees general*

Proposed street trees should be in keeping with the following:

- (a) Significant existing trees are to be identified and incorporated within parkland and road reserve where possible. Prior to Council accepting these trees as an asset at Off Maintenance, the developer will be required to provide an Arborist report (at no cost to Council) outlining the current condition and long term viability of the trees.
- (b) The use of same species where possible creating avenue planting. Incorporation of individual feature trees at focal points like roundabouts, medians and main collector roads etc. Designing in this way can assist in way finding within a development.
- (c) Species chosen should reflect the local character of the area and where possible, use existing species which are appropriate for the available space allowing for future growth including root development and canopy spread.
- (d) Planting techniques should incorporate containment of root growth where necessary. Setback from kerb should be sufficient to enable safe access and egress for parked vehicles and not impede visibility at driveway crossovers and pedestrian crossings etc. Consideration must also be given to service location, street lights and traffic signage when planning the positioning of trees.

SC6.3.7.7.1.5 *Street tree locations*

- (1) Planting is to be avoided in the following situations:
 - (a) Where the footpath is less than 3 ~~meters-metres~~ wide. Where an existing street footpath containing trees and shrubs contradicts this, than discretion maybe exercised to vary this provision in accordance with the other elements of this policy.
 - (b) Where kerb and channel has not yet been constructed, except with the written permission of the Council. The situation where this provision will be varied would be where the Council has an approved street design, or has determined a standard location of services/kerb and channelling for streets of a certain theme.
 - (c) Within 3 ~~meters-metres~~ of and invert crossing, driveway, electricity pole, fire hydrants, water valves and inspection boxes.
 - (d) Within 7.5 ~~meters-metres~~ of a street light.
 - (e) Within 1 ~~meter-metre~~ to the back of kerb or any service to minimise conflict with such utilities with an absolute minimum of 600 mm.
 - (f) Within 7.5 ~~meters-metres~~ of the property line for driveway access for the property.
 - (g) Within 20 ~~meters-metres~~ of the property line for an access street intersection.
 - (h) Within 40 ~~meters-metres~~ of the property line for a collector street intersection.
 - (i) Within 55 ~~meters-metres~~ of the property line for a trunk collection street intersection.
 - (j) Within the sight triangle as defined by the aforementioned distance/footpath width. Trees and shrubs may be planted outside the sight triangle if no conflict with access drives or services is generated.
 - (k) Under any overhead powerlines **unless** trees are of an approved type.
- (2) Trees should be planted at a least 1 tree per allotment or on average 1 tree every 20 ~~metersmetres~~, whichever is lesser.

SC6.3.7.7.1.6 *Street tree characteristics*

- (1) This section outlines the preferred characteristics of the proposed street trees that are to be considered when selecting species for utilisation within the road reserve. The species are to be approved by Council and are to be in keeping with the following points:
 - (a) Minimum stock size - *General* - is to be minimum 45 litre bag.
 - (b) Minimum stock size - *High Profile Location* - is to be minimum 100 litre bag.
 - (c) Tree is to demonstrate a strong single leader with no bifurcation of the trunk.
 - (d) Tree is to show good trunk taper and calliper and be self supporting without the assistance of stakes (stakes being required for the establishment period).
 - (e) Tree is to have a minimum clear trunk of 1.2 ~~meters~~ metres as to maintain sightlines.
 - (f) Trees are **not** to be pot bound. Pot bound specimens are to be rejected.
 - (g) Any pruning has been carried out in accordance with AS 4373 – *Pruning of Amenity Trees*.
 - (h) Trees are to be true to form, disease and pest free and in vigorous healthy condition.
- (2) Tree is to be planted in accordance with best practice. Street tree species are selected in accordance with approved list shown in **Appendix SC6.3C (Approved street trees)**. An approved Root Barrier treatment to be installed where required by Council.
- (3) Note it is expected that only one type of tree would be used per street treatment zone and any other tree must be specifically approved by the relevant Council development engineer.
- (4) The 'Land Management Manuals' published by the Department of Environment and Resource Management must be referenced by Consultants to assist in plant species selection, planning strategies, design and site management decisions with regard to local environment and soil types.

SC6.3.7.7.1.7 *Removal and reinstatement*

- (1) The Council may approve requests from property owners for removal of trees and shrubs within the road reserve within the following guidelines:
 - (a) The request shall be made by the owner of the property having frontage to the footpath. Where the request is made by any other person, it shall be accompanied by the written consent of the property owner in which the tree fronts.
 - (b) The request shall clearly state the reasons for the removal. Matters to which Council shall give due consideration include:
 - (i) The species of tree or shrub;
 - (ii) Damage to the applicant's land and improvements;
 - (iii) Death or disease of tree or shrub;
 - (iv) Danger to person's using the road reserve;
 - (v) Interference with visibility of traffic.
 - (c) Where, in the opinion of the Council, the complaint could be alleviated by other means, the removal of tree or shrub shall not be approved until such remedies have been applied.
 - (d) Where practical, a tree or shrub which is removed shall be replaced, by the applicant/owner, with an advanced tree or shrub of an approved species.
- (2) All trees and shrubs within the road reserve, whom so ever planted, are considered the property of Council. Any interference with such trees and shrubs other than in strict compliance with the provisions of the policy shall be regarded as an offence for which a person may be prosecuted.

SC6.3.7.7.2 Traffic islands

- (1) Landscaping of medians, traffic control devices etc. is to be carried out in accordance with the Main Roads Landscape Manual. Any proposals are to be documented in a landscape plan and submitted for approval. Medians and islands that will be planted must be designed to accommodate landscape works by providing:
 - (a) Adequate site preparation and soil depths,
 - (b) Root Barriers where needed,
 - (c) Conduit for future tap connection,
 - (d) Sub-soil drainage discharging to an enclosed pipe system.
- (2) Plant selection should take into account:
 - (a) Sight paths at intersections and speed control devices,
 - (b) Tree form, shape and location within the road reserve must not encroach into the space required for a vehicle to pass through a traffic control device.

SC6.3.7.7.3 Planting of batters

SC6.3.7.7.3.1 Batters less than 1H in 6W

These batters can easily be mown and therefore maybe approved as being grassed. Each project will be assessed on a project by project basis with site location, accessibility, purpose and surrounding character being taken into account regarding the acceptability of grass as opposed to planting.

SC6.3.7.7.3.2 Batters Greater than 1H in 6W

These batters are not easily mown and therefore easily maintained landscape is required. Site location, accessibility, purpose and surrounding character will be taken into account when selecting plant species. Generally, these batters are densely planted and mulched with a suitable edge treatment installed. Very steep batters are to be constructed using a combination of retaining walls and gently sloped planting areas. Surface drainage should be managed by redirecting away from steep batters as to reduce erosion and batter destabilisation. Where there is a possibility of erosion, alternative mulching treatments are to be considered such as hydromulching or biodegradable matting product such as *Jutemat*.

SC6.3.7.7.4 Irrigation systems within road reserve

Irrigation systems proposed for installation within the road reserve are not to be installed on a permanent basis. If proposed, an irrigation plan accompanying the landscape plans is to be submitted to Council for approval.

SC6.3.7.7.5 Entrance features and fencing

- (1) Marketing features to the entry of a developments such as waterfalls, fountains, flagpoles, ornate entrance walls/structures, landscaping and the like are to be contained within the private property boundary and are not to protrude onto any footpath, road reserve etc.
- (2) Proposed fencing/acoustic fencing to the street frontage of a development is to be constructed within the private property boundary. The fencing is to have a maximum lineal run of no more than 20 ~~meters~~ metres without articulation. These articulations are to be setback a minimum of 1.5 ~~meters~~ metres into the block to provide an adequate planting area for soft landscaping to improve the aesthetics of the development frontage.

SC6.3.8 Electrical and Lighting

SC6.3.8.1 General

- (1) Electrical Reticulation and Street Lighting shall be designed and installed to the requirements of the Electrical Safety Act 2002, Regulations and associated Australian Standards. All work shall be designed, constructed, supervised and certified by competent electrical engineers qualified to undertake such work. All lighting must be the

most energy efficient lighting available in the National Electricity Market Load Tables for Unmetered Connection Points (AEMO 2015). LED lights are Council's preferred technology, other types of lightings must be approved by Council's Development Engineers.

SC6.3.8.2 Urban and Rural Residential reticulation

- (1) Underground electrical reticulation to each and every lot shall be provided in all new residential, commercial and industrial developments unless otherwise agreed to by Council.
- (2) Where minor subdivisional development occurs within an area which has existing overhead reticulation, Council may approve overhead connection subject to Ergon approval.
- (3) Conduit location and alignments shall be in accordance with the following requirements:
 - (a) Shared trenching with telephone reticulation at road crossings and on footpaths is permissible;
 - (b) No sharing of trenches is to occur with water reticulation;
 - (c) Crossing of existing roads are generally to be bored;
 - (d) Council's senior development engineer may approve open trenching to roads below collector standard dependent on the condition of the existing pavement and surfacing or where subsoil conditions or site specific constraints prohibit the use of boring equipment;
 - (e) Road crossings are to be at right angles to the road centre line;
 - (f) Electrical crossings are generally to be to the opposite boundary to water service crossings; and
 - (g) Electrical crossings are not permitted within the area defined as an intersection under the *Traffic Regulations 1962*, unless on standard 0.3 metre to 0.9 metre alignment of protected intersecting property line.
- (4) Electrical pillar locations shall be in accordance with the following requirements:
 - (a) Pillars shall be located at side boundaries wherever possible;
 - (b) Pillars shall be located on alternative boundaries to water hydrants;
 - (c) No pillars shall be located on truncated boundaries at intersections; and
 - (d) Placement of pillars on tangent points may be accepted if necessary.
- (5) Pad mount transformers shall be located within the road reserve fronting proposed or existing parkland or drainage reserves unless otherwise approved by Council.
- (6) A Certificate of Electricity Supply from Ergon Energy is to be submitted to Council prior to approval of a plan of subdivision. A property note may be entered in Council's system to alert the property owner or prospective purchasers that the property may not be serviced by electricity until a Certificate of Acceptance for the development has been issued by Ergon Energy and it is energised.

SC6.3.8.3 Rural reticulation

- (1) Electrical reticulation will generally not be required for sustainable rural lots, or lots created from a rural boundary realignment. Where electricity is not provided at the time of subdivision, a property note may be entered in Council's system to alert the property owner or prospective purchasers that –

At the time of its creation, Council did not require this lot to be connected to the reticulated electricity network. The owner and potential purchasers should investigate whether the lot has since been connected to the network or if alternative power arrangements have been made. Connecting to the reticulated electricity network provided by Ergon Energy or another provider is only one way of providing electricity to this lot.

- (2) Electrical reticulation will be required for new lots that are not deemed sustainable for rural production, and which are not created from a rural boundary realignment, unless otherwise agreed to by Council.
- (3) Council will generally accept overhead supply to rural allotments, however the developer shall install underground supply where required by Ergon Energy.
- (4) Where electrical reticulation is required, a Certificate of Electricity Supply from Ergon Energy is to be submitted to Council prior to approval of a plan of subdivision. A property note may be entered in Council's system to alert the property owner or prospective purchasers that the property may not be serviced by electricity until a Certificate of Acceptance for the development has been issued by Ergon Energy and it is energised.
- (5) For the purposes of this Policy, any lot that does not comply with the 100 hectare minimum area shall be considered unsustainable for rural production purposes, unless otherwise accepted as being sustainable for rural production through Council's assessment of the reconfiguring a lot application. To remove any doubt, any rural lot likely to be used primarily as a rural home site, is not considered sustainable for rural production.

SC6.3.8.4 Street lighting design requirements

SC6.3.8.4.1 General

All works are to be designed to the requirements of the following Ergon Energy standards and approval:

- (a) Australian Standard Code of Practice AS1158.2005,
- (b) Queensland Department of Main Roads requirements and approvals for State Controlled roads,
- (c) Bundaberg Regional Council requirements.

SC6.3.8.4.2 Street lighting requirements

Table SC6.3.9.4.2.1 (Lighting standards for various road classifications) references street lighting requirements against road classifications.

Table SC6.3.9.4.2.1 Lighting standards for various road classifications

Zones/Uses	Road Type	Street Lighting Standard
<i>Residential</i>	Access Place	P4
	Access Street	P4
	Collector (Neighbourhood)	P4
	Trunk Collector (Suburban)	V4
<i>Commercial</i>	All	P2
<i>Industry</i>	All	P4

SC6.3.8.4.3 Street lighting in rural/ village/ township residential areas

Street lighting requirements for rural residential developments will be assessed on a case by case basis, but will generally be designed with 'flag' lighting at intersections and at other locations determined on safety issues. The standard for a Village/Township collector will be nominated with the development approval.

SC6.3.8.4.4 Pedestrian and bikeway pathway lighting

- (1) Lighting of pedestrian and bikeway pathways between streets is to be achieved by arranging for a street light to coincide with the walkway entrance, such that the light is visible from every point within the walkway.
- (2) Lighting of pedestrian and bikeway pathways will be assessed on a case by case basis and will generally be in accordance with the relevant Australian Standards.

SC6.3.8.4.5 Open space lighting

Lighting of open space and park areas will be undertaken on a case by case basis.

SC6.3.8.4.6 Pedestrian crossings and refuge lighting

Pedestrian crossings and refuges shall be lit to the requirements of AS1158.4 *"Supplementary Lighting at Pedestrian Crossings"*.

SC6.3.8.4.7 Intersection and roundabout lighting

Intersections and roundabouts shall be lit to the requirements of AS1158.1 *"Vehicular Traffic Lighting"*.

SC6.3.8.4.8 Alignment of street lighting

- (1) Where underground power is provided, the light pole location is to generally be 600 mm behind the back of kerb.
- (2) Street light poles are to be located at side boundaries wherever possible.
- (3) Street light poles shall not be located adjacent to water crossings.
- (4) Offset of one (1) metre from physically located conduits is acceptable provided access to properties is not affected.

SC6.3.8.4.9 Lighting materials

All lighting poles and fittings shall comply with the following Australian Standards:

- (a) AS1158 - "The lighting of urban roads and other public thoroughfares";
- (b) AS1798 - "Lighting poles and bracket arms - preferred dimensions";
- (c) AS3771 - "Road lighting luminaries with integral control gear";
- (d) AS4065 - "Concrete poles for overhead lines and street lighting".

SC6.3.8.4.10 Turtle friendly lighting

Within an identified Sea Turtle Sensitive Area (as shown on the Coastal protection overlay map), all street lighting, park lighting and outdoor lighting shall be the most energy efficient, dark sky compliant, and amber lighting available in the National Electricity Market Load Tables for Unmetered Connection Points (AEMO 2015). Dark sky compliant lighting prevents light from escaping upward, where necessary lights may be shrouded to direct light down and away from the beach (e.g., aeroscreen light fittings).

SC6.3.8.4.11 Process

At the time of seating of the Plan of Survey, Council will accept that satisfactory arrangements have been made for the supply of electricity if a letter from Ergon Energy verifying such arrangements, is provided.

SC6.3.8.4.12 Controls

Electrical reticulation and street lighting shall be assessed during the Operational Works stage of a development.

SC6.3.9 Environmental requirements

SC6.3.9.1 Dust

Dust control measures must include minimising exposure of site areas, staging of earthworks and setting wind speed limits for site operation. Where works are considered to be operating in high winds or causing a sufficient dust nuisance, Council shall require development works to cease until conditions are favourable.

SC6.3.9.2 External surfaces

A Developer must ensure that during construction the external pavement surfaces are swept or washed regularly and maintained in good condition.

SC6.3.9.3 Erosion and sediment control

Erosion and sediment control must be designed in accordance with the recommendations contained within the Environment Protection Agency's (EPA) – *Guideline – EPA Best Practice Urban Stormwater Management – Erosion and Sediment Control* and International Erosion Control Association's (IECA) – *Best Practice Erosion & Sediment Control* and 'Queensland Urban Drainage Manual' (QUDM).

SC6.3.9.4 Protection of vegetation

- (1) The identification and protection of trees on or in close proximity to a development site must be in accordance with AS4970 – Protection of trees on development sites. Trees requiring pruning are to be pruned in accordance with AS4373 - Pruning of amenity trees and must be agreed with Council's development engineer prior to commencement of works. No earthworks must be undertaken within the Tree Protection zone of protected vegetation or vegetation to be retained.
- (2) The development site must be cleared of all weeds listed in the following documents or as otherwise specified in a weed management plan for the site:
 - (a) Land Protection (Pest and Stock Route Management) Regulation 2003;
 - (b) Council's Pest Management Plan;
 - (c) Invasive Naturalised Plants in Southeast Queensland, alphabetical by genus (Queensland Herbarium, 2002).
- (3) The developer is to prevent the establishment of potential weeds as well as the spread of weeds and other pests through the movement of soil, weed seeds and contaminants through machinery, vehicular, building materials and other vectors.

SC6.3.10 Earthworks

SC6.3.10.1 General

General earthworks must be as follows:

- (a) The minimum fall on residential or rural residential must be 1 in 200 to the street or other approved stormwater lawful point of discharge;
- (b) The minimum fall on commercial or industrial allotments must be 1 in 400 to the street or other approved stormwater lawful point of discharge;
- (c) A testing regime must be submitted for approval with the operational works approval.

SC6.3.10.2 Batter treatment

Batter treatments must comply with the following:

- (a) Cut and fill batters must not exceed 1 in 6 in urban drains on overflow drainage paths (except rural road table drains where 1 in 4 is acceptable) which in all areas unless specifically approved otherwise;
- (b) The toe of any fill batter and the top of any cut batter must be a minimum 300mm clear of the boundary line of an adjoining property.
- (c) In certain circumstances it may be advantageous to construct cut or fill batters on adjoining property. In these situations, permission from adjoining property owner/s and Council's development engineer will be required.
- (d) Batter treatments are preferred to retaining walls in parkland and other public owned lands (see **Section SC6.3.10.3 (Retaining walls and structures)**).

SC6.3.10.3 Retaining walls and structures

Retaining walls must be designed in accordance with the following:

- (a) In residential areas, retaining walls and structures over 1.5 metres in height are to be stepped 1.0 metre (horizontally) for each 1.5 metres in height to a maximum height of 3.0 metres and landscaped appropriately, unless approved specifically otherwise;
- (b) Retaining walls over 1.5 metres require approval by Council in the Development Approval;
- (c) All retaining walls and structures abutting existing or proposed road reserves, parkland or other public owned lands must be contained within the proposed allotments, unless approved specifically otherwise;
- (d) Design drawings for retaining walls and structures higher than 0.9 metres or subject to surcharge loadings must be certified by a RPEQ for compliance with AS4678- Earth-retaining structures.

SC6.3.10.4 Suitable material for embankments and earthworks (allotment fill)

Material suitable for earthworks and embankments will be as follows:

- (a) In *Roads (Embankment and leads)* – refer to Austroads Part 4I: Earthworks Materials
- (b) *Allotment Earthworks* – refer to AS3798 with further qualifications:
 - (i) No rock within 600 mm of finished surface – with rock defined as stone with a dimension greater than 2/3 the layer thickness;
 - (ii) In top 600 mm of fill - not greater than 20 percent retained on 37.5 mm sieve;
 - (iii) Any fill that is defined as Moderately Expansive in Table 3.2 of Austroads 4I: Embankment Materials (2009, p.10) is deemed to be unsuitable, unless specifically approved for use by the relevant Council development engineer.

SC6.3.11 Telecommunications

- (1) The Developer is required to enter into an agreement with a telecommunications infrastructure provider for the provision of telecommunications infrastructure to the development as per the Telecommunications Act 1997. More information about the Developer's responsibilities under the Telecommunications Act 1997 is available at <https://www.communications.gov.au/policy/policy-listing/telecommunications-new-developments>.
- (2) Telecommunications conduits (fibre-ready pit and pipe) will be required for all new developments unless the development is exempt from the requirement to install fibre-ready pit and pipe under Part 20A of the Telecommunications Act 1997. The Developer will be required to provide evidence to Council that the development complies with any relevant exemption criteria. Information about the exemption process is available at <https://www.communications.gov.au/policy/policy-listing/exemption-pit-and-pipe-requirements>.
- (3) The provision of connectivity and all other works (including operational works approvals) shall be entirely at the Developer's expense unless otherwise arranged under contract with the telecommunications infrastructure provider.

SC6.3.12 Gas supply

The Developer is encouraged to enter into an agreement with a gas distribution authority for the provision of a gas supply network within the development (e.g., especially commercial and industrial developments within existing gas supply service areas).

SC6.3.13 Operational works, construction, inspection, maintenance and bonding procedures

This section outlines the responsibilities, requirements and obligations on Developers and their consultants when undertaking operational works within the Bundaberg Regional Council local government area. The intent is to streamline the process of finalising a project to the 'on maintenance' and 'off maintenance' stages.

SC6.3.13.1 General

- (1) The working hours for construction activities are only permitted between 7:00am and 5:00pm, Monday to Friday, unless otherwise approved by Council's development engineers.
- (2) The location of all existing infrastructure services must be identified before operational works commence.
- (3) Consultation with Council 's development engineers is encouraged, especially in areas involving design variations and certification this will assist in the early identification and resolution of matters and issues that may cause delays where a compliance assessment process is required (ROL - obtaining signed survey plans).
- (4) Road closures must be undertaken in accordance with Bundaberg Regional Council's road closure policy.
- (5) Asignit software must be used if works require the erection of traffic control signs on the road reserve. Asignit software is used to manage the documentation and reporting of roadworks, road closures (including signage placement), floods and other traffic events on Council's road network. It will also provide reporting to Council when internal staff, suppliers and contractors are working on Council's road network. Council provides Asignit software and training free of charge. Please contact Asignit directly at admin@asignit.com or through their website www.asignit.com for the software to be delivered to your business. Prior to commencing work in the road reserve, Traffic Management Control Plans must be uploaded to the Asignit system and confirmation sent to development@bundaberg.qld.gov.au.
- (6) Public Liability Insurance must be maintained at the greater of the value given in the contract or \$20 Million

SC6.3.13.2 Works supervision and responsibilities

- (1) The Developer must engage the services of suitably qualified professionals to ensure all development work is designed and constructed to;
 - (a) the engineering standards set out in this Planning Scheme Policy;
 - (b) all relevant Australian Standards and Building Codes;
 - (c) approved drawings and nominated standard drawings; and
 - (d) the requirements outlined within all relevant technical specifications.
- (2) The Developer must appoint a Developer's Superintendent to be the single point of contact for Council during the operational works. Typically, the Developer's Superintendent will be the civil Supervising Engineer or main civil contractor (i.e., Principal Contractor). The Developer's Superintendent has the following responsibilities:
 - (a) Overall management, control and operation of the construction site;
 - (b) Coordinating the development of the Construction Management Plan (see SC6.3.13.3);
 - (c) Ensuring compliance with the Construction Management Plan;
 - (d) Coordinating the supervision, construction and certification of all engineering, building, landscaping and minor works;
 - (e) Coordinating Council inspections and testing;

- (f) Coordinating resolution for non-conforming works;
 - (g) Implementing complaint management procedures;
 - (h) Coordinating meetings and record keeping (i.e., minuting meetings);
 - (i) Coordinating all reporting and submission of all as-constructed information.
- (3) Where operational works requires engineering certification, the following responsibilities apply:
- (a) The Developer must appoint a Supervising Engineer, who is a Registered Professional Engineer of Queensland (RPEQ), for each area of engineering requiring certification. For example, a development requiring both electrical and civil works will require a Civil Supervising Engineer (RPEQ Civil) and an Electrical Supervising Engineer (RPEQ Electrical) in accordance with the Professional Engineers Act 2002. Each Supervising Engineer is responsible for the supervision and certification of engineering works in their respective engineering field.
 - (b) The Supervising Engineer is responsible for developing a Quality Plan (including inspection and test plans). The Supervising Engineer is responsible for compliance with the Quality Plan.
 - (c) A construction superintendent may be nominated or appointed by a Supervising Engineer but must be supervised by the Supervising Engineer at all times throughout the construction period. The Supervising Engineer is to take full responsibility for all construction work related to the infrastructure they are certifying.
- (4) Where operational works requires building certification, the Developer must appoint a licensed Building Certifier to ensure works are designed and constructed to appropriate building standards.
- (5) Where operational works requires landscape works, the Developer must appoint a suitably qualified person to ensure works are designed and constructed to the approved landscape plan.
- (6) Council's development engineers are available to provide advice on the level of supervision required for development works.

SC6.3.13.3 Construction Management Plan

- (1) The purpose of the Construction Management Plan (CMP) is to ensure:
- (a) the operational works are undertaken in a safe and efficient manner,
 - (b) minimise the impact on surrounding properties,
 - (c) protects the environment,
 - (d) maintains the levels of service of existing infrastructure, and
 - (e) ensures new infrastructure is built to an appropriate quality.
- (2) The CMP will include
- (a) Key Contact Information,
 - (b) Construction Program,
 - (c) Safety Plan,
 - (d) Environmental Management Plan,
 - (e) Quality Plans, and
 - (f) Traffic Management Plan.
- (3) The level of detail in the CMP will depend on the scope of the operational works. It is unlikely that one consultant will provide all components of the CMP, however, it is the responsibility of the Developer's Superintendent to coordinate the development of the entire document.

SC6.3.13.3.1 Key Contact Information

- (1) The Key Contact Information will include the following:
 - (a) Developer's Superintendent (name and contact details);
 - (b) List of all Supervising Engineers (name, contact details, RPEQ details, engineering area and scope of works under their supervision)
 - (c) Principal Contractor (name and contact details);
 - (d) A list of nominated site personnel and contact details;
 - (e) Workplace Health and Safety Officer/Contact (name and contact details).
- (2) Depending on the scope of the operational works the additional contacts may also be required:
 - (a) Building Certifier/s (name and contact details);
 - (b) Landscape Consultant (name and contact details);

SC6.3.13.3.2 Construction Program

- (1) The Construction Program will be a broad overview of the significant milestones and their respective timings. The Construction Program should allow Council to program its staff to provide inspection and testing.
- (2) The Construction Program will include two (2) sets of A3 "for construction" drawings incorporating any changes required by the Operational Works Approval. These drawings are to be provided in ADAC compliant XML files too.

SC6.3.13.3.3 Safety Plan

Council encourages a culture of safe working environments and procedures. A Safety Plan must be completed for a construction 'workplace' in accordance with the Work Place Health and Safety Act 2011. The CMP must clearly state that a Safety Plan has been completed for the workplace. The CMP must include an extract from the Safety Plan that outlines the induction process for Council staff entering the workplace. If requested the Safety Plan must be made available to Council at any time during the works.

SC6.3.13.3.4 Environmental Management Plan

The Environmental Management Plan must be completed in accordance with the Environmental Protection Legislation. The Environmental Management Plan must be submitted with the CMP for Council's information. The Environmental Management Plan will include the following:

- (a) Hours of work;
- (b) Access and site restrictions;
- (c) Procedures to ensure that the external road surfaces remain in a clean state, free of detritus generated from the site,
- (d) Noise and vibration;
- (e) Air quality, dust and odour;
- (f) Acid sulphate soils;
- (g) Cultural Heritage;
- (h) Management of adjacent fauna;
- (i) Storage of fuel and other hazardous goods;
- (j) Fuelling and maintenance of vehicles and equipment;
- (k) Disposal of waste (including fuel, oil, chemicals and sewage);
- (l) Disposal of excess spoil;
- (m) Water quality and surface water runoff;
- (n) Management of Site Dewater;

- (o) Sedimentation and erosion control;
- (p) Stockpile management;
- (q) Re-vegetation and reinstatement of disturbed areas;
- (r) Management of weeds and pests;
- (s) Waste management;
- (t) Handling and reporting of complaints and environmental incidents (including dispute resolution procedures).

SC6.3.13.3.5 Quality Plans

- (1) The Quality Plans must be completed for all works being undertaken as part of the operational works. The Quality Plans may cover a range of activities where different levels of supervision and certification are required.
- (2) For contributed assets (i.e., future Council assets), Quality Plans must be submitted for Council's approval with the CMP. The Quality Plan for contributed assets will include the following:
 - (a) Details of who is responsible for supervision and certification of each component of the works (e.g., engineer, building certifier and/or landscape architect);
 - (b) Inspection and Test Plans (ITP) for all relevant components of the works. The ITPs must include the proposed test frequencies and Council inspection hold points as listed in section SC6.3.13.4. This will include provision on the ITP to allow Council's inspectors to sign attendance at hold points (see SC6.3.13.4.1);
 - (c) For all other assets, the CMP must state who is responsible for the Quality Plans of these assets. If requested the Quality Plans must be made available to Council at any time during the works.

SC6.3.13.3.6 Traffic Management Plan

The Traffic Management Plan (TMP) must be completed in accordance with the requirements of the Manual for Uniform Traffic Control Devices (MUTCD). The TMP and supporting Traffic Guidance Scheme (TGS) must be submitted with the CMP for Council's information and feedback. The TMP must be undertaken by a qualified Traffic Management Designer (TMD) and uploaded to the ASignit system and with a confirmation sent to development@bundaberg.qld.gov.au.

SC6.3.13.4 Council Inspections and testing standards

It is the responsibility of the Supervising Engineer to arrange all inspections, testing and certifications. The Supervising Engineer must be present during all Council inspections. Council officers will not deal directly with Contractors.

SC6.3.13.4.1 Inspections (Council Hold Points)

- (1) Provide at least 48 hours notice for Council officers to inspect:
 - (a) Placement of reinforcement, formwork and areas of construction jointing prior to pouring of all concrete;
 - (b) Installation of root barriers and trees;
 - (c) All pavement layer proof rolls (i.e., sub-grade, sub-base and base);
 - (d) All prepared pavement prior to prime (i.e., after brooming);
 - (e) Location of each electrical light pole within the works;
 - (f) Bedding, pipelaying and backfilling for water supply, sewerage and stormwater drainage features, including sewer points of connection, water service connections and stormwater connections to existing network;
 - (g) Pressure testing for all water and sewerage mains segments;
 - (h) Sewerage and stormwater access chambers for the following:

- (i) Prior to pouring/placement of access chamber bases;
- (ii) Formwork/placement for access chambers prior to pouring;
- (iii) Vacuum testing for wastewater access chambers.

SC6.3.13.4.2 Testing

- (1) The Supervising Engineer is responsible for ensuring all works are tested in accordance with the appropriate standards. All costs associated with testing are to be borne by the Developer.
- (2) Tests may include, but are not limited to, the following:
 - (a) Closed circuit television (CCTV) report and footage of all sewerage and stormwater infrastructure prior to the commencement of the maintenance period and again prior to the conclusion of the maintenance period;
 - (b) Vacuum testing of the required proportion of sewerage access chambers as per the relevant standard;
 - (c) Proof rolls and compaction testing of all pavement layers (i.e., sub-grade, sub-base and base) as per the relevant standard;
 - (d) Geotechnical tests and quality/uniformity of fill tests for all earthworks.

SC6.3.13.4.3 Tag and Bag Procedure for Partial Water Services

- (1) Provide at least 2 weeks notice for Council officers to organise tags for partial water services.
- (2) Provide at least 48 hours notice for Council officers to undertake Tag and Bag of partial water services. Prior to contacting Council, the Developer's Superintendent is to ensure the following:
 - (a) Sterilisation and pressure testing of all water mains associated with the partial service have been undertaken;
 - (b) the partial services are live;
 - (c) lots to be serviced are at their finished surface level; and
 - (d) final survey and pegging of all lots is completed.

SC6.3.13.5 On-Maintenance Report

- (1) The Developer's Superintendent is required to provide an On-Maintenance Report prior to acceptance of on-maintenance. This report must include the following:
 - (a) Certification signed by the relevant Supervising Engineer/s (i.e., an RPEQ for each area of engineering) that all works have been undertaken, completed and inspected in accordance with:
 - (i) the operational works approval,
 - (ii) the relevant conditions of any higher order Material Change of Use approval or Reconfiguring a Lot approval, and
 - (iii) requirements of Bundaberg Regional Council Planning Scheme Policy for Development Works and associated standard drawings.
 - (b) Certification signed by the relevant Supervising Engineer/s (i.e., RPEQ) confirming any variations to the design that result in Operational Work being outside of design tolerance will not result in a failure of the Operational Work to perform as intended by the design;
 - (c) "As Constructed" information as listed in Section SC6.3.13.7. Including certification signed by a engineering or cadastral surveyor confirming the "As Constructed" information has been collected and documented in accordance with standard industry practice and is accurate to within 20mm.
 - (d) Certification of building work signed by a licensed Building Certifier.

- (e) Certification that landscape works are constructed as per the approved landscape plan by the landscape architect/designer.
- (f) Completed quality plans, including:
 - (i) A plan identifying where and when inspections and testing occurred;
 - (ii) All ITPs associated with contributed assets (any variations from the ITPs submitted at pre-start should be justified);
 - (iii) Test results from CCTV for all sewerage and stormwater infrastructure (including WSA compliant Infrastructure Condition Reports and all CCTV data);
 - (iv) Test results from pressure testing water and sewerage mains;
 - (v) Road compaction testing and proof test rolling results; and
 - (vi) All tests associated of earthworks including drawing/s identifying fill depth and location on the site.
- (2) If required, an exceptions report with rectification timeframes will be provided by the Developer's Superintendent to Council after the inspection.

SC6.3.13.6 Amendment to approved drawings

The relevant Council development engineer must approve all design variations on a project. Where amendments are carried out without Council approval, the change is to be substantiated by the Developer's Superintendent. Council reserves the right to order variations to the works where they don't meet design standards provided in this Planning Scheme Policy. Where rectification works are required, such works will be carried out at the Developer's expense.

SC6.3.13.7 As Constructed information

SC6.3.13.7.1 Minor projects

- (1) *Electronic* - collated "As Constructed" information is required as follows:
 - (a) Formatted as AutoCAD 2004 or later 'model space',
 - (b) Scaled to 1 unit = 1 metre,
 - (c) Tied to a minimum of two permanent survey marks with 2nd order horizontal accuracy (MGA94 Zone 56 coordinates) or better (to enable linking of the "As Constructed" information to Council's GIS system),
 - (d) With finished surfaces (spot heights and contours) to 5m outside the plan area of the Operational Work,
 - (e) With separate layers for each type of infrastructure (water main, water service, electricity, telecommunication, lighting, stormwater drainage, roadwork, sewerage, footpath within the plan area of the Operational Work,
 - (f) That highlights infrastructure within the plan area of the Operational Work that has not been affected by the Operational Work and therefore may not be accurately located,
 - (g) Compiled using AutoCAD's eTransmit function resulting in one file (*.zip) that contains all "As Constructed" information relevant to the Operational Work and all plot style tables, font maps, etc that are necessary to successfully extract the eTransmit file and access the "As Constructed" information.
- (2) Hard Copies - Two (2) complete sets of scale drawings on A1 or A3 paper, complete with annotations and amendments, presented in a clear & legible form.
- (3) PDF Copies – 'As Constructed' signed drawings in .pdf format

SC6.3.13.7.2 Major projects - as design as construct (ADAC) submission

- (1) *Electronic* - Council has adopted the ADAC system of presentation of 'as constructed' information for major projects. Refer to Council's Guidelines on the Implementation of ADAC for Major Projects with the Bundaberg Regional Council Local Government Area.

- (2) Hard Copies - Two (2) complete sets of scale drawings on A1 or A3 paper, complete with annotations and amendments, presented in a clear & legible form.

SC6.3.13.8 Pre-start procedure

- (1) A pre-start meeting must be held on site prior to any works commencing. The following people are required to attend the pre-start meeting:
- (a) Developer's Superintendent (i.e., Single point of contact for works)
 - (b) Supervising Engineer/s (i.e., Civil RPEQ and other RPEQs as required - see SC6.3.13.2)
 - (c) Principal Contractor (i.e., Main Civil Contractor)
 - (d) Council's representatives (i.e., Development Engineer and Technical Officer), and
 - (e) Developer (where appropriate).
- (2) At least 48 hours notice must be given prior to the pre-start meeting. This notice will include the submission of a CMP for approval (see SC6.3.13.3). Where the components of the CMP cannot be completed before the pre-start meeting, the Developer's Superintendent must seek approval to provide an incomplete CMP.
- (3) The Developer's Superintendent is responsible for organising and minuting the pre-start meeting. The draft minutes are to be forwarded to the Council for approval within one week of the meeting. Once approved, the Developer's Superintendent is responsible for distribution of the approved minutes to all attendees of the pre-start meeting.

SC6.3.13.9 On-Maintenance procedure

SC6.3.13.9.1 On-Maintenance meeting and inspection

- (1) An On-Maintenance meeting must be held on site prior to commencing the maintenance period. The following people are required to attend the On-Maintenance meeting:
- (a) Developer's Superintendent (i.e., Single point of contact for works),
 - (b) Supervising Engineer/s (i.e., Civil RPEQ and other RPEQs as required - see SC6.3.13.2),
 - (c) Principal Contractor (i.e., Main Civil Contractor),
 - (d) Council's representatives (i.e., Development Engineer and Technical Officer), and
 - (e) Developer (where appropriate).
- (2) At least 48 hours notice must be given prior to the On-Maintenance meeting. This notice will include the submission of an On-Maintenance Report for approval (see SC6.3.13.5).
- (3) The Developer's Superintendent is responsible for organising and minuting the On-Maintenance meeting. The draft minutes are to be forwarded to the Council for approval within one week of the meeting. Once approved, the Developer's Superintendent is responsible for distribution of the approved minutes to all attendees of the On-Maintenance meeting.

~~SC6.3.13.9.2 General (security) performance bond and maintenance bonds~~

- ~~(1) Council at its discretion may accept a Performance Bond to provide surety of completion of outstanding works. The Performance Bond must be to a value of 1.3* the value of the expected works. Generally, Bank Guarantees will NOT be accepted as a Performance Bonds.~~
- ~~(2) Where Performance bonds are for a considerable amount of monies Council will consider a staged reduction of the bond monies.~~
- ~~(3)(4) The Developer is required to submit a Maintenance Bond to the value of 5% of the total construction cost of Operational Work, including all variations, or \$2,000, whichever is higher. This bond will be held by the Assessment Manager until the Operational Work is~~

~~accepted 'Off Maintenance'. The maintenance bond may be in the form of an unconditional Bank Guarantee.~~

SC6.3.13.9.3 SC6.3.13.9.2 Works accepted On-Maintenance

Council will provide written confirmation that a project has been accepted On-Maintenance. The letter may include a list of outstanding minor works.

SC6.3.13.9.4 SC6.3.13.9.3 On-Maintenance period

- (1) The On-Maintenance period for a project will generally be 12 months except for bioretention areas which will have a period of 24 months. The On-Maintenance period may be extended in part or in whole where outstanding works have not been finished or maintenance is undertaken by the contractor, delaying acceptance of the Operational Work Off-Maintenance.
- (2) The On-Maintenance period is to commence on the date nominated in Council's On-Maintenance acceptance letter and is to conclude on the date nominated in the Council's Off-Maintenance acceptance letter. During the On-Maintenance Period, the Developer's Superintendent must:
 - (a) Ensure Operational Work is maintained at no cost to Council;
 - (b) Footpaths, street trees and landscaping, drainage reserves and Parks are kept in a tidy manner by seeding and mowing; and
 - (c) Ensure defects (if any) are rectified within a reasonable time (generally 2 weeks from when they are identified).
- (3) The On-Maintenance period is between Council and the Developer should not be confused with any Defects Liability Period that may exist.

SC6.3.13.10 Off-Maintenance procedure

Prior to the Operational Work being accepted Off-Maintenance:

- (a) Ensure grass coverage of at least 80% (per square metre) is obtained over all public access land,
- (b) Confirm with Council's representative that temporary erosion and sediment control measures are no longer required and, if warranted, arrange for their disposal, and
- (c) Ensure any defects (if any) raising during the maintenance period are rectified.

SC6.3.13.10.1 Off-Maintenance meeting and inspection

- (1) An Off-Maintenance meeting must be held on site prior to Council accepting the Operational Work as Off-Maintenance. The following people are required to attend the 'Off Maintenance' meeting:
 - (a) Developer's Superintendent (i.e., Single point of contact for works),
 - (b) Supervising Engineer/s (i.e., Civil RPEQ and other RPEQs as required - see SC6.3.13.2),
 - (c) Principal Contractor (i.e., Main Civil Contractor),
 - (d) Council's representatives (i.e., Development Engineer and Technical Officer), and
 - (e) Developer (where appropriate).
- (2) At least 48 hours notice must be given prior to the Off-Maintenance meeting. This notice will include the following:
 - (a) Confirmation signed by the Supervising Engineer (i.e., RPEQ) that all infrastructure are in a satisfactory condition;
 - (b) Identification of remedial works undertaken during the maintenance period (including test reports if required);
 - (c) Final test results from CCTV for all sewerage and stormwater infrastructure (including WSA compliant Infrastructure Condition Reports and all CCTV data);

- (3) The Developer's Superintendent is responsible for organising and minuting the Off-Maintenance meeting. The draft minutes are to be forwarded to the Council for approval within one week of the meeting. Once approved, the Developer's Superintendent is responsible for distribution of the approved minutes to all attendees of the Off-Maintenance meeting.

SC6.3.13.10.2 Works accepted Off-Maintenance

Council will provide written confirmation that the operational works have been accepted Off-Maintenance.

SC6.3.13.11 Bonding

SC6.3.13.11.1 Preliminary

Bonding is the lodgement of a financial security to Council by the Developer in one or more of the following circumstances:

- (a) to cover all development construction works during the maintenance period;
- (b) as security to ensure the completion and fulfilment of specific conditions/works;
- (c) to cover the costs of uncompleted works to enable early approval of the plan of survey or commencement of a use.

SC6.3.13.11.2 Performance Bonds

- (1) Council may require a Performance Bond to provide surety of completion and fulfilment of works or conditions of approval and/or mitigate risk of damage to Council infrastructure or the environment. The bond may be required as a condition of approval or at the discretion of the Council.
- (2) The Performance Bond must be to a value of 130% of the value of the expected works.
- (3) Performance Bonds are refundable once the development is formally accepted On-Maintenance.
- (4) Where Performance Bonds are for a considerable amount of monies Council will consider a staged reduction of the bond monies.
- (5) Where the conditions/works are not completed to the satisfaction of Council and in accordance with any relevant standards, the bond may be forfeited to cover the costs of the works and/or repairs to Council infrastructure.

SC6.3.13.11.3 Maintenance Bonds

- (1) The Developer is required to submit a Maintenance Bond to Council to guarantee satisfactory maintenance of the works and rectification of defective works during the maintenance period.
- (2) The Maintenance Bond must be to the value of 5% of the total construction cost of Operational Work, including all variations, or \$2,000, whichever is higher.
- (3) The Maintenance Bond will be held by the Assessment Manager until the Operational Work is accepted Off Maintenance.

SC6.3.13.11.4 Uncompleted Works Bonds

- (1) In general, Council requires all works to be completed prior to the approval of the plan of survey. However, where exceptional circumstances exist, Council may accept a bond to secure uncompleted works associated with reconfiguring a lot to enable early approval of the plan of survey.
- (2) Council will generally only accept an uncompleted works bond (to enable approval of the plan of survey or commencement of the use) where the following works have been completed (where applicable):-
 - (a) 100 percent of bulk earthworks are completed and stabilised to the local government's satisfaction;

- (b) Where for works associated with reconfiguring a lot, 100 percent of works within the proposed lots must be completed to the local government's satisfaction;
 - (c) All major stormwater drainage works must be completed to the local government's satisfaction;
 - (d) An appropriately qualified surveyor has certified that the roads are within the correct alignment, where applicable;
 - (e) 100 percent of sewerage and water supply works, including external and internal reticulation, are completed to the local government's satisfaction;
 - (f) All testing results and "As Constructed" information of the completed works is provided to the local government's satisfaction;
 - (g) Certificate of Electrical Supply must be provided to the local government;
 - (h) An agreement has been entered into between the Developer and a telecommunications infrastructure provider for the provision of telecommunications infrastructure to the development;
- (3) The uncompleted works bond must be to a value of 130% of the value of the estimated uncompleted works costs, or \$2000, whichever is higher.
 - (4) The Developer must lodge a formal request with Council which must include the following (where applicable):
 - (a) The relevant bond submission form;
 - (b) Certification signed by the relevant Supervising Engineer (i.e. RPEQ) which must include the following (where applicable):
 - (i) A fully priced bill of quantities detailing the works completed and the works still outstanding;
 - (ii) Written confirmation that the completed works have been constructed on the correct alignments and to the required standards, in accordance with the conditions of the development approval; and
 - (iii) Written confirmation that all works and services will be completed and operational within 3 months of the date of approval of the plan of survey or commencement of the use, or further period agreed to by Council.
 - (5) After the bond submission is reviewed, Council will confirm agreement of the proposed security bond amount with the Developer.
 - (6) Where Council agrees to accept an uncompleted works bond, prospective purchasers of the land or part of the land the subject of the uncompleted works bond must be advised of the relevant uncompleted works (including a description of the uncompleted works) through a special condition in the contract of sale for the land. A property note may also be entered in Council's system to alert prospective purchasers of the relevant uncompleted works.
 - (7) Upon satisfactory completion of all works and acceptance of the works On-Maintenance, the uncompleted works bond will be released by Council. The Developer must submit to Council the relevant request for bond release form.
 - (8) Where the works are not completed to the relevant standard within a reasonable timeframe (generally not more than 3 months from approval of the plan of survey or commencement of the use), the bond may be forfeited to cover the cost of the works.

SC6.3.13.11.5 Form of security bonds

- (1) The security bond given is to be in the form of either: -
 - (a) Cash (held in Trust); or
 - (b) Bank guarantee.
- (2) Bank Guarantees must be:
 - (a) Unconditional and irrevocable;

- (b) Exclude a termination date;
- (c) Be financial security from either:
 - (i) An Authorised Deposit-Taking Institution (ADI) with a minimum Long Term Credit Rating of BBB with Standard & Poor's (or equivalent rating agencies);
or
 - (ii) An Authorised Insurer with a Standard & Poor's rating of A+ or better; and
- (d) Detail the full and correct name of the Developer, the real property description(s), relevant development approval number(s) and the purpose of the security bond(s).

Appendix SC6.3A Standard drawings list

Council's standard drawings are shown in **Table SC6.3A.1 (Standard drawings)**.

Table SC6.3A.1 Standard drawings

Drawing Number	Description
Roads - Bundaberg Regional Council	
R1002	Residential Roads – Optional Type Plans & Cross Section to suit WSUD
R1004	Typical Cross Sections – Industrial Collector and Access Street
R1010	Driveways – Residential Driveway Slabs
R1011	Driveways – Industrial and Commercial Driveway Slabs – Two Way Access
R1012	Driveways – Rural and Urban Accesses Requiring Culverts – No Kerb and Channel
R1013	Driveways - Rural and Urban Accesses – No Kerb and Channel
R1014	Driveways – Residential Invert Crossings (Layback & Standard Kerb & Channel)
R1015	Driveways – Residential Invert Crossing – Steep Driveways
R1016	Driveways – Residential Driveway Slabs for Brown Streets
R1020	Kerb and Channel – Kerbs, Channels and Inverts – Profiles and Dimensions
R1021	Kerb and Channel – Kerb and Channel Drainage Connections
R1030	Footpaths and Cycle Paths – Concrete Strip Footpaths
R1031	Footpaths and Cycle Paths – Bicycle Deflection Rail
R1032	Footpaths and Cycle Paths – Chicane Entrance Treatment
R1040	Signage – Street Name Sign and Post
R1041	Signage – Sign – Footings and Locations
R1042	Signage – Location Plan or Rural Addressing Number Post
R1043	Signage – Bus Stop Sign Details
R1050	Public Utilities – Typical Service Conduit Alignment
R1051	Public Utilities – Conduit/Service Road – Crossing Details
R1060	Road Edge Guide Posts and Bollards – Posts Types and Spacings
R1061	Road Edge Guide Posts and Bollards – Standard Bollard Treatment with 4 PVC Casing
R1062	Road Edge Guide Posts and Bollards – Standard Bollard Treatment
R2001	Road Type cross sections – Urban Road – Sub-arterial
R2002	Road Type cross sections – Urban Road – Trunk Collector
R2003	Road Type cross sections – Urban Road – Collector Street
R2004	Road Type cross sections – Urban Road – Access Street
R2005	Road Type cross sections – Urban Road – Access Place
R2006	Road Type cross sections – Urban Road – CBD/Commercial Access
R2007	Road Type cross sections – Urban Road – Industrial Collector
R2008	Road Type cross sections – Urban Road – Industrial Access
R3001	Road Type cross sections – Rural Road – Principal Rural Road
R3002	Road Type cross sections – Rural Road – Collector Roads
R3003	Road Type cross sections – Rural Road – Access Roads
R3004	Road Type cross sections – Rural Road – Unsealed Roads
Roads - Institute of Public Works Engineering Australasia Queensland Division (IPWEAQ) Standard Drawings	
SEQ R - 090	Kerb Ramp – Ramped Pedestrian Crossings
SEQ R - 091	Kerb Ramp – Ramped and Cut Through Treatments for Pedestrian Crossings Slip Lanes and Medians
SEQ R - 092	Kerb Ramp – Installation of TGSI's on Ramped Kerb Crossings (Sheet 1 of 2)
SEQ R - 093	Kerb Ramp – Installation of TGSI's on Ramped Kerb Crossings (Sheet 2 of 2)
SEQ R - 094	Kerb Ramp – Locations and Configurations
SEQ R - 140	Subsoil Drains - Detail

Drawing Number	Description
SEQ R - 142	Subsoil Drains – Access Points
SEQ R – 180	Typical Bus Stop layout
SEQ R – 181	Typical Bus Stop layout – Guidelines for the Layout of a Rural Bus Stop
Stormwater - Bundaberg Regional Council	
D1001	Field Inlet - Filed Inlet/Grated Gully Pit – Profiles and Dimensions
D1002	Field Inlet -Field Inlet pit Dome Top Cover Partially Submerged Inlet
R1002	Residential Roads – Optional Type Plans & Cross Section to Suit WSUD
37133	WSUD – Bioretention – Infill Sites
Stormwater - IPWEAQ	
SEQ D-010	Stormwater Access Chamber Details – 1050 – 2100 diameter
SEQ D-014	Manhole Frame – (Roadway and Non-Roadway) - 1050 to 1500 diameter
SEQ D-018	Manhole Riser Details – (Roadway)
SEQ D-019	Manhole Cover – (Roadway) – 1050 – 1500 diameter
SEQ D-020	Manhole Cover – (Non Roadway) – 1050 – 1500 diameter
SEQ D-021	Manhole Cover Concrete Infill – (Pedestrian Traffic) – 1050 – 1500 diameter
SEQ D-060	Drainage Pits Kerb inlet – Kerb in Line General Arrangements
SEQ D-061	Drainage Pits - Kerb Inlet – Precast Lintel Details
SEQ D-062	Drainage Pits – Kerb Inlet – Grate and Frame
SEQ D-082	Drainage Details – Culvert Inlet Screens
D-0011	Access Chamber – Roof Slabs – Dia 1050 - 2100
D-0012	Access Chamber – Roof Slabs – Dia 1500 Extended 600 and 900
D-0013	Access Chamber – Roof Slabs – Rectangular Standard Reinforcement
D-0017	Access Chamber – Roof Slabs – Rectangular Fabric Reinforcement
D-0030	Excavation, Bedding and Backfill of Stormwater Drainage Pipes
D-0031	Excavation, Bedding and Backfill of Precast Box Culverts
D-0040	Sediment Control Devices – Sediment Fence – Entry/Exit Sediment Trap
D-0041	Sediment Control Devices – Kerb and Field Inlets – Check Dams & Straw Bale Bank
D-0080	Inlets and Outlets to Stormwater Drains (Concrete)
D3201	Residential Property Access Standard Box Culvert Base Slabs
D3202	Residential Property Access Standard Box Culvert Wings/Headwalls
Water and wastewater - WBBROC	
WBB-GEN-1100-1	General Standard Drawing – Water Supply, Sewerage, Vacuum Sewerage and Pressure Sewerage Legend
WBB-SEW SET	Sewerage Standard Drawing Set
WBB-SPS SET	Sewage Pump Station Standard Drawing Set
WBB-WAT SET	Water Supply Standard Drawing Set
Open space, public parks and land for community facilities	
16566	Picnic shelter shed
16567	Picnic shelter table and seating
16568	Picnic table with roof
16478-S01	Picnic shelter – layout and construction details
Tree Planting Details – Bundaberg Regional Council	
P6111	Standard Street Planting Details - Typical detail – Road shoulder planting
P6211	Standard Street Planting Details - Typical detail – Back of kerb planting
P6311	Standard Street Planting Details - Typical detail – Tree protection requirements

Appendix SC6.3B Street and park naming procedure

SC6.3B.1 Park names

- (1) Park names shall reflect respected persons and families who have made a significant contribution to the well being of the region where the park is located. The Council at its sole discretion may determine contrary to this requirement.
- (2) The Council shall consider suggestions from developers of new parks for park names.

SC6.3B.2 Street names

- (1) Street names shall reflect aspects of the area they are located, including historical names. The Council at its sole discretion may determine contrary to this requirement.
- (2) Council's order of preference in allocating street names shall be:
 - (a) Historical Persons/Historical Place Names,
 - (b) Other relevant aspects (e.g., local flora and fauna) ,
 - (c) Themed Street Names.
- (3) The Council shall consider up to 3 suggestions per street from Developers of new streets for street names.
- (4) The Council will consider developments where street and park names follow a particular theme.
- (5) Street names shall be nouns and generally contain one (1) word. Composite words may be acceptable when they supplement the primary name. Names shall be unique and un-ambiguous to the Bundaberg Regional Council Local Government Area.
- (6) Where a street is extended, the new section created will retain the name of the extended street.

SC6.3B.3 Definition of terms

Table SC6.3B.3.1 (Street name – Nomenclature description) provides the road definitions which apply in the naming of streets.

Table SC6.3B.3.1 Street name – Nomenclature description

Type	Definition
Road	An Arterial, Sub Arterial, Trunk Collector, Collector Road;
Street	An Arterial, Sub Arterial, Trunk Collector, Collector or Access Road;
Drive	Collector or Access Road of substantial length;
Avenue	A tree lined Collector or Access Road;
Boulevard	A Collector or Access Road with significant landscape;
Terrace	Collector or Access Road with significant topographical features;
Crescent	A Loop Road;
Circuit	A Loop Road that rejoins itself;
Way	Similar to Drive or Avenue;
Lane	A narrow public right of way of reserve width;
Court	A cul-de-sac less than 100 metres in length;
Close	A cul-de-sac less than 100 metres in length;
Place	A cul-de-sac greater than 100 metres in length.

SC6.3B.4 Process of approval of names of park or streets

The process for approval of Park and Street names is as follows:

- (e) Council will keep a list of suggested names for streets which will be updated when requests are received from the public. The list will be available to developers and the public on request;
- (f) Prior to the sealing of a Plan of Survey creating a road, the developer shall submit 3 suggested road names for each new street in their development;
- (g) Prior to the sealing of a Plan of Survey creating a park, the developer may submit a suggested park name for each new park in their development;
- (h) For "themed" developed the developer shall submit a list of potential street and park names for the entire development prior to the sealing of the Plan of Survey for Stage 1 of the development;
- (i) The Council will consider suggested street and park names at its Planning and Development Committee Meetings guided by this Policy;
- (j) The Council has the sole right to determine street and park names;
- (k) The developer will be advised of Council's chosen street and park names and shall provide appropriate signage in accordance with the relevant policies and guidelines.

Appendix SC6.3C Approved street trees

The following is a list of approved street trees for developments in the Bundaberg Regional Council area.

Table SC6.3E.1 Approved street trees (not under powerlines)

Botanical Name	Common Name	Use	Comments
<i>Agathis robusta</i>	Kauri Pine	Rural Street Tree	Large tree, Pine like in form, large fruit when mature makes this unsuitable for urban location.
<i>Banksia integrifolia</i>	Coastal Banksia	Coastal Street Tree	Gnarled form, Yellow flowers, woody seed pods.
<i>Brachychiton acerfolius</i>	Illawarra Flame Tree	Urban/Rural Street Tree	Deciduous tree to approximately 15m, red flowers in spring/summer. Best suited to larger road reserve.
<i>Brachychiton rupestris</i>	Qld Bottle Tree	Urban/Rural Street Tree	Semi deciduous tree to 15m. Large swollen bottle trunk a feature. Creamy flowers in spring/summer. Best suited to larger road reserve.
<i>Buckinghamia celsissima</i>	Ivory Curl	Urban Street Tree	Masses of creamy flowers
<i>Callistemon viminalis</i>	Weeping Bottlebrush	Urban/Rural Street Tree	Masses of red flowers, weeping in form, can look untidy.
<i>Cupaniopsis anacardiodes</i>	Tuckeroo	Coastal Street Tree	Lime green foliage, orange berries, lollipop form, mature specimens have buttressed trunk.
<i>Elaeocarpus eumundii</i>	Eumundi Quandong	Urban/Rural Street Tree	Med rainforest tree, red new growth a feature, columnar in form.
<i>Elaeocarpus obovatus</i>	Hard Quandong	Urban/Rural Street Tree	Med rainforest tree, small cream flowers followed by blue berries, peach coloured new growth a feature.
<i>Flindersia australis</i>	Crows Ash	Urban/Rural Street Tree	Green foliage, woody seed pods, columnar in form, many mature specimens within Bundaberg streetscape.
<i>Grevillea baileyana</i>	White Oak	Urban/Rural Street Tree	Masses of white/cream flowers, Lobbed leaves with gold undersides.
<i>Harpullia pendula</i>	Tulipwood	Urban Street Tree	Lime green foliage, orange berries, light coloured bark, many examples within the Bundaberg streetscape.
<i>Hymenosporum flavum</i>	Native Frangipani	Urban/Rural Street Tree	Narrow evergreen tree to 10m. Fragrant yellow flowers in spring. Grows in sun or shade, prefers good quality well drained soil. Does not like to be too exposed.
<i>Lophostemon confertus</i>	Brush Box	Rural Street Tree	Dense crown of shiny leaves, Columnar in habit
<i>Stenocarpus sinuatus</i>	Qld Firewheel Tree	Urban/Rural Street Tree	Tall evergreen tree 15-20m tall. Variable dark green leaves. Orange red flowers in summer. Best suited to larger road reserve
<i>Syzygium luehmannii</i>	Small Leaved Lilly Pilly	Urban Street Tree	Dense tree requiring lift pruning within streetscape, red berries, red/pink new growth a feature.

Botanical Name	Common Name	Use	Comments
<i>Waterhousea floribunda</i>	Weeping Lilly Pilly	Urban/Rural Street Tree	Bushy tree, weeping habit, white/cream flowers followed by berries, found naturally along creek lines.

Table SC6.3E.2 Approved street trees (under powerlines)

Botanical Name	Common Name	Use	Comments
<i>Acmena hemilampra</i>	Satin Ash	Urban Street Tree	Cream flowers followed by white berries. Lush green tree, Can require periodic lift pruning.
<i>Acronychia imperforata</i>	Fraser Island Apple	Coastal Street Tree	
<i>Alectryon coriaceus</i>	Beach Birds Eye	Coastal Street Tree	
<i>Backhousea myrtifolia</i>	Grey Myrtle	Urban/Rural Street Tree	
<i>Backhousea citriodora</i>	Lemon Scented Myrtle	Urban/Rural Street Tree	Small tree, creamy flowers, lemon scented leaves used in cooking
<i>Corymbia ptychocarpa</i>	Swamp Bloodwood	Urban/Rural Street Tree	Small tree, large leaves flowers Pink or Red (Winter/Spring)
<i>Elaeocarpus reticulatus</i>	'Prima Donna' cultivar	Urban/Rural Street Tree	Small evergreen tree, this cultivar has small pink frilled flowers
<i>Phaleria clerodendron</i>	Scented Daphne	Urban/Rural Street Tree	Small tree to 6m large, glossy green leaves. White fragrant flowers on trunk and branches predominantly in summer.
<i>Xanthostemon chrysanthus</i>	Golden Penda	Urban Street Tree	Small evergreen tree. Bright yellow pom pom flowers a feature.

Appendix SC6.3D Approved coastal trees

The following is a list of approved coastal trees for developments in the Bundaberg Regional Council area.

Table SC6.3F.1 Approved coastal trees development

Botanical Name	Common Name	Comments
<i>Araucaria cunninghamii</i>	Hoop pine	Very tall and erect pineshaped tree with symmetrical branches. Frost tender.
<i>Banksia integrifolia</i>	Coast banksia	Shapely tree with large dull green leaves with white underneath. Strongly scented yellow flowers in thick dense spikes
<i>Banksia serrata</i>	Red honeysuckle	Small tree with hard, toothed leaves. Widely cultivated as a coastal ornamental. Bird attractant.
<i>Callistemon viminalis</i>	Weeping bottlebrush	A large shrub or small tree 3-8m high with a graceful, weeping appearance that produces brilliant red flowers in spring and early summer.
<i>Callitris columellaris</i>	Coast cypress pine	A tall dense, evergreen pine that can be cut back to form a dense hedge. Prefers deep sandy loams.
<i>Casuarina equisetifolia</i>	Coast she-oak	Small she-oak with sparse drooping needle-like foliage. Highly resistant to wind and salt spray and grows on raw sand.
<i>Cupaniopsis anacardioides</i>	Tuckeroo	Excellent shade tree with dark green foliage. Will stand planting in exposed situations on poor soils along the coastal strip.
<i>Eucalyptus ptychocarpa</i>	Swamp bloodwood	A small spreading ornamental tree bearing masses of spectacular crimson, pink or white flowers. Has large leathery leaves.
<i>Eucalyptus tereticornis</i>	Blue gum	Eucalypt with smooth bluey grey trunk with irregular blotches. An important hollow producing tree. Flowers used by native birds and bats and leaves used by koalas.
<i>Eucalyptus tessellaris</i>	Moreton Bay Ash	A tall, slender, attractive eucalypt with smooth, white bark on the upper trunk and hard, chunky, tessellated bark around the base. White flowers attract parrots.
<i>Eugenia reinwardtiana</i>	Beach cherry	Shrub to 3m producing edible red fruits about 2cm in diameter.
<i>Harpullia pendula</i>	Tulipwood	Shade tree with large, glossy leaves and clusters of yellow flowers followed by red or yellow seed cases containing two shiny black seeds. Widely used as a street tree on a variety of soils where it rarely exceeds 10m.
<i>Leptospermum petersonii</i>	Lemon-scented teatree	Bushy shrub to 5m bearing masses of white flowers. Excellent for hedges and screens. Grows on most soil types.
<i>Livistona decipiens</i>	Weeping cabbage palm	Tall native palm with a dense head of fan-shaped leaves and slender trunk. Requires warm conditions for best growth and moist, shady conditions when young.
<i>Melaleuca dealbata</i>	Silver-leafed paperbark	Common tree on coastal creeks north of Maryborough. Greyish green leaves that fade to red with age. Bears white flowers attractive to birds and bees.
<i>Melaleuca leucadendra</i>	Broad-leaved tea-tree	Weeping tree with a fairly straight trunk covered with layers of papery white bark. Bird attracting when in flower.

Appendix SC6.3E Approved open forests and woodland species

The following is a list of approved open forests and woodland species for developments in the Bundaberg Regional Council area.

Table SC6.3G.1 Approved open forest and woodland species

Botanical Name	Common Name	Comments
<i>Acacia disparrima</i> (<i>syn aulacocarpa</i>)	Hickory wattle	Small fast growing tree with a height range of 6-20m. Produces sweetly scented yellow flowers in autumn. Good pioneer species widely used by native wildlife.
<i>Acacia maidenii</i>	Maiden's wattle	Small, compact, fast growing wattle bearing yellow flowers.
<i>Alphitonia excelsa</i>	Soap tree or red ash	Tree with a layered, spreading canopy and leaves distinctly white on the underside. Fast growing and widely used by native fauna.
<i>Casuarina littoralis</i>	Forest oak	Small tree usually with a conical shape and branches characteristically curving upwards. Usually found on stony or sandy soils.
<i>Corymbia citriodora</i>	Lemon-scented gum	A clean, straight tree of graceful appearance with smooth pinkish grey trunk. Leaves have a strong lemon scented smell when crushed. Food tree for greater gliders.
<i>Corymbia intermedia</i>	Pink bloodwood	A medium to tall tree covered with brownish-chunky bark. Flowers used by fruitbats and lorikeets.
<i>Eucalyptus tereticornis</i>	Blue gum	Eucalypt with smooth bluey grey trunk with irregular blotches. An important hollow producing tree. Flowers used by native birds and bats and leaves used by koalas.
<i>Eucalyptus tessellaris</i>	Moreton Bay Ash	A tall, slender, attractive eucalypt with smooth, white bark on the upper trunk and hard, chunky, tessellated bark around the base. White flowers attract parrots.
<i>Grevillea banksii</i>	Red flowered silky oak	An attractive small shrub with heads of red or white blooms and fern-like foliage.
<i>Lophostemon confertus</i>	Brush box	Tree with a dense crown of dark green, shiny leaves often used for street and park planting as a shade tree.
<i>Lophostemon suaveolens</i>	Swamp mahogany	A medium sized tree with rough, flaky bark and attractive white flowers. Fast growing and suitable for wet soils.
<i>Melia azedarach</i>	White cedar	A deciduous tree with attractive compound leaves and blue flowers, and clusters of yellow berries. Berries are poisonous to some domestic animals but eaten by possums and native birds.

Appendix SC6.3F Approved shrubs and vine forests species

The following is a list of approved shrubs and vine forests species for developments in the Bundaberg Regional Council area.

Table SC6.3H.1 Approved shrubs and vine forest species

Botanical Name	Common Name	Comments
<i>Alchornea ilicifolia</i>	Holly bush	Shrub or small tree with sharply toothed, stiff leathery leaves.
<i>Alectryon connatus</i>	Bird's eye alectryon	Small tree with young parts and flowers densely hairy. Pale blue-green colour under the leaves.
<i>Aphananthe philippinensis</i>	Rough-leaved elm	Small to medium-sized tree with rough-surfaced leaves and branchlets, and prickly toothed leaves.
<i>Bridelia leichhardtii</i>	Small-leaved brush ironbark	Shrub or small tree with small leaves and red fruit 4-5mm across.
<i>Canthium coprosmoides</i>	Coast canthium	Tall shrub or small tree with orange-red 2-lobed fruit 8mm across.
<i>Cassine melanocarpa</i>	Black olive plum	Small tree with thick and leathery leaves with shiny black fruit 1 ½ - 2 ½ cm across.
<i>Cleistanthus cunninghamii</i>	Cleistanthus	Small tree with branchlets having raised protuberances. Fruit a 3-lobed capsule.
<i>Clerodendrum floribundum</i>	Lolly bush	Small tree or shrub with branchlets often purplish. Attractive black fruit are seated in a bright red petal like calyx.
<i>Cupaniopsis anacardioides</i>	Tuckeroo	Excellent shade tree with dark green foliage. Will stand planting in exposed situations on poor soils along the coastal strip.
<i>Drypetes deplanchei</i>	Yellow tulip	Medium sized tree with young leaves sharply toothed. Fruit a red/orange coloured drupe.
<i>Ficus obliqua</i>	Small-leaved Moreton Bay fig	Tall tree growing to 40m. Fruit a yellow to orange coloured fig. Fruit eaten by birds.
<i>Flindersia australis</i>	Crows ash	Large shade tree reaching to about 18m in open plantings. Foliage is dark green in a dense rounded crown. An excellent shade and avenue tree native to Queensland.
<i>Flindersia collina</i>	Leopard ash	Queensland native tree with slender trunk and glossy green crown and white flowers. Trunk has leopard like blotches. Ideal as a medium sized shade tree.
<i>Harpullia pendula</i>	Tulipwood	Shade tree with large, glossy leaves and clusters of yellow flowers followed by red or yellow seed cases containing two shiny black seeds. Widely used as a street tree on a variety of soils where it rarely exceeds 10m.
<i>Jagera pseudorhus</i>	Foambark	Small tree with capsules covered with rusty brown irritating hairs, splitting into 3 segments. Seeds eaten by ground-dwelling native fauna.
<i>Melia azedarach</i>	White cedar	A deciduous tree with attractive compound leaves and blue flowers, and clusters of yellow berries. Berries are poisonous to some domestic animals but eaten by possums and native birds.
<i>Mischocarpus pyriformis</i>	Yellow pear-fruit	Medium tree with yellow/orange, pear-shaped capsules. Slow growing.
<i>Pleiogynium timorense</i>	Burdekin plum	Medium to large tree with a large, spreading crown that produces an edible reddish purple plum.
<i>Rapanea variabilis</i>	Muttonwood	Small tree to about 5m. Produces mauve to blue small drupes about 5mm in diameter. Has attractive foliage and decorative fruit.

Appendix SC6.3G Approved species for banks of saltwater watercourses

The following is a list of approved species for banks of saltwater watercourses within developments in the Bundaberg Regional Council area.

Table SC6.3I.1 Approved species for banks of saltwater watercourses

Botanical Name	Common Name	Comments
<i>Acacia disparrima</i> (<i>syn aulacocarpa</i>)	Hickory wattle	Small fast growing tree with a height range of 6-20m. Produces sweetly scented yellow flowers in autumn. Good pioneer species widely used by native wildlife.
<i>Alphitonia excelsa</i>	Soap tree or red ash	Tree with a layered, spreading canopy and leaves distinctly white on the underside. Fast growing and widely used by native fauna.
<i>Callitris columellaris</i> *	Coast cypress pine	A tall dense, evergreen pine that can be cut back to form a dense hedge. Prefers deep sandy loams.
<i>Casuarina equisetifolia</i> *	Coast she-oak	Small she-oak with sparse drooping needle-like foliage. Highly resistant to wind and salt spray and grows on raw sand.
<i>Casuarina glauca</i>	Swamp oak	Fast growing sheoak native of saline and wet sites but used for windbreaks and shelter belts in heavy soils. Seeds eaten by pigeons.
<i>Clerodendrum floribundum</i>	Lolly bush	Small tree or shrub with branchlets often purplish. Attractive black fruit are seated in a bright red petal like calyx.
<i>Cupaniopsis anacardioides</i>	Tuckeroo	Excellent shade tree with dark green foliage. Will stand planting in exposed situations on poor soils along the coastal strip.
<i>Eucalyptus tereticornis</i>	Blue gum	Eucalypt with smooth bluey-grey trunk with irregular blotches. An important hollow-producing tree. Flowers used by native birds and bats and leaves used by koalas.
<i>Eucalyptus tessellaris</i>	Moreton Bay Ash	A tall, slender, attractive eucalypt with smooth, white bark on the upper trunk and hard, chunky, tessellated bark around the base. White flowers attract parrots.
<i>Ficus opposita</i>	Sandpaper fig	Small tree with sandpapery rough leaves. Figs eaten by native birds.
<i>Glochidion ferdinandi</i>	Coast glochidion	Small densely growing tree to 10m. Green to red roundish, ribbed capsule.
<i>Jagera pseudorhus</i>	Foambark	Small tree with capsules covered with rusty brown irritating hairs, splitting into 3 segments. Seeds eaten by ground-dwelling native fauna.
<i>Livistona decipiens</i>	Weeping cabbage palm	Tall native palm with a dense head of fan-shaped leaves and slender trunk. Requires warm conditions for best growth and moist, shady conditions when young.
<i>Melia azedarach</i>	White cedar	A deciduous tree with attractive compound leaves and blue flowers, and clusters of yellow berries. Berries are poisonous to some domestic animals but eaten by possums and native birds.
<i>Pleiogynium timorense</i>	Burdekin plum	Medium to large tree with a large, spreading crown that produces an edible reddish purple plum.

Note— * Found mainly in coastal river areas rather than saltwater river areas.

Appendix SC6.3H Approved species for banks of freshwater watercourses

The following is a list of approved species for banks of freshwater watercourses within developments in the Bundaberg Regional Council area.

Table SC6.3J.1 Approved species for banks of freshwater watercourses

Botanical Name	Common Name	Comments
<i>Acacia disparrima</i> (<i>syn aulacocarpa</i>)	Hickory wattle	Small fast growing tree with a height range of 6-20m. Produces sweetly scented yellow flowers in autumn. Good pioneer species widely used by native wildlife.
<i>Alphitonia excelsa</i>	Soap tree or red ash	Tree with a layered, spreading canopy and leaves distinctly white on the underside. Fast growing and widely used by native fauna.
<i>Clerodendrum floribundum</i>	Lolly bush	Small tree or shrub with branchlets often purplish. Attractive black fruit are seated in a bright red petal-like calyx.
<i>Cupaniopsis anacardioides</i>	Tuckeroo	Excellent shade tree with dark green foliage. Will stand planting in exposed situations on poor soils along the coastal strip.
<i>Eucalyptus tereticornis</i>	Blue gum	Eucalypt with smooth bluey-grey trunk with irregular blotches. An important hollow-producing tree. Flowers used by native birds and bats and leaves used by koalas.
<i>Ficus coronata</i>	Creek sandpaper fig	Small fig growing along creek banks. Fruit edible, purplish and hairy.
<i>Glochidion sumatranum</i>	Cheese tree	Small to medium fast growing tree. Fruits are flattened and fluted similar to round cheese.
<i>Jagera pseudorhus</i>	Foambark	Small tree with capsules covered with rusty brown irritating hairs, splitting into 3 segments. Seeds eaten by ground-dwelling native fauna.
<i>Leptospermum polygalifolium</i>	Wild may	Slender, twiggy shrub with small, narrow scented leaves and white flowers.
<i>Melaleuca quinquenervia</i>	Paper bark	Medium sized-tree that likes wet and wallum-like areas. Birds, bats and ants feed on the nectar.
<i>Melia azedarach</i>	White cedar	A deciduous tree with attractive compound leaves and blue flowers, and clusters of yellow berries. Berries are poisonous to some domestic animals but eaten by possums and native birds.
<i>Pleiogynium timorense</i>	Burdekin plum	Medium to large tree with a large, spreading crown that produces an edible reddish-purple plum.
<i>Waterhousea floribunda</i>	Weeping cherry	Excellent spreading tree with decorative yellow flowers and dense green foliage. Suited to moist soils. Fruit attractive to birds and bats.

Appendix SC6.3I Approved small trees and tall shrubs species

The following is a list of approved small trees and tall shrubs species for developments in the Bundaberg Regional Council area.

Table SC6.3K.1 Approved small tree and tall shrub species

Botanical Name	Common Name	Comments
<i>Barklya syringifolia</i>	Barklya, Golden shower tree	Slow growing, very showy, evergreen small tree with heart-shaped leaves. Bears masses of brilliant, yellow flowers in early summer.
<i>Buckinghamia celsissima</i>	Ivory curl	Showy small tree bearing masses of grevillea-like white flowers. Excellent tree for avenue planting. Rarely exceeds 6m in amenity plantings.
<i>Callistemon polandii</i>	Red bottlebrush	A bushy small tree growing to 5m that is noted for its long lasting 9cm long, bright red, gold-tipped flowers.
<i>Callistemon Viminalis</i>	Weeping bottlebrush	A large shrub or small tree 3-8m high with a graceful, weeping appearance that produces brilliant red flowers in spring and early summer.
<i>Eucalyptus ptychocarpa</i>	Swamp bloodwood	A small spreading ornamental tree bearing masses of spectacular crimson, pink or white flowers. Has large leathery leaves.
<i>Euodia muelleri</i>	Little euodia	Small tree to about 5m. Colourful reddish-pink flowers grow from trunk.
<i>Harpullia pendula</i>	Tulipwood	Shade tree with large, glossy leaves and clusters of yellow flowers followed by red or yellow seed cases containing two shiny black seeds. Widely used as a street tree on a variety of soils where it rarely exceeds 10m.
<i>Leptospermum petersonii</i>	Lemon-scented tea-tree	Bushy shrub to 5m bearing masses of white flowers. Excellent for hedges and screens. Grows on most soil types.
<i>Melaleuca leucadendra</i>	Broad-leaved tea-tree	Weeping tree with a fairly straight trunk covered with layers of papery white bark. Bird attracting when in flower.
<i>Melaleuca viridiflora</i>	Red-flowering tea-tree	Medium sized paperbark that has pale lemon to pink and occasionally red flowers.
<i>Pittosporum rhombifolium</i>	White pittosporum	Usually grows to about 6m in cultivation. Has a dense crown of glossy, dark green, toothed leaves and small white flowers which produces clusters of orange berries in winter.
<i>Xanthostemon chrysanthus</i>	Golden penda	Small tree that occurs in coastal north Qld. Flowers are bright yellow, very prominent and bird attracting. Excellent specimen tree where ample moisture is available.

Appendix SC6.3J Unacceptable plant species

The following plant species are unacceptable for landscaping within the Bundaberg Regional Council area.

Table SC6.3L.1 Unacceptable plant species

Botanical Name	Common Name
<i>Acacia farnesiana</i>	Mimosa Bush
<i>Acalypha sinensis</i>	Chinese Acalypha
<i>Acetosa sagittata</i>	Rambling Dock
<i>Agave americana</i>	Century Plant
<i>Agave sisalana</i>	Sisal
<i>Agave vivipara</i> var. <i>vivipara</i>	Sisal
<i>Ageratina adenophora</i>	Crofton Weed
<i>Ageratina riparia</i>	Mistflower
<i>Ageratum houstonianum</i>	Blue Billygoat Weed
<i>Alternanthera philoxeroides</i>	Aligator Weed
<i>Anredera cordifolia</i>	Madeira Vine, Lamb's Tail, Potato Vine
<i>Araujia horotum</i>	White Moth Vine
<i>Ardisia crispa/crenata</i>	Coral Berry, Ardisia
<i>Ardisia humilis</i>	Spice Berry
<i>Arecastrum</i> (syn. <i>Syagrus</i>) <i>romanzoffianum</i>	Cocos Palm
<i>Aristolochia elegans</i>	Dutchman's Pipe or Calico Flower
<i>Arunda donax</i>	Giant Reed
<i>Asclepias curassavica</i>	Red Cotton Bush
<i>Asparagus africans</i>	Asparagus fern
<i>Asparagus (Myrsiphullum) asparagoides</i>	Bridal Creeper
<i>Asparagus densiflora</i>	Asparagus fern
<i>Asparagus plumosus</i>	Ferny Asparagus
<i>Baccharis halimifolia</i>	Groundsel Bush
<i>Bidens pilosa</i>	Cobbler's Pegs
<i>Brachiaria decumbens</i>	Signal Grass
<i>Brachiaria multica</i>	Para Grass
<i>Bryophyllum delagoense</i> (Syn. <i>B. diagremonianum</i> x <i>tubiflorum</i>)	Mother-of-Millions Hybrid
<i>Bryophyllum pinnatum</i>	Live Plant
<i>Bryophyllum tubiflorum</i>	Mother-of-Millions
<i>Caesilpinia decapetala</i>	Thorny Poinciana
<i>Callisia fragrans</i>	Purple Succulent
<i>Canna species (indica and generalis)</i>	Canna Lilly
<i>Cardiospermum grandiflorum</i>	Balloon Vine
<i>Cascabela thevitia</i> syn. <i>Thevitia peruviana</i>)	Yellow Oleander
<i>Cassia coluteoides</i>	Easter Cassia
<i>Catharanthus roseus</i>	Pink Periwinkle
<i>Celtis sinensis</i>	Chinese Elm, Chinese Celtis
<i>Cenchrus caliculatis</i>	
<i>Cenchrus echinatus</i>	Mossman River Grass
<i>Cestrum parqui</i>	Cestrum
<i>Chloris gayana</i>	Rhodes Grass
<i>Chrysanthemoides monilifera</i> subsp. <i>rotunda</i>	Bitou Bush
<i>Cinnamomum camphora</i>	Camphor Laurel
<i>Commelina benghalensis</i>	Hairy Wandering Jew

Botanical Name	Common Name
<i>Conyza bonariensis</i>	Flax-leaf Fleabane
<i>Conyza canadensis</i>	Canadian Fleabane
<i>Conyza sumatrensis</i>	Tall Fleabane
<i>Corymbia torelliana</i>	Cadaga or Cadaghi
<i>Cynodon dactylon</i>	Bahama Grass / Green Couch
<i>Cyperus brevifolius</i>	Mullumbimy Couch
<i>Cyperus involucratus</i>	African Sedge
<i>Cyperus rotundus</i>	Nut Grass
<i>Desmodium intortum</i>	Green-leaved Desmodium
<i>Desmodium uncinatum</i>	Silver-leaved Desmodium
<i>Digitaria eriantha</i>	Pangola Grass
<i>Duranta erecta</i>	Duranta, Blue Sky Flower
<i>Eichornia crassipes</i>	Water Hyacinth
<i>Eleusine indica</i>	Crowsfoot Grass
<i>Eragrostis curvula</i>	African Lovegrass
<i>Erythrina crista-galli</i>	Cockspur Coral Tree
<i>Eugenia uniflora</i>	Brazilian Cherry
<i>Euphorbia cyathophora</i>	Painted Spurge
<i>Euphorbia heterophylla</i>	Milk Weed
<i>Furcrea foetida</i>	Cuban Hemp
<i>Furcrea selloa</i>	Hemp
<i>Gleditsia triacanthos (+ all ornamental varieties)</i>	Honey Locust Tree
<i>Gloriosa superba</i>	Glory Lilly
<i>Gomphocarpus physocarpus</i>	Balloon Cotton Bush
<i>Gymnocoronis spilanthoides</i>	Senegal Tea
<i>Hymenachne amplexicaulis</i>	
<i>Hypoestes phyllostachya</i>	Polka-dot Plant
<i>Impatiens walleriana</i>	Balsam
<i>Ipomoea cairica</i>	Mile a Minute
<i>Ipomoea indica</i>	Morning Glory
<i>Juncus articulatus</i>	Jointed Rush
<i>Koelreuteria elegans</i>	Golden Rain Tree
<i>Lantana camara var. camara</i>	Lantana
<i>Lantana montevidensis</i>	Creeping Lantana
<i>Leucaena leucocephala</i>	Leucaena
<i>Ligustrum lucidum</i>	Privet Broad Leaf
<i>Ligustrum sinense</i>	Privet Small Leaf, Chinese Privet
<i>Lilium formosanum</i>	Taiwan Lily
<i>Lonicera japonica</i>	Japanese Honeysuckle
<i>Ludwigia ochoualis</i>	
<i>Lycium ferocissimum</i>	African Boxthorn
<i>Macfadyena unuis-cati</i>	Cats Claw Creeper
<i>Macroptilium atropurpureum</i>	Sirat
<i>Macrotyloma axillare</i>	Perrenia Horse Gram
<i>Melinis minutiflora</i>	Molasses Grass
<i>Melinis repens</i>	Red Natal Grass
<i>Mimosa pudica</i>	Common Sensitive Plant
<i>Murraya paniculata cv. Exotica</i>	Murraya, mock orange
<i>Myriophyllum aquaticum</i>	Parrot's Feather
<i>Nasella neessiana</i>	Chilean Needle Grass

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Botanical Name	Common Name
<i>Neonotonia wightii</i>	Glycine
<i>Nephrolepis cordifolia</i>	Fish bone fern
<i>Nymphaea caerulea subsp.zanzibarensis</i>	Blue Lotus
<i>Ochna serrulata</i>	Ochna, Mickey Mouse Bush
<i>Oenothera drummondii subsp. drummondii</i>	Beach evening Primrose
<i>Olea africana</i>	African Olive
<i>Olea europea</i>	Olive
<i>Optuntia spp.</i>	Drooping Pear Tree, prickly pears
<i>Oxalis corniculata</i>	Creeping Oxalis, Yellow Wood Sorrell
<i>Panicum maximum</i>	Green Panic / Guinea Grass
<i>Parkinsonia aculeata</i>	Jerusalem Thorn
<i>Paspalum conjugatum</i>	Paspalum
<i>Paspalum dilatatum</i>	Paspalum
<i>Paspalum mandiocanum</i>	
<i>Paspalum notatum</i>	Bahia Grass
<i>Passiflora edulis</i>	Passion Fruit
<i>Passiflora foetida</i>	Stinking Passion Vine
<i>Passiflora suberosa</i>	Corky Passion Vine
<i>Passiflora subpeltata</i>	White Passion Fruit
<i>Parthenium hysterophorus</i>	Parthenium Weed
<i>Paulownia spp</i>	Paulownia
<i>Pennisetum alopecuroides</i>	Swamp Foxtail
<i>Pennisetum clandestinum</i>	Kikuyu Grass
<i>Pennisetum purpureum</i>	Elephant Grass
<i>Pennisetum setaceum</i>	African Fountain Grass
<i>Phyla canescens</i>	Condamine Couch / Lippia
<i>Phyllostachys aurea</i>	Fishpole Bamboo
<i>Phytolacca octandra</i>	Inkweed
<i>Pinus caribaea</i>	Caribbean Slash Pine
<i>Pinus elliottii</i>	Slash Pine
<i>Pistia stratiotes</i>	Water Lettuce
<i>Prosopis pallida</i>	Algaroba
<i>Prunus munsoniana</i>	Wild Goose Plum
<i>Psidium guajava</i>	Guajava, Guava
<i>Pueraria lobata</i>	Kudzu
<i>Pyrostegia venusta</i>	Flame Vine
<i>Raphiolepis indica</i>	Indian Hawthorn
<i>Ricinus communis</i>	Castor Oil Plant
<i>Rivina humilis</i>	Spice Berry
<i>Rorippa nasturtium-aquaticum (syn. Nasturtium officinale)</i>	Watercress
<i>Rubus bellobatus</i>	Kittatinny Blackberry
<i>Rubus discolor (R.fruticosa complex)</i>	a Blackberry
<i>Rubus ellipticus</i>	Yellow Berry
<i>Rubus fruticosus</i>	Blackberry
<i>Ruellia malacosperma</i>	Ruellia
<i>Ruppia maratima</i>	Sea Tassel
<i>Salvia coccinea</i>	Red Salvia
<i>Salvinia molesta</i>	Salvinia
<i>Sansevieria trifasciata</i>	Mother in Laws Tongue

Botanical Name	Common Name
<i>Scheffera actinophylla</i>	Umbrella Tree
<i>Schinus molle</i>	Pepper Tree
<i>Schinus terebinthifolia</i>	Broad Leafed Pepperina Tree, Pepper Tree
<i>Senecio madagascariensis</i>	Fire Weed
<i>Senecio tamoides</i>	Canary Creeper
<i>Senna pendulina</i>	Easter cassia, Winter senna
<i>Senna septentrionalis (syn. floribunda)</i>	Arsenic Bush
<i>Setaria sphacelata</i>	South African Pigeon Grass
<i>Sida rhombifolia</i>	Paddy's Lucerna
<i>Solanum erianthum</i>	Tobacco Bush
<i>Solanum hispidum</i>	Giant Devil's Fig
<i>Solanum mauritianum</i>	Wild tobacco tree
<i>Solanum seaforthianum</i>	Brazilian nightshade
<i>Solanum torvum</i>	Devil's Fig
<i>Solidago canadensis var. scabra</i>	Canadian Goldenrod
<i>Spathodea campanulata</i>	African Tulip Tree
<i>Sphagneticola (syn. Wedelia) trilobata</i>	Singapore Daisy
<i>Sporobolus africanus</i>	Paramatta Grass
<i>Sporobolus fertilis</i>	Giant Paramatta Grass
<i>Sporobolus jacquemontii</i>	American rat's tail Grass
<i>Stylosanthes scabra</i>	Shrubby Stylo
<i>Tagetes minuta</i>	Stinking Roger
<i>Stenolobium stans</i>	Yellow Bells, Yellow Bell Flower
<i>Themada quadrivalvis</i>	Grader Grass, Thatch Grass
<i>Thunbergia alata</i>	Black-eyed Susan
<i>Thunbergia grandiflora</i>	Blue Thunbergia
<i>Tithonia diversifolia</i>	Mexican Sunflower
<i>Tradescantia albiflora</i>	Wandering jew
<i>Tradescantia zebrina</i>	Zebrina
<i>Triumfetta rhomboidea</i>	Chinese Burr
<i>Verbesina enceloides</i>	Crownbeard
<i>Xanthium spinosum</i>	Bathurst Burr