

Amendment Instrument

Planning Scheme Policies (Administrative and Minor Amendment) No. 3

**Made under the *Sustainable Planning Act 2009*, section 117
(Process for preparing, making or amending local planning
instruments)**

This amendment has effect on and from 3 August 2015



1. Short title

This amendment instrument may be cited as *Planning Scheme Policies (Administrative and Minor Amendment) No. 3*.

2. Commencement

This amendment instrument has effect on and from 3 August 2015.

3. Purpose

The purpose of this amendment instrument is to address a small number of minor editorial and operational matters that require correction or changes to improve the clarity and efficiency of the following planning scheme policies:-

- Planning scheme policy for the flood hazard overlay code;
- Planning scheme policy for development works; and
- Planning scheme policy for the transport and parking code.

This amendment instrument amends the component of the *Sunshine Coast Planning Scheme 2014* in Table 1, Column 1, in respect of the provisions stated in Table 1, Column 2, in the manner stated in Table 1, Column 3.

Table 1 Amendment table

Column 1	Column 2	Column 3
Planning scheme policy component	Planning scheme policy provision	Amendment
Schedule 6 (Planning scheme policies), SC6.9 (Planning scheme policy for the flood hazard overlay code)	Section SC6.9.3 (Advice for floodplain protection, flood and storm tide inundation immunity and safety, building design and built form, essential network infrastructure, essential community infrastructure, hazardous and other material and flood impacts outcomes)	Amend as shown in Appendix A
Schedule 6 (Planning scheme policies), SC6.9 (Planning scheme policy for the flood hazard overlay code)	Section SC6.9.6 (Guidelines for achieving Flood hazard overlay code outcomes)	Amend as shown in Appendix A
Schedule 6 (Planning scheme policies), SC6.14 (Planning scheme policy for development works)	Section SC6.14.1.5 (Life cycle costs and life cycle management plans), Table 6.14.1A (Life cycle expenditure categories)	Amend as shown in Appendix A
Schedule 6 (Planning scheme policies), SC6.14 (Planning scheme policy for development works)	Section SC6.14.3.3 (Design requirements)	Amend as shown in Appendix A
Schedule 6 (Planning scheme policies), SC6.14 (Planning scheme policy for development works)	Section SC6.14.3.4 (Development design) and Figure SC6.14.3B (Inter-allotment stormwater locations)	Amend and renumber as shown in Appendix A

Column 1	Column 2	Column 3
Planning scheme policy component	Planning scheme policy provision	Amendment
Schedule 6 (Planning scheme policies), SC6.14 (Planning scheme policy for development works)	Section SC6.14.3.5 (Design requirements – stormwater drainage)	Amend as shown in Appendix A
Schedule 6 (Planning scheme policies), SC6.14 (Planning scheme policy for development works)	Section SC6.14.3.7 (Design requirements – stormwater quality), Table SC6.14.3G (Triggers for application of stormwater quality design objectives)	Amend as shown in Appendix A
Schedule 6 (Planning scheme policies), SC6.14 (Planning scheme policy for development works)	Section SC6.14.3.9 (Stormwater management plans), Table SC6.14.3H (C ₁₀ vs development category)	Amend as shown in Appendix A
Schedule 6 (Planning scheme policies), SC6.14 (Planning scheme policy for development works)	Section SC6.14.4.3 (Standard drawings), Table SC6.14.4A (WSAA drawing numbers)	Amend as shown in Appendix A
Schedule 6 (Planning scheme policies), SC6.17 (Planning scheme policy for the transport and parking code)	Section SC6.17.4 (Advice for achieving transport network outcomes), Table SC6.17B (Urban transport corridors)	Amend as shown in Appendix A
Schedule 6 (Planning scheme policies), SC6.17 (Planning scheme policy for the transport and parking code)	Appendix SC6.17A (Typical street and road cross sections)	Amend as shown in Appendix A

Appendix A Amendment schedule

SC6.9 Planning scheme policy for the flood hazard overlay code

SC6.9.1 Purpose

The purpose of this planning scheme policy is to:-

- (a) provide advice about achieving outcomes in the **Flood hazard overlay code**;
- (b) identify and provide guidance about information that may be required to support a development application where subject to the **Flood hazard overlay code**; and
- (c) identify guidelines that may be relevant to achieving outcomes in the **Flood hazard overlay code**.

Note—the **Planning scheme policy for development works** also provides advice and sets out information that may be required to support a development application subject to the **Flood hazard overlay code** in relation to the stormwater management.

Note—nothing in this planning scheme policy limits Council's discretion to request other relevant information in accordance with the Act.

SC6.9.2 Application

This planning scheme policy applies to development which requires assessment against the **Flood hazard overlay code**.

SC6.9.3 Advice for floodplain protection, flood and storm tide inundation immunity and safety, building design and built form, essential network infrastructure, essential community infrastructure, hazardous and other materials and flood impacts outcomes

- (1) The following is advice for achieving outcomes in the **Flood hazard overlay code**:-
 - (a) compliance with Performance Outcome PO1 to PO9 of **Table 8.2.7.3.2 (Criteria for assessable development)** of the **Flood hazard overlay code** may be demonstrated in part or aided by the submission of a flood hazard assessment report and a flood hazard mitigation report prepared by a competent person in accordance with **Appendix SC6.9A (Reporting template for flood hazard assessment report and flood hazard mitigation report)**

Note—for the purposes of this planning scheme policy a competent person is a Registered Professional Engineer of Queensland (RPEQ) with appropriate and proven technical experience in the preparation of flood hazard assessment and mitigation reports.

- (2) The following is advice for achieving Performance Outcome PO3 and PO5 of **Table 8.2.7.3.2 (Criteria for assessable development)** of the **Flood hazard overlay code**:-
 - (a) freeboard above the DFE/DSTE or Historical should not apply to ground floor commercial uses where activating the street frontage through direct pedestrian entry to the building from the road reserve;
 - (b) floor levels should be set above the minimum floor level to the greatest level feasible;
 - (c) building design should account for the potential need to relocate property prior to a flood event and recover quickly following a flood event;
 - (d) businesses should ensure that they have the necessary continuity plans in place that:
 - (i) understand the likely warning time for a flood event;
 - (ii) define a trigger for action to implement a disaster management plan (flood);
 - (iii) define necessary asset protection actions, such as relocating stock to a higher location (and the time required to implement);
 - (iv) define the necessary equipment required for clean-up and return to service and determine from where it will be sourced (based on an understanding that in a regional event demand may limit availability); and

Schedule 6

Appendix A Amendment schedule

SC6.9.5 Special design requirements

Climate change/variability

- (1) Climate change/variability investigations must include tailwater increases that account for a projected sea level rise of 0.8m. A sensitivity analysis must be undertaken using a projected sea level rise of 1.1m to ensure the freeboard is not exceeded.

Levees

- (2) Council will not permit the use of levees to satisfy flood immunity standards, for the following reasons:-
 - (a) there is no guarantee that the levees will remain with the land;
 - (b) levees are a band-aid solution rather than an intrinsic solution; and
 - (c) there is possibility that levees can be breached or overtopped in extreme storms, which can lead to an increase in damage and subsequently greater potential for damage.

Basements and carpark

- (3) Minimum standards for flood and storm tide inundation immunity for all developments are detailed in **Table 8.2.7.3.3 (Flood levels and flood immunity requirements for development and infrastructure)** of the **Flood hazard overlay code**.
- (4) As well as 10% AEP immunity, the 1% AEP flooding of carparking areas must not exceed a depth of inundation of 250mm, a depth x velocity ratio of 0.4m²/s and velocity of 2.0m/s.
- (5) Basement carpark can be constructed below the specified levels provided that suitably waterproofed perimeter walls, air vents, and entry/exit ramps at the carpark entrance are above at least 500mm above the 1% AEP flood levels for all flooding sources.

Safety

- (6) Flood and storm tide inundation safety can be addressed by either providing effective evacuation routes or incorporating safe refuges within the development.
- (7) Developments which become isolated during a DFE and are inundated during a PMF shall be avoided.
- (8) An effective access route is defined as follows:-
 - (a) at least one access route must be safely accessible and trafficable for evacuation purposes during the 1% AEP flood or storm tide event. This is achieved if the crown of the road which forms the evacuation route is at or above the 1% AEP flood or storm tide level;
 - (b) at least one evacuation route must be provided which enables people to progressively evacuate to areas above the PMF in the face of advancing flood or storm tide waters for events exceeding the DFE. This is achieved if the evacuation route continuously grades uphill from the development site to land not inundated during a PMF; and
 - (c) accounts for the time required for evacuation and ensures that this is achievable in the time between a DFE being exceeded and the peak of the PMF occurring.

SC6.9.6 Guidelines for achieving Flood hazard overlay code outcomes

For the purposes of the performance outcomes and acceptable outcomes in the **Flood hazard overlay code**, the following are relevant guidelines:-

- (a) *Floodplain Management in Australia: Best Practice Principles and Guidelines SCARM Report 73* (CSIRO, 2000)
- (b) the *State Planning Policy December 2013* (Department of State Development, Infrastructure and Planning) and *State Planning Policy Guidelines*;
- (c) **Stormwater management code** and the **Planning scheme policy for development works**;

Schedule 6

- (d) *Planning for stronger more resilient floodplains, Part 2, Measures to support floodplain management in future planning scheme* (Queensland Reconstruction Authority, 2012);
- (e) *QUDM, Australian Rainfall and Runoff* (IEAust, 1999);
- (f) any subsequent revisions or project guidelines from ARR.org.au; ~~and~~
- ~~(g) *Guideline for improving flood resilience for new development: A selection of case studies* (Sunshine Coast Council, 2014); *Sunshine Coast Council Flood Resilience Implementation Guidelines—New Development: Adaption Case Studies* (2013); and~~
- ~~(g)(h) *Guideline for improving flood resilience for existing development* (Sunshine Coast Council, 2014).~~

SC6.14 Planning scheme policy for development works

SC6.14.1 Introduction

SC6.14.1.1 Purpose

The purpose of this planning scheme policy is to:-

- (a) provide advice about achieving outcomes in the relevant planning scheme codes as contained in the planning scheme; and
- (b) provide guidance for the design and construction of infrastructure works which reflects sound practice in engineering, environmental management and natural resource planning and sustainability, while also addressing considerations relating to whole of life cycle costs, safety, accessibility and aesthetics.

Note—nothing in this planning scheme policy limits Council's discretion to request relevant information in accordance with the Act.

SC6.14.1.2 Application

- (1) This planning scheme policy is to be read in conjunction with all codes in which reference is made to the **Planning scheme policy for development works**.
- (2) This planning scheme policy comprises the following sections that identify development and design standards for works undertaken as part of new developments which require Council approval and details standards and procedures for contributed assets with regard to construction, compliance and acceptance:-

SC6.14.1	Introduction
SC6.14.2	Road infrastructure
SC6.14.3	Stormwater management
SC6.14.4	Water supply infrastructure
SC6.14.5	Sewerage infrastructure
SC6.14.6	Site development management
SC6.14.7	Open space and landscaping infrastructure
SC6.14.8	Coastal and waterfront structures
SC6.14.9	Constructed waterbodies
SC6.14.10	Earthworks
SC6.14.11	Specifications and construction

Sections SC6.14.2 to SC6.14.10

- (3) The standards identified in this planning scheme policy apply to all assessable development and to infrastructure, capital assets such as roads, bridges, dams, drainage, water or sewerage systems, which is required to be provided in conjunction with such assessable development.
- (4) When undertaking development, developers and supervising engineers, professionally qualified engineering practitioners who are registered with the Board of Professional Engineers Queensland (supervising RPEQ), should have regard to the standards contained within this document, which are the minimum acceptable to satisfy performance requirements.
- (5) Developers and supervising engineers may propose alternative solutions for Council approval to meet the objectives of these standards including sustainability, safety, legal and environmental considerations.

SC6.14.1.3 General advice

- (1) Where published standards, guidelines, and documents are referenced in this planning scheme policy, it is to be interpreted that the reference is the most current version (including any amendments) of that published standard, guideline or document.
- (2) The developer and supervising engineer are responsible for ensuring the current edition of reference documents is used.
- (3) All standard forms (e.g. as-constructed certificates, CWITP etc.) will be made available by Council in both hard copy and electronic forms.

- (4) Council has adopted the IPWEAQ standard drawings for roads and drainage (except where modified).

Note—all Council documents are available for perusal at Council's Customer Service Centres.

SC6.14.1.4 Place making approach

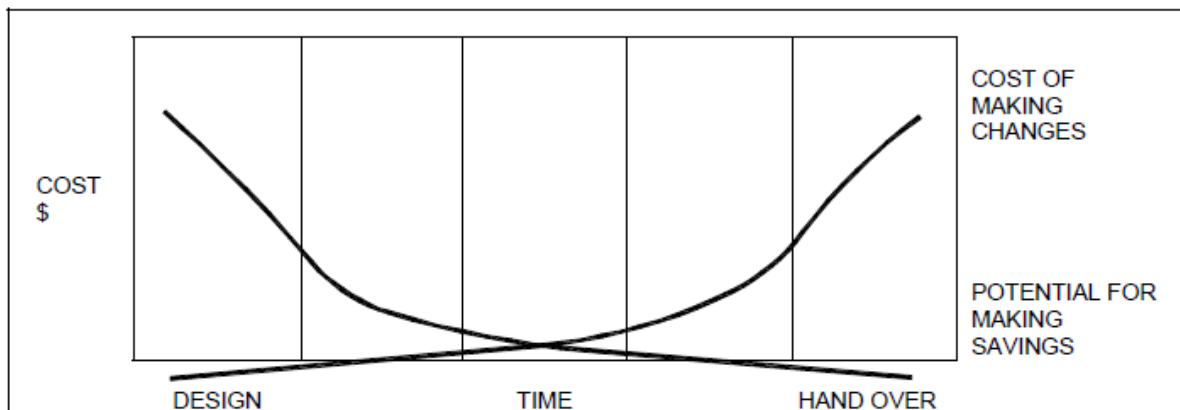
- (1) In the application of the standards identified in this policy, developers and consultants should also be aware that Council has adopted a place making approach to the development of designs for its unique community of communities. In certain instances design standards for a locality may have already been developed.
- (2) In greenfield and other situations where no design palette exists, the purpose of a place making approach is to build on the existing character and values of an area rather than contrive it. Accordingly there will be instances where conditions of development approval will specifically require that design of infrastructure be consistent with Council's adopted place making approach for the particular locality.
- (3) Place making is an integrated approach to working with communities on a broad range of issues from infrastructure to town centre management to community capacity building. It has a philosophy and methodology which is holistic, multidisciplinary and requires long term commitments to people, places and partnerships. It is a tool to achieve sustainable outcomes socially, economically and environmentally to provide our communities with a sense of place and belonging.
- (4) Council has adopted the Place Making Charter to ensure that the unique characteristics and needs of our places, local communities and people are recognised and maintained. The Charter outlines Council's vision with 5 key principles and is supported by Council's Place Making Policy - People, Places and Partnerships. The 5 key principles are:-
- (a) community values and people are at the heart of place making;
 - (b) engaging and collaborating with stakeholders and community;
 - (c) building community capacity to take action;
 - (d) the look and feel of our community centres should reflect the values of the people and place; and
 - (e) achieving integrated and sustainable place outcomes.
- (5) The Placemaking Charter and Placemaking Policy provide an understanding of how Council is undertaking a place making approach to improve its service to each individual community. It outlines Council's vision and highlights a number of place making initiatives and interventions that contribute towards providing a sense of place.
- (6) The overarching philosophy in the design of all works within Council controlled land is to consider these spaces as places, and recognise that they have the ability to strengthen both our identity and our quality of life through good design.

SC6.14.1.5 Life cycle costs and life cycle management plans

- (1) The service provided by contributed assets ultimately becomes the responsibility of the Council to continue to deliver. To support this delivery, Council may require that during the design phase, a life cycle approach be adopted that considers the ongoing management obligations of the asset.
- (2) The required levels of service for contributed assets should be met in the most cost-effective way, and therefore infrastructure should be provided in a manner which maximises resource efficiency and minimises whole of life cycle costs.
- (3) Early identification of costs enables effective decisions to be made in balancing performance, reliability, maintainability, maintenance support and other goals against life cycle costs. Decisions made early in an asset's life cycle, for example during the design phase, have a much greater influence on reducing life cycle costs than those made post handover, as shown diagrammatically in **Figure SC6.14.1A (Potential savings and cost relationship)**.

Schedule 6

Figure SC6.14.1A Potential savings and cost relationship



- (4) The preparation of a life cycle management plan and funding options may be requested for those proposed contributed assets that are considered over and above the level of service represented by the standards contained in this planning scheme policy.
- (5) For these assets to be acceptable to Council, the lifecycle costing of the proposed asset needs to be evaluated to determine:-
 - (a) maintenance and operational requirements for the ongoing management of the asset; and
 - (b) the costs associated with the ongoing management of the asset.
- (6) The maintenance, operational and replacement costs of these assets are to be evaluated over the operating life of the asset or for a minimum of 30 years. Applicants should provide:-
 - (a) a detailed assessment of the relevant infrastructure network and how it operates;
 - (b) a detailed management system; and
 - (c) a forecast of ongoing maintenance costs associated with the operating life of the asset.
- (7) A life cycle management plan should consider all management options and strategies as part of the asset lifecycle from planning to disposal. The objective of this is to consider lowest life cycle cost (rather than short term savings) when making asset management decisions.
- (8) Strategies are to be defined for each stage. Recurrent costs, being operations and maintenance, and capital costs, such as renewal/rehabilitation/replacement, upgrade/augmentation, enhancement (new assets) and disposal are referred to in **Table SC6.14.1A (Life cycle expenditure categories)**.

Table SC6.14.1A Life cycle expenditure categories

Category	Definition	Typical examples
Maintenance	Expenditure related to the ongoing up keep of assets	Mowing, painting, inspections
Operations	Expenditure on day to day activity of business operations	Power costs, utility costs
Renewals / Rehabilitation / Replacement	Expenditure in maintaining the current level of service by reinstating the original life of the asset	Reseal, replacement
Upgrade / augmentation	Expenditure on upgrading the level of service by investment in an existing infrastructure or service	Widening or sealing of roads, traffic calming
Expansion	Expenditure on increasing the level of service by investment in new assets	New assets or services as part of a new subdivision
Disposal	Any costs associated with the disposal or decommissioning of assets	<u>Sale of material or plant, road closure, removal of assets</u>

Schedule 6

- (9) For proposed contributed assets for which Council requires submission of a life cycle management plan and life cycle costing to facilitate Council's assessment of the development proposal, the applicant's submission to Council should be prepared using:-
- (a) Council's standard Whole of Life template;
 - (b) the asset life for each key component of infrastructure as shown in Council's Whole of Life template guideline document; and
 - (c) the set of financial indicators and criteria as shown in Council's Whole of Life template guideline document.

Note—the above documents are available on Council's website.

SC6.14.1.6 Responsibilities – design and construction of engineering works

- (1) All engineering infrastructure approved for construction (including works which is to be transferred to private ownership and works which is to be transferred to Council ownership as a contributed asset), is to be designed and supervised during construction by an engineer who is registered with the Board of Professional Engineers, Queensland.
- (2) The engineer is to ensure that all such infrastructure has been designed and constructed in accordance with the standards identified in this planning scheme policy and in accordance with sound engineering practice. Should the engineer propose a design which does not fall within the range of design alternatives which are consistent with the standards identified in this planning scheme policy, the engineer should discuss the proposal with the relevant engineering and environmental assessment staff at an early stage to determine Council's attitude to the proposal.
- (3) Council's standards for engineering design drawings lodged with development applications are detailed in **Appendix SC6.14A (Standards for engineering design drawings) of Section SC6.14.1 (Introduction)**.
- (4) Drawings should be lodged on A1, and/or A3 sized sheets. Where designs are lodged on A1 sized sheets, at least one copy at A3 size should also be lodged. Design details may also be lodged on A4 sized sheets.
- (5) Stormwater catchment plans and drainage design calculations should be lodged as supporting information to the design drawings.
- (6) For development on existing allotments, site development plans should show proposed site layout, existing contours/levels, proposed levels, proposed paved areas, proposed stormwater layout and levels, proposed driveway access and car parking layout with line marking and other relevant details.
- (7) Design drawings should detail existing and planned utility services and should highlight any potential service conflicts.

SC6.14.3 Stormwater management

SC6.14.3.1 Purpose

The purpose of this section of the **Planning scheme policy for development works** is to:-

- (a) provide guidance on the policy and standards required in relation to the provision of stormwater infrastructure for new development; and
- (b) ensure stormwater infrastructure design and construction satisfies Council's requirements and environmental and safety expectations.

SC6.14.3.2 Application

This section is structured as follows:-

- (a) **Sections SC6.14.3.1 and SC6.14.3.2** provide the framework for the guidelines;
- (b) **Section SC6.14.3.3 and SC6.14.3.4** provides design requirements relating to development design;
- (c) **Section SC6.14.3.5** provides design requirements relating to stormwater drainage;
- (d) **Section SC6.14.3.6** provides design requirements relating to hydrology and watercourse stability;
- (e) **Section SC6.14.3.7** provides design requirements relating to stormwater quality;
- (f) **Section SC6.14.3.8** provides design requirements relating to stormwater harvesting;
- (g) **Section SC6.14.3.9** provides information requirements for stormwater management plans; and
- (h) **Section SC6.15.3.10** contains guidelines for achieving compliance with this section of the planning scheme policy.

SC6.14.3.3 Design requirements

Adjacent properties and lawful point of discharge

- (1) A lawful point of discharge is to be provided to accommodate all roof and surface water runoff:-
 - (a) originating from and flowing through the development site; and
 - (b) originating from the external up-slope catchment flowing through the development site or diverted by the development;
- (2) An applicant proposing to discharge stormwater runoff from a proposed development site in an altered or concentrated form onto any adjoining and/or downstream property, must provide Council with written consent to a future easement from all property owners through which this runoff may flow. The easement is to be registered prior to Council endorsing the plan of survey for lot reconfiguration, or commencement of use for material change of use. Easements across affected properties are to be in accordance with the QUDM.
- (3) Where stormwater runoff from adjacent or upstream properties enters the proposed development site, a stormwater network is to be provided within the new works to accommodate such flows. The stormwater network must ensure that no stormwater ponding occurs on any adjacent or upstream properties and is to be designed in accordance with the hydrological requirements in **Section SC6.14.3.9 (Stormwater management plans)**.
- (4) The stormwater network is to be designed to accommodate a fully developed upstream catchment. The stormwater network must also be designed so that it can be constructed up to the development site's boundaries and extended in the future to accommodate future development without disturbing existing or recently proposed development.
- (5) The tests and principles of QUDM will be applied in determining if a lawful point of discharge has been achieved. If no lawful point of discharge or if no discharge approval agreement has been obtained, then the design cannot be accepted or approved.

Stormwater reserves and stormwater easements

- (6) Stormwater reserve or where appropriate park or road reserve will generally be required over all stormwater flow paths and their verges unless specially approved in the following circumstances:-
- (a) development of rural size lots;
 - (b) development of rural residential size lots where:-
 - (i) the catchment is smaller than 5 hectares;
 - (ii) the flow path does not adjoin a park area; and
 - (iii) blockage of the flow path will not cause flooding of adjoining lots; and
 - (c) development of urban land where:-
 - (i) Council-controlled land does not drain into the flow path;
 - (ii) the catchment is smaller than one hectare; and
 - (iii) blockage of the flow path will not cause flooding of adjoining lots.
- (7) Stormwater reserve or where appropriate park or road reserve will be required over all areas containing detention basins, gross pollutant traps and other stormwater quality improvement devices, and verges required to adequately serve or maintain these devices. The reserve will not be less than 5.0m wide.
- (8) Easements are required over all stormwater networks (natural and constructed), which traverse private property. Additional information is provided in QUDM. All costs associated with the provision of an easement are to be borne by the applicant.
- (9) The building of structures over or upon easements is not generally in the interest of the party that is vested in the easement. Accordingly, development applications that involve a proposal to build over or upon easements are required to demonstrate that:-
- (a) the proposal does not conflict with the terms of the easement agreement;
 - (b) the proposed structure or the construction of the proposed structure does not increase loadings on the underground infrastructure assets;
 - (c) the stormwater network through the easement does not include an overland flowpath or an open channel;
 - (d) the proposed structure does not restrict (or prevent) access of maintenance staff and plant; and
 - (e) fencing allows free passage of flow.
- (10) Vestment:-
- (a) all reserves and easements to be vested to Council shall only occur after written consent is obtained from the relevant stormwater asset custodian and land custodians within Council;
 - (b) easements are to be vested in favour of Council for all stormwater networks structures and/or facilities which are or will be the responsibility of Council to preserve and maintain; and
 - (c) roofwater/inter-allotment stormwater systems and associated cut off/swale drains are considered as private drains and future maintenance responsibility will vest with the property owners. An easement in favour of ~~all upstream property owners~~ Council will be required over these stormwater systems.
- (11) Easement dimensions:-
- (a) easements to be registered in favour of Council are to comply with QUDM and have a minimum width of 4.0m except where the easement is for inter-allotment stormwater systems; and

- (b) easements over ~~roofwater or~~ inter-allotment stormwater systems are to be minimum width of 2.0m for pipes up to 300mm in diameter. All pipes 300mm in diameter or larger are to be covered by easements in accordance with QUDM.
- (12) Existing easements in favour of Council will only be extinguished where the need for the stormwater network through the land not in Council control is determined to be no longer warranted. All costs associated with the surrendering of an easement are to be borne by the applicant. In some cases, Council may require compensation for the loss of the rights under the easement.
- (13) Overland flow easements:-
- (a) this type of easement allows for the passage of stormwater runoff or redirection of flow across the natural land surface. These easements prohibit any activities or works which may obstruct or impede the flow of stormwater runoff unless prior approval is provided. Designs of overland flow path must take into account future fencing that may be constructed across the easement. ~~Generally, overland flow easements shall be in favour of Council, however, private easements in favour of all upstream property owners may apply where in accordance with the circumstances stated in (10)(c);~~
 - (b) any fences to be constructed across easements or along the easement boundary are to provide sufficient access for Council's maintenance or future construction by either the provision of gates or removable sections that are wide enough to allow access;
 - (c) fencing is to allow free passage of flow; and
 - (d) survey levels provided on the design plans will form the basis of the levels required for this overland flow. Survey levels are acceptable on the registered plan of subdivision and provided to AHD.
- (14) Access easements:-
- (a) access easements permit Council to have access from the nearest surveyed road to any stormwater easements, in order to carry out maintenance and/or construction activities or works. This will normally be a requirement of all other stormwater-related easements in favour of Council;
 - (b) in order for stormwater management facilities to function at their designated level of service, most will require some level of periodic inspection, maintenance works, cleaning or repairs. Therefore, consideration is to be given to the maintenance of the stormwater system and stormwater quality management facilities during the design process; and
 - (c) reasonable access for both personnel and equipment is one of the most critical design considerations of both the enclosed and open stormwater networks. Any proposed landscaping should be designed in conjunction with access requirements.
- (15) Maintenance of stormwater reserves and easements:-
- (a) stormwater easements will be covered by a binding agreement between Council and the landholder,
 - (b) trees and understorey vegetation should not be planted on stormwater easements/reserves without the prior written consent of Council;
 - (c) native vegetation is to be retained on the easement/reserve;
 - (d) declared and environmental weeds are to be removed from any easement;
 - (e) no structures, excavation, filling, or stormwater works are to be commenced on an easement or reserve without the prior written consent of Council; and
 - (f) maintenance (including costs) of all stormwater quality management facilities is an important consideration and a detailed management plan or maintenance strategy is to be produced for each facility and submitted to Council for review prior to development approval for operational works.

SC6.14.3.4 Development design

General

- (1) The design of urban stormwater systems is to be in accordance with the following guidelines with this order defining the precedence of any one document over another:-
 - (a) QUDM;
 - (b) *Water Sensitive Urban Design Guidelines for South East Queensland*; and
 - (c) *Australian Rainfall and Runoff (ARR)*.
- (2) The design of rural stormwater systems is to be in accordance with the following guidelines with this order defining the precedence of any one document over another:-
 - (a) *DTMR – Road Drainage Manual*; and
 - (b) *Australian Rainfall and Runoff (ARR)*.
- (3) The interpretation of urban and rural environments is to be made by reference to the zone within which the land is included in the planning scheme.
- (4) Drainage structures are to be in accordance with the IPWEAQ Standard Drawings.
- (5) Inter-allotment stormwater systems or roofwater stormwater systems that take more than one allotment do not discharge to kerb and channel. The inter-allotment stormwater systems or roofwater stormwater systems are to be connected to a Council gully pit, field inlet or manhole to the satisfaction of Council. Inspection pits or field inlets (constructed at the low point of each allotment) are to be provided at regular intervals along the roofwater stormwater system and must be in accordance with IPWEAQ Standard Drawing D-0110.
- (6) A connection point at the lowest point is to be provided for each property. This connection point is to be a minimum of 100mm in diameter for Urban Residential-Low Density, 150mm for Urban Residential High Density and 225mm for commercial or industrial development as defined in QUDM.
- ~~(7) All rear of allotment (roofwater) stormwater systems are to discharge to a Council gully, field inlet or the like and not to the kerb and channel. Inspection pits or field inlets (constructed at the low point of each allotment) are to be provided at regular intervals along the roofwater stormwater system and must be in accordance with IMEAQ Standard Drawing D-0110.~~
- ~~(7)~~ Where there is a requirement for the stormwater management system to connect to an existing Council asset, the connection is to:-
 - (a) not cause structural damage to or failure of the existing asset;
 - (b) be appropriately sealed; and
 - (c) not interfere with or reduce the intended purpose of the existing asset.
- ~~(8)~~ For connecting pipes into enclosed stormwater networks connections are to be made only to gully pits, manholes and field inlets. The connection is to be core-drilled and sealed with a two-part epoxy sealant.

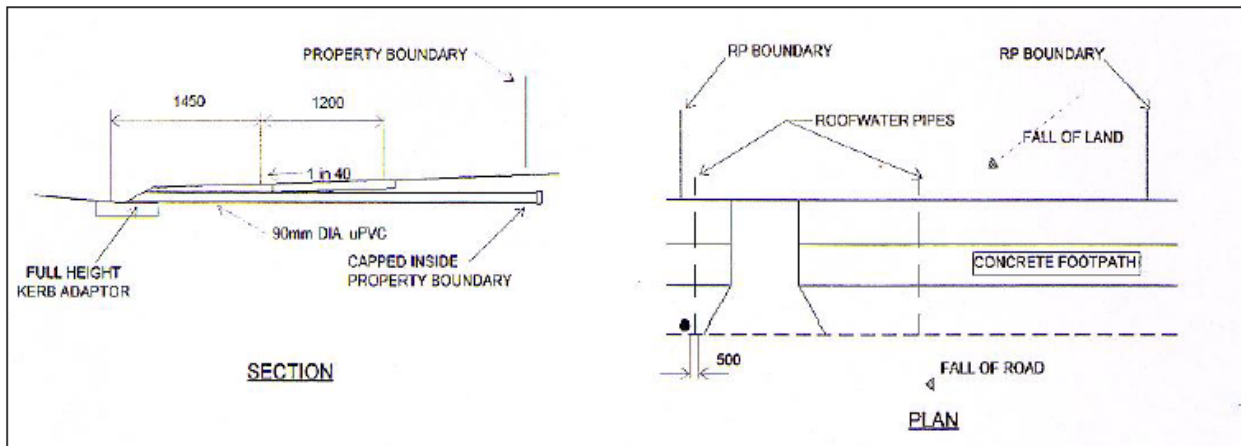
Residential zone category

- ~~(9)~~ Land in the Low density residential zone as defined in the planning scheme is to be considered as Urban Residential-Low Density where greater than 5 dwellings per hectare but less than 20 dwellings per hectare in accordance with QUDM and as such, the appropriate minor storm design event and runoff co-efficient as per QUDM will apply.
- ~~(10)~~ Land in the Medium density residential zone, High density residential zone or Tourist accommodation zone as defined in the planning scheme where greater than 20 dwellings per hectare or for multiple dwellings is to be considered as Urban Residential-High Density in accordance with QUDM.
- ~~(11)~~ Allotments which do not fall at least 1 in 200 towards the road reserve must be provided with a rear of allotment roofwater stormwater system in accordance with QUDM. A minimum Level 32 is

required for ~~all Urban Residential – Low Density lots, while Level 3 will be required for all other activities of residential development (except rural and rural residential). This roofwater system will be required regardless of the downhill property type. Hydraulic engineers shall determine the size of Level 1 soakage pits (if allowed), and Level 3 bund or raised mowing strip.~~

- (43)(12) For allotments which do fall towards the road reserve (refer **Figure SC6.14.3A (Residential outfalls towards the road)**), two kerb adaptors are to be provided and are to conform to IPWEAQ Standard Drawing R-0081. One should be located at the centre of the block and the other 500mm from the common boundary on the low side. Where a concrete footpath is to be constructed a 90mm diameter UPVC pipe is to extend from the adaptor to the property boundary in accordance with Council's Standard Drawings.

Figure SC6.14.3A Residential outfalls towards the road



- (44)(13) At least one connection point generally at the lowest point is to be provided for each property. This connection point is to be a minimum of 100mm in diameter for Urban Residential – Low Density and 150mm for Urban Residential – High Density (QUDM).

Rural and Rural residential zone category

- (45)(14) Development in the Rural zone and the Rural residential zone as defined in the planning scheme is to be considered as Rural Residential in accordance with QUDM.
- (46)(15) For land in the Rural zone or Rural residential zone, stormwater runoff from the road reserve may be discharged directly onto the subject subdivision should it be impossible to direct stormwater to a watercourse.
- (47)(16) A stormwater reserve or easement will be required over the stormwater outlet from the road reserve (refer to **Section SC6.14.3.5 (Design requirements – stormwater drainage)**). A property note informing property owners that stormwater discharges will occur during rainfall and that the amenity of their allotment may be reduced may be applied.
- (48)(17) Allotments which are less than 2000m² in area and have on-site effluent disposal require inter-allotment stormwater. This should be designed as per Urban Residential – Low Density (QUDM).

(49)(18) ~~Access to Rural residential and Rural building sites is to flood free during a 39% AEP event and ensure that a low hazard criteria is met. The safety of the site can be determined by the following equation: Low Hazard: $D + 0.3V \leq 0.8$ where D = depth of floodwater in the DFE (m) and must be less than 0.8m and V = velocity of floodwaters in the DFE (m/s) and must be less than 2m/s.~~

Centre zone category and Industry zone category

- (20)(19) Development in the Centre zone category as defined in the planning scheme is to be considered as:-
 - (a) Commercial and Industrial in accordance with QUDM; and

(b) Central Business and Commercial in accordance with QUDM.

(21)(20) Development in the Industry zone category as defined in the planning scheme is to be considered as:-

(a) Commercial and Industrial in accordance with QUDM; and

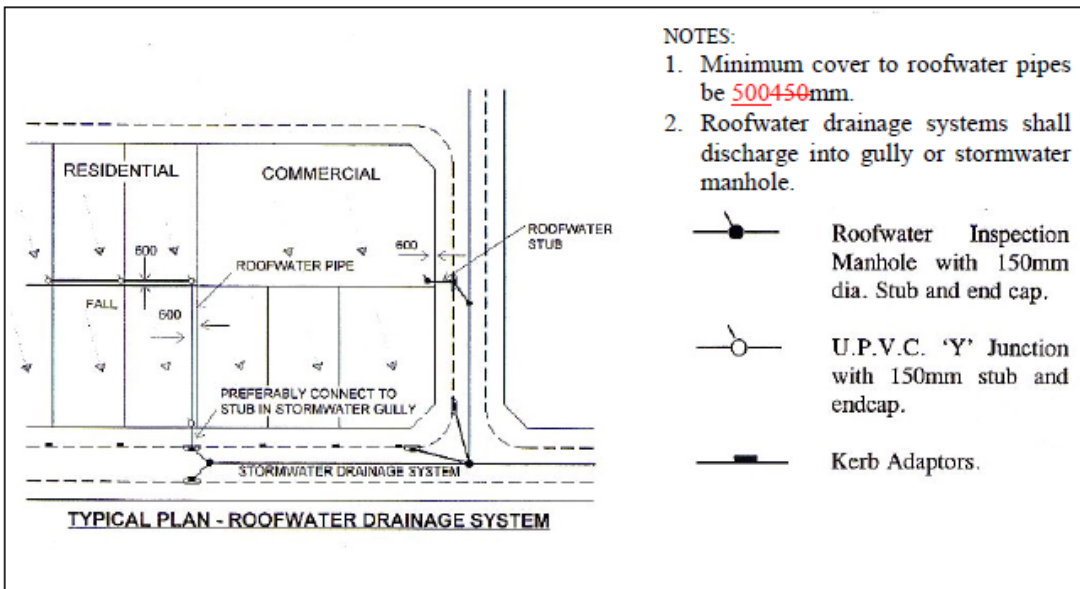
(b) Industrial in accordance with QUDM.

(22)(21) Should the land fall away from the road reserve, roofwater stormwater system must be provided in accordance with QUDM (Levels, 3, 4 and 5).

(23)(22) For land which falls towards the road reserve, the roofwater system is to be piped and connected to the trunk drainage system at a manhole or gully. A stub is to be provided in new stormwater networks for this purpose, located 600mm within the front property boundary (refer **Figure SC6.14.3B (Inter-allotment stormwater locations)**). This must also be within 1.2m from the common boundary on the low side (refer Council's Standard Drawings). Where a site is being redeveloped, the lot must be reconfigured to ensure that these requirements are met.

(24)(23) At least one connection point, generally at the lowest point, is to be provided for each property. This connection point is to be minimum of 225mm for commercial or industrial development (QUDM).

Figure SC6.14.3B Inter-allotment stormwater locations



Recreation zone category

(25)(24) Development in the Recreation zone category as defined in the planning scheme is to be considered as Open Space and Parks in accordance with QUDM.

(26)(25) The natural stormwater corridor should be retained in land designated for public open space, i.e. park, stormwater, or road reserve.

(27)(26) Pipe stormwater networks are generally required through parks designated for active use. Care should be taken over the design of surcharge pits and inlet structures, so as to ensure that safety and amenity criteria are satisfied.

(28)(27) The planning for dual use (e.g. stormwater networks and park) is to be integrated within the whole planning process to ensure that the final design provides for amenity, health and safety and stormwater management functions of the development.

(29)(28) For public safety purposes, all public facilities such as play equipment and BBQs are to be located clear of 1% AEP flood levels and clear of 1% AEP overland flow paths.

~~(30)~~(29) Stormwater standards to be applied to a dual use area must be considered in terms of the mix of functional uses such as:-

- (a) general open space areas with a low to high need for access by pedestrians and cyclists;
- (b) passive areas with a low to high visitation;
- (c) active areas in low to high tourist significant areas; and
- (d) natural watercourses with low to high ecological significance.

~~(31)~~(30) Appropriate stormwater standards for particular areas will be required by Council having regard to the following:-

- (a) major flood capacity;
- (b) convenience flood capacity – minor event in terms of interval event and the time to drain ponded sites;
- (c) maintenance costs (e.g. batter slopes between 1 in 4 and 1 in 6);
- (d) safety (e.g. maximum $D \times V$ of $0.4 \text{ m}^2/\text{sec}$);
- (e) stability factors such as resistance to scour or slip; and
- (f) ecological considerations such as preserving valuable areas, appropriate planting in waterway areas and minimum impact on existing riparian/aquatic ecosystems.

SC6.14.3.5 Design requirements – stormwater drainage

General

- (1) All stormwater quantity discharges are to be calculated in accordance with QUDM unless approved otherwise.
- (2) Roofwater and allotment surface stormwater runoff is to be piped for the minor design storm and must comply with AS 3500.3 and QUDM.
- (3) Discharge from outside of Council's stormwater catchments is not to be directed into Council's stormwater system.
- (4) To reduce sudden increases in roadway flow widths, stormwater runoff discharges in excess of 50 litres per second for the 5% AEP storm event must be piped to a Council stormwater drainage system (i.e. gully (catchpit), access chamber, etc.) and not to the kerb and channel.
- (5) Should any internally collected stormwater runoff be designed to bypass its pre-developed point of discharge into Council's stormwater system, Council's gully which would receive this additional runoff must be analysed to ensure its functionality. This also includes the gully's connection to the trunk stormwater network.
- (6) Should an adjacent property or properties by virtue of topography and/or existing development require current or future gravity fed stormwater discharge through the subject site an easement in favour of that property or properties is to be provided. This easement will extend from the road reserve to the registered boundaries adjoining these properties (refer to QUDM for easement widths). A drain or connection (minimum of 225mm diameter) is to be constructed in this easement so as to reduce future impacts to residents of the subject site.
- (7) Existing overland flow paths are to be preserved.
- (8) The development design may be rejected if it incorporates structures and facilities that:-
 - (a) require considerable maintenance;
 - (b) are difficult to maintain;
 - (c) require specialist maintenance services that are not common to Council's maintenance services; or

Schedule 6

- (d) are small and numerous when there is a viable alternative.
- (9) The stormwater system will not be accepted off-maintenance or connected to an existing downstream canal or waterway until there has been compliance with all aspects of the approved stormwater management plan including water quality objectives and performance criteria.

Natural waterways and drainage paths

- (10) The development design and site layout is required to consider the natural waterways and drainage paths to achieve the requirements of the **Biodiversity, waterways and wetlands overlay code**.
- (11) Council's preferred approach is for waterways and drainage paths to remain in their natural state. Some selective clearing and maintenance may only be carried out with the approval of Council.
- (12) The natural waterway and drainage paths are to be analysed for 39%, 18%, 10%, 5%, 1%, 0.5%, 0.2% AEP flows and PMF with the predicted flood contour lines provided on all relevant plans. Council may relax the required AEP events to be modelled dependent on the scale and type of the development and the characteristics of the natural waterway. Land filling is not to occur below these levels unless it can be demonstrated that there will be no detrimental effects to other properties along the waterway/drainage path and there is no net filling below these levels. The waterway's natural state should control the type, volume and placement of fill allowable in a development application.
- (13) For natural waterways and drainage paths, the development is to be planned and designed so that the 1% AEP flood event is contained within a drainage reserve or where appropriate park or drainage easement.

Natural channel design

- (14) The design, implementation and/or construction of any natural channel or natural channel rehabilitation works are to be in accordance with the *Brisbane City Council (BCC) Natural Channel Design Guidelines*.
- (15) In addition to the requirements within the *BCC Natural Channel Design Guidelines*, Sunshine Coast's local topography, geology and geomorphology are to be considered in the design of natural channel works or natural channel rehabilitation works.
- (16) An extended maintenance period may be required until the channel has sufficiently stabilised and vegetative cover is well established. The desired style of drainage channel can vary from a grass lined overland flow path for very small catchments, to a fully established river channel for large catchments.
- (17) Desirable bed conditions in a reconstructed watercourse usually depend on the following factors:-
 - (a) catchment areas;
 - (b) catchment soil type (infiltration capacity) and erodibility; and
 - (c) canopy cover.
- (18) Any works within receiving waters, including natural channel design, are not to be included as a treatment device in any stormwater treatment train models.

Open channel design

- (19) Open channels are to be designed in accordance with QUDM, with particular attention to the structural design requirements.
- (20) Open channels are to be designed to cater for the major design storm event and are to include freeboard provisions in accordance with this planning scheme policy. Open channels through parkland or open space areas may be designed to cater for 10% AEP flows. The associated overbank flow areas, which cater for the difference between 1% AEP and 10% AEP flows are to be designed to ensure low velocities occur during flood, while enhancing amenity values during non-flood periods.
- (21) Soft lined channels are to be designed to have maximum 1v:4h side slopes for vegetated channels and 1v:6h side slopes for grass lined channels. Soft lined open drains or channels must

be designed in a manner that permits maintenance activities such as grass and brush cutting, debris removal, relining and structural repairs.

- (22) Council's minimum landscaping requirements for open channels dictates a minimum Manning's *n* of 0.12 although greater values may be directed by Council where deemed appropriate. A sensitivity analysis should always be undertaken for a Manning's *n* 50% higher than design roughness to ensure the freeboard is not exceeded and a sensitivity analysis should always be undertaken for a Manning's *n* 50% lower than design roughness to ensure scour thresholds are not exceeded.
- (23) **Table SC6.14.3A (Floodplain re-vegetation density guidelines for various Manning's Roughness values)** provides a semi-quantitative approach towards the evaluation of various Manning's roughness coefficients (refer *BCC Natural Channel Design Guidelines*).

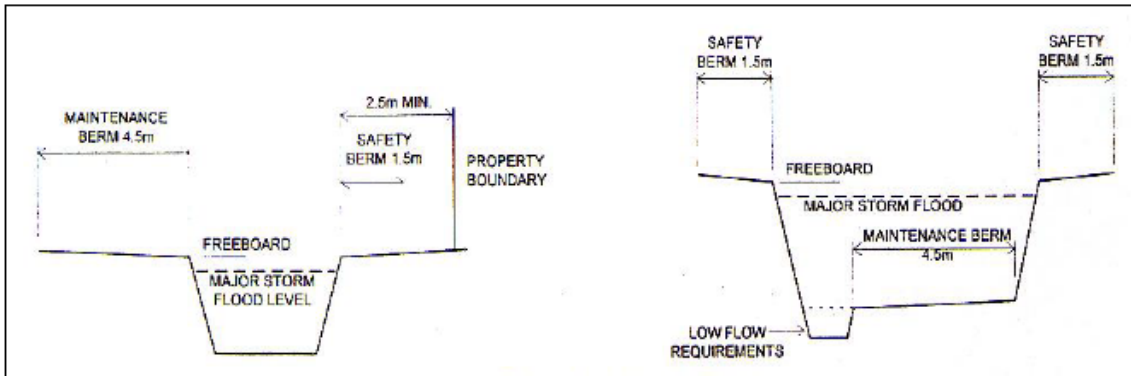
Table SC6.14.3A Floodplain re-vegetation density guidelines for various Manning's Roughness values

Manning's <i>n</i>	Description
0.03	Short grass with the water depth >> grass height.
0.04	Short grass with the water depth >> grass height on a slightly irregular earth surface. Trees at 10.0m spacing and areas are easy to mow.
0.05	Long grass on an irregular (bumpy) surface with few trees and irregular ground could make grass cutting difficult. Alternatively, trees at 8.0m spacing on an even, well grassed surface, no shrubs, no low branches.
0.06	Long grass, trees at 6.0m spacing, few shrubs. Easy to walk through vegetation. Area not mowed, but regular maintenance is required to removed weeds and debris.
0.07	Trees at 5.0m spacing, no low branches, few shrubs, walking may be difficult in some areas.
0.08	Trees at 4.0m spacing, some low branches, few shrubs, few restrictions to walking.
0.09	Trees at 3.0m spacing, weeds and long grasses may exist in some locations. Walking becomes difficult due to fallen branches and woody debris.
0.10	Trees at 2.0m space, low branches, regular shrubs, no vines. Canopy cover possible shades weeds and it is difficult to walk through.
0.12	Trees at 1.5m spacing with some low branches, a few shrubs. Slow to walk through.
0.15	Trees and shrubs at 1.0m spacing, some vines, low branches, fallen trees, difficult and slow to walk through. Alternatively, a continuous coverage of woody weeds with sparse leaves and no vines.
0.20	Trees and shrubs at 1m spacing plus thick vine cover at flood level and fallen trees, very difficult to walk through. Alternatively, a continuous coverage of healthy shrubs and woody weeds from ground level to above flood level

Note—maximum possible flow velocities for water passing through/over vegetation is dependant on the Mannings roughness and shall be in accordance with QUDM Table 9.05.1 and Table 9.05.3.

- (24) Designed open channels are to have as minimum a 1.5m safety berm on each side. A 4.5m maintenance berm is also required on one side or both sides, if more than 15.0m between top of banks. This maintenance berm may be located within the open channel above the minor storm flow level or alternatively it may also include the safety berm, provided that the maintenance berm is above the major storm flow level and associated freeboard (refer **Figure SC6.14.3C (Berms)**).
- (25) The top of bank should be a minimum of 3.0m from any private property.

Figure SC6.14.3C Berms



Overland flow paths

- (26) Overland flow paths are to be shaped so that the overland flow component of the 1% AEP storm flow is fully contained within the flow path, reserve or easement with a minimum 100mm freeboard to adjoining lots. Flow paths are to also fully contain the 1% AEP storm flow as overland flow to cater for the incidence of a fully blocked underground stormwater network.
- (27) Where an overland flow path is used also for public access the depth by velocity product for the overland flow component of the 1% AEP storm flow does not exceed $0.4\text{m}^2/\text{sec}$.
- (28) Any proposed development is to take account of existing or created overland flow paths and make due provision in the design. Design maximum overland flow velocity should not exceed $2.0\text{m}/\text{sec}$ with depth of flow not exceeding 300mm and depth by velocity product not exceeding $0.4\text{m}^2/\text{sec}$.
- (29) Overland flow paths should be located in road reserves, parks, pathways or other Council controlled land. Overland flow paths should not traverse private property, but may be permitted through non-Council controlled land with the appropriate easements as detailed in this section.
- (30) Overland flow paths and proposed drainage reserves and easements are to be clearly indicated on the engineering drawings.
- (31) In site developments such as multiple dwellings (apartments/ townhouses) where the sites are filled to provide suitable falls to the roadway, particular attention is to be paid to the preservation of existing overland flow paths, the obstruction of which may cause flooding or ponding of stormwater on adjoining properties.
- (32) Overland flow paths not in designated channels are required to have a velocity depth product of no greater than $0.4\text{ m}^2/\text{sec}$ and a maximum depth of 300mm (applicable to vehicular accommodation and access areas) for the 1% AEP event. Where these values are exceeded, alternative layout or upgrade to the pipe drainage system may be required.
- (33) Where there is no alternative layout (especially in built up areas) or where the overland flow path is completely blocked, underground drainage to PMF capacity will be required. The inlet capacity is to be designed to allow for an additional 50% blockage factor.
- (34) Details and calculations are required for all overland flow paths. Calculations are to demonstrate that overland flow will not enter lots during a 1% AEP flow and that freeboard is achieved during this event. Stormwater calculations, cross sections and plan layouts are to be provided for any proposed overland flow path. The applicant is required to ensure that as-constructed levels are consistent with those shown on the approved engineering drawings.
- (35) The localised overland flow and site drainage in smaller allotment subdivisions or where built to boundary building envelopes apply will also require the applicant to carefully design the stormwater network. Additional pipe stormwater networks, easements and concrete lined drains may be required along the rear boundary of lots including the boundary of the development.

Public safety

- (36) The enclosed stormwater network (including manholes, GPTs, gully manholes and other enclosed structures) is to be designed in accordance with AS 2865: Safe Working in Confined Spaces and particular attention is required in regard to Section 7 of AS 2865.

- (37) Detailed safety requirements for all ponded water bodies proposed for areas of public open space are:-
- (a) side slopes are to be no steeper than 1:6 (H:V), with recommended slopes of 1:8 (H:V);
 - (b) water's edge is to be offset at least 15.0m from allotment boundaries or roadways except where safety fencing is provided;
 - (c) interim fencing is required between the construction and establishment of vegetation within the water body (typically during the on-maintenance period) where any part of the water body is deeper than 350mm; and
 - (d) areas are to be fenced and gated in any areas where the above safety requirements are not met (e.g. in maintenance access areas).
- (38) Urban waterways and stormwater drainage systems can represent a significant safety risk during storms and times of flood. The design of urban waterways and stormwater drainage systems that require safety fencing is strongly discouraged and should only be used if it is impractical or unfeasible to design the system such that it does not represent an unacceptable risk. Risks associated with urban waterways and stormwater drainage systems shall be managed in accordance with QUDM.

Stormwater network layout

- (39) The stormwater network layout is to be generally in accordance with QUDM. However, pipe work within the verge is generally not permitted.
- (40) Alignments may vary depending on the location of sewer mains and pits but should generally be located as follows:-
- (a) rear boundary within 2.5m; and
 - (b) side boundary within 1.2m.
- (41) Manhole covers within road carriage ways are to be located to reduce potential noise created by covers that are driven over.
- (42) Gully to gully drain lines are acceptable for pipes 600 mm diameter or less provided that the design complies with all the following:-
- (a) gullies are consistent with Council's Standard Drawings;
 - (b) acute angles in connecting pipes are avoided to minimise head losses;
 - (c) potential interference with other utility services on the footpath is avoided;
 - (d) the major stormwater line (spine) of the gully to gully system is constructed on one side of the road only. Any gullies on the opposite side of the road are to be connected directly across the road. Under no circumstances are spines of gully to gully systems permitted on both sides of the road; and
 - (e) the gully pit is appropriately benched.
- (43) Gully manholes are not considered to be appropriate and are not a preferred solution. However, there are rare instances that gully manholes are necessary. Accordingly, gully manholes may be approved provided that compliance with all of the following is achieved:-
- (a) the inlet and manhole is at the same point (e.g. at the sag of the road);
 - (b) it is the only alternative to a multi-grated inlet;
 - (c) written advice from the responsible utility authority is submitted stating that the existing services will preclude the construction of the conventional herringbone layout without substantial utility service relocation costs;
 - (d) Council's standard components such as lintels and grates are to be used wherever possible;

- (e) hydraulic analysis and structural testing data are to accompany the design if it is proposed to use alternative components;
- (f) the gully manholes are not to pose a public safety risk; and
- (g) the gully manhole complies with the requirements as detailed in this section.

Pipes

- (44) Pipes within the stormwater conveyance system shall have a minimum diameter of 375mm including anti-ponding gullies.
- (45) Pipes of 300mm are acceptable for driveway or road culverts providing that if the capacity is exceeded there is no risk to other assets or worsening.
- (46) While Council will approve the use of any structurally sound pipe, prior approval must be sought for the use of any pipe other than steel reinforced (RCP) concrete pipes. Saltwater cover RCP pipes are to be used in locations where the stormwater network may be subject to tidal wetting and drying.
- (47) Rubber ring joint pipes are to be used for all pipes. Prior approval must be sought for the use of external band joint pipes, pipes up to and including 600mm diameter and external bands (EB Joint) for larger than 600mm diameter. Butt joint pipes are not permitted.
- (48) Service and construction loadings are to be calculated in accordance with AS 3725: Loads on Buried Concrete Pipes. In many cases, construction loading will be the critical load case for selection of pipe class. AS 4058: Precast Concrete Pipes (Pressure and Non-Pressure) will apply for testing requirements or where standard steel reinforced concrete pipes may be exposed to aggressive conditions.
- (49) To counteract premature pipe cracking, the following are required:-
 - (a) the design and selection of the pipe type and class is to consider construction loading (based upon the calculations described above), which is usually the critical load case for pipes < 900mm diameter;
 - (b) stormwater plans issued for construction are required to indicate for each drain line the following:-
 - (i) pipe type and class;
 - (ii) installation type; and
 - (iii) construction method (layer thickness, compaction plant);
 - (c) design aids available from concrete pipe manufacturers may be used and are recommended. These include software for calculation of loads on pipes to AS 3725, tables and charts. It is recommended that charts showing the relationship between compaction equipment and pipe class are also included with the engineering drawings;
 - (d) no more than two weeks before the on-maintenance inspection and prior to the formal acceptance of on-maintenance, closed circuit television camera (CCTV) inspection is required to demonstrate that the standard of the stormwater network is acceptable to Council. CCTV inspections can be arranged through suitably qualified service providers. Any defects identified by the inspection are to be repaired or replaced or as directed by Council. A follow up camera survey is required to demonstrate that the remediation measures are satisfactory. The CCTV pipe surveys are required to conform to Council's standard inspection and reporting protocols; and
 - (e) cracked pipes shall be rejected. Hairline or crazing cracks associated with concrete shrinkage are permitted.

Box culverts

- (50) Box culverts may be used where low vertical clearances exist or as approved; however, circular sections should be used in enclosed stormwater networks wherever possible.
- (51) Box sections are to be constructed from precast reinforced concrete box culvert sections.
- (52) The minimum dimension of a box culvert is to be 375mm.

Manholes

- (53) Manholes are to be designed and constructed in accordance with Standard Drawings from IPWEAQ or the State Road Authority or equivalent. Any manholes required outside these standards must be structurally certified by a RPEQ.
- (54) Benching is not recommended. However, deflection devices may be used if improved hydraulic efficiency is required.
- (55) Manholes are to be avoided in road pavements and trafficable areas wherever possible. Typically stormwater drainage systems are to be designed from gully pit to gully pit.
- (56) Precast manholes are acceptable.
- (57) The spacing of manholes is to be in accordance with QUDM.
- (58) Where stormwater manholes are located in major stormwater event flow paths or where the design hydraulic grade line is above the top of the manhole, bolt down manhole covers are required.

Gully pits and catch pits

- (59) Council will permit the following types of gullies or catchpits (or alternative brands that meet the same specifications):-
 - (a) IPWEAQ Gully with cast iron bicycle-safe grate roadway type, lip in line (Refer IPWEAQ Standard Drawing D-0063); and
 - (b) inlets are to be provided with Max Q bicycle-safe grates only. Fluted grates and concrete filled covers will not be permitted.
- (60) Inlet capacity charts for IPWEAQ are available in QUDM. Designers should use these charts and the appropriate provisions for blockage as set out in QUDM.
- (61) All gullies or catchpits are to be designed so as to be Lip-in-line (Refer IPWEAQ Standard Drawings D-0063 and D-0067), except for "anti-ponding" gullies. The minimum outlet pipe for gullies or catchpits is to be 375mm nominal diameter, except for anti-ponding gullies where a 300mm diameter pipe may be used.
- (62) Allowable flow widths and capacity are as follows:-
 - (a) multilane roads (with more than one lane travelling in one direction) – refers to Section 11.2.2 of the *Queensland Department of Transport and Main Roads - Road Drainage Manual 2010*;
 - (b) sub-arterial roads, trunk collector roads, collector streets and access streets, as defined in Queensland Streets;
 - (c) intersections on State controlled roads and side streets connecting to State controlled roads (up to the end of the auxiliary lanes or tapers leading onto the state-controlled road) – refer to Section 11.2.2 of the *Queensland Department of Transport and Main Roads - Road Drainage Manual 2010*; and
 - (d) other intersections - refer to QUDM.
- (63) None of the requirements outlined in this section reduces the depth requirements stipulated elsewhere in these guides.
- (64) On rural roads the design flows or ponding in the table drain is not to encroach upon the shoulder for the longitudinal or cross drainage.
- (65) For gully pit capture charts, refer to Council's Standard Drawings.

Field inlets and pipe outlets

- (66) General design:-

- (a) for inlets within or outlets to an overland flow path, the design should generally be in accordance with IPWEA Standard Drawing D-0080. Maintenance and amenity factors should also be considered.

(67) Field inlets:-

- (a) Council will permit the use of IPWEA Field Inlet Type 1 & 2 (Refer Standard Drawing D0050) or alternatives that meet the same specifications;
- (b) field inlets (and surcharge pits) are to be designed and constructed in accordance with the above mentioned standard drawing or DTMR equivalent;
- (c) a 50% blockage factor is to be applied during design calculations. When debris is expected, a raised grated inlet is required with a locking device;
- (d) further design information, including appropriate bar spacing of the grate is provided in QUDM.

(68) Pipe outlets:-

- (a) energy dissipaters will generally be required at all outlets to reduce velocity to acceptable levels. Refer to QUDM for permissible velocities;
- (b) drowned outlets are not to be used without prior approval, except where enclosed drains outlet to a canal;
- (c) for inlet headwalls where the pipe invert is located below the natural channel invert such that a standard field inlet is not warranted (e.g. the drop is less than the pipe diameter), a masonry "inverted curtain wall" is to be constructed across the headwall apron in preference to stone pitching outside the headwall;
- (d) refer to *BCC Stormwater Outlets in Parks and Waterways* for design of drop structures and stormwater outlets.

Structural design

- (69) Designers are referred to QUDM for the structural design of the enclosed stormwater network. Further information on pipe, RCBC bedding and backfilling can be gained from IPWEAQ Standard Drawings or State Road Authority equivalent.

SC6.14.3.6 Design requirements – hydrology and watercourse stability

Waterway stability management

- (1) Development prevents increased channel bed and bank erosion in watercourses by limiting changes in flow rate and flow duration within receiving waters. This will be achieved by limiting the post-development peak 63% AEP event discharge within the receiving waterway to the pre-development peak 63% AEP discharge.
- (2) The waterway stability objective is only applicable when runoff from the site passes through or drains to natural channels, non-tidal waterways or wetlands as detailed in **Table SC6.14.3B (Triggers for application of waterway stability management objective)**.

Table SC6.14.3B Triggers for application of waterway stability management objective

Situation	Application of Waterway Stability Management Objective
Runoff from or within the site does not pass through or drain to natural channels, non-tidal waterways or wetlands	Exempt
Runoff from or within the site passes through or drains to natural channels, non-tidal waterways or wetlands	Apply if development type is not exempt from application of stormwater quality design objectives

- (3) Compliance with this design objective can be demonstrated using design procedures detailed in QUDM.

- (10) Developments for which compliance with the peak flow management objective is required must determine the volume of detention needed and ensure that the required detention volume is provided in the development design. The objective is to ameliorate the impact of urbanisation as much as possible, and to prevent nuisance flooding and flood damage as best as physically practical.
- (11) The required detention volume for the development is to be calculated through the hydrological routing methods. Using such hydrological routing methods, the detention volume for a sub-catchment can be determined across the development site thus allowing the developer to assign detention requirements between separate basins and/or on-site detention requirements.
- (12) Detention basins:-
- (a) the hydraulic design of detention (dry) and retention (wet) basins is outlined in QUDM and further information is provided in various publications;
 - (b) basins are to be analysed for the entire range of design storms (1% AEP). Design procedures are provided in QUDM;
 - (c) the recommended maximum batter for grassed slopes is to be 1v in 6h and for vegetated batters is to be 1v in 4h;
 - (d) the maximum depth of water in a wet basin, lake or dam less than 0.5ha in area is to be 1.2m during dry weather flows;
 - (e) for detention or dry basins:-
 - (i) the maximum depth of water in the basin is to be 1.2m at 5% AEP flows;
 - (ii) subsoil drainage may be required. However, designs which assist the recharge of groundwater are encouraged, provided that the surface does not remain water-logged for more than a few days;
 - (iii) the relevant site soil conditions will determine if this is possible or necessary; and
 - (iv) low flow provisions are to be catered for. This is to be a minimum of 63% AEP and should be piped between the inlet and outlet structure. The basin floor is to have a minimum grade of 1v in 150h;
 - (f) inlet/outlet weirs:-
 - (i) are to have depth velocity products in line with QUDM. In some cases, a number of smaller outlets may be required, instead of one large outlet. The use of multiple outlets will also reduce the likelihood of system blockage. Multiple outlets may also be necessary when limiting outflow to pre-developed rates; and
 - (ii) should employ appropriate landscaping so as to improve the amenity of the area by screening of inlets and outlet(s). Care must be taken to ensure trees or shrubs used do not affect the hydraulics of the structure or increase the risk of blocking by vegetative matter (i.e. small leafed type vegetation is preferred to broad leafed type);
 - (g) for safety:-
 - (i) signs are to be placed at relevant locations warning of the possible hazards such as water depth, piped inlet suction, major spillway effects; and
 - (ii) downstream effects of spillway usage need to be considered during design; and
 - (h) detention basins are also required to comply with the requirements under the *Water Act (2000)*.

SC6.14.3.7 Design requirements – stormwater quality

Design objectives for stormwater quality management

- (1) Development protects or enhances the environmental values and water quality of receiving waters or buffer areas within or downstream of the site by achieving the design objectives for stormwater quality management specified in **Table SC6.14.3F (Stormwater quality design objectives – operational (post construction) phase of development)** prior to discharge to receiving waters or buffer areas within or downstream of the site.

Table SC6.14.3F Stormwater quality design objectives – operational (post construction) phase of development

Pollutant	Minimum reductions in mean annual loads from unmitigated development (%)
Total Suspended Solids (TSS)	80
Total Phosphorous (TP)	60
Total Nitrogen (TN)	45
Gross Pollutants > 5mm	90

- (2) The stormwater quality design objectives are only applicable when required by **Table SC6.14.3G (Triggers for application of stormwater quality design objectives)**. For development where the stormwater quality design objectives are not applicable alternative measures appropriate for the scale of development are outlined.

Table SC6.14.3G Triggers for application of stormwater quality design objectives

Development type		Application of stormwater quality design objectives	Alternative management measures required
Dual occupancy		Exempt from WSUD load reduction targets	
MCU for urban purposes other than industrial (refer QUDM)	Lot size < 2500m ²	Exempt from WSUD load reduction targets	Harvesting and reuse of stormwater (rainwater tanks connected to toilet and for outdoor use) and runoff from impervious areas to be sloped to landscaped areas
	Lot size ≥ 2500m ²	WSUD load reduction targets apply to the developed portion of the site ¹	
MCU for industrial	Lot size < 850m ²	Exempt from WSUD load reduction targets	Harvesting and reuse of stormwater (rainwater tanks connected to toilet and for outdoor use) and runoff from impervious areas to be sloped to landscaped areas
	Lot ≥ size 850m	WSUD load reduction targets apply to the developed portion of the site ²	
Reconfiguring a Lot	Reconfiguring that includes a new road ³	WSUD load reduction targets apply	
	Reconfiguring that does not include a new road	Exempt from WSUD load reduction targets	Harvesting and reuse of stormwater (rainwater tanks). Protect vegetated buffers to waterways

Notes –

1. Sparse or distributed sites (e.g. cabins spread over a site) are exempt from WSUD targets.
2. For sites between 850m² and 2500m², the WSUD load reduction targets only apply if it is reasonable to extend the existing piping system to the site. The calculation to determine a reasonable extension is: reasonable length of pipe (m) = site area (m²)/50.
3. ~~New roads in rural residential/rural reconfigurations are exempt from these requirements. WSUD load reduction targets only apply to the impervious surface of the new roads. For rural residential/rural reconfigurations with lot sizes greater than 3,000m² see alternative management measures for stormwater quality management (refer SC6.14.3.7(8)).~~

Complying solutions for stormwater quality management

- (3) For certain types of development for which application of stormwater quality design objectives is required, deemed to comply solutions will be accepted. The deemed to comply solutions and developments for which they are applicable are detailed in the latest version of the *Water by Design Bioretention Technical Design Guideline*.

- (4) The deemed to comply solutions remove the need to undertake detailed modelling to size the stormwater quality treatment measures. Preparation of a flood and stormwater management plan is still required.

Alternative management measures for stormwater quality management

- (5) Alternative management measures for stormwater quality management are applicable when, in accordance with **Table SC6.14.3F (Stormwater quality design objectives – operational (post construction) phase of development)**, the development is exempt for complying with stormwater quality design objectives.
- (6) For MCU (multiple dwelling, commercial, industrial) development with greater than 25% of site impervious:-
- (a) a minimum of 80% of roof area is to be connected to a rainwater tank in accordance with **Section SC6.14.3.7 (Design requirements – stormwater quality)**. Tank capacity is to be not less than 15 litres per square metre of total roof area and for external use, washing machine and toilet flushing only; and
 - (b) where not precluded by site conditions (steep slopes, inability to achieve free draining outlet) achieve stormwater quality design objectives.
- (7) For MCU (multiple dwelling, commercial, industrial) development with less than 25% of site impervious and sparse:-
- (a) a minimum of 80% of roof area connected to a rainwater tank in accordance with **Section SC6.14.3.7 (Design requirements – stormwater quality)**. Tank capacity not less than 15 litres per square metre of total roof area. Tank to supply external use, washing machine and toilet flushing only;
 - (b) where not precluded by site conditions (inability to separate road runoff from site runoff) achieve stormwater quality design objectives for road runoff;
 - (c) reduce as far as practicable directly connected impervious area by using a combination of stormwater harvesting, vegetated swales and buffers, and infiltration systems. The proposed stormwater management strategy should ensure that no impervious area runoff discharges from the site without appropriate treatment;
 - (d) locate all drainage lines with catchment area greater than 1 hectare within drainage easement and re-vegetate the area of drainage easement to provide vegetated buffer to drainage line. Minimum width of drainage easement to extend 4.0m either side of centre of drainage line; and
 - (e) locate all areas subject to flooding during a 1% AEP flood event within drainage easement and re-vegetate the area of drainage easement to provide vegetated buffer to waterway.
- (8) For REC with proposed lot sizes greater than 3,000m² and no internal road:-
- (a) locate all drainage lines with catchment area greater than 1 hectare within drainage easement and re-vegetate the area of drainage easement to provide vegetated buffer to drainage line. Minimum width of drainage easement to extend 4.0m either side of centre of drainage line; and
 - (b) locate all areas subject to flooding during a 1% AEP flood event within drainage easement and re-vegetate the area of drainage easement to provide vegetated buffer to waterway.
- (9) For REC with proposed lot sizes greater than 3000m² with internal road:-
- (a) where not precluded by site conditions (inability to separate road runoff from site runoff) achieve stormwater quality design objectives for road runoff;
 - (b) locate all drainage lines with catchment area greater than 1 hectare within drainage easement and re-vegetate the area of drainage easement to provide vegetated buffer to drainage line. Minimum width of drainage easement to extend 4.0m either side of centre of drainage line; and
 - (c) locate all areas subject to flooding during a 1% AEP flood event within drainage easement and re-vegetate the area of drainage easement to provide vegetated buffer to waterway.

- (viii) oil removal based on specific gravity of 0.82 – 0.87: >95%;
 - (ix) installation of units is to be performed in strict accordance with the manufacturer recommendations and specifications;
 - (x) the installation of the device must account for prevailing soil pressures and must be designed to prevent hydrostatic uplift when the water table is at or close to the ground surface; and
 - (xi) the installation must be designed to prevent damage by vandals;
- (e) a range of devices are commercially available for installation in appropriate situations. A list of these devices can be supplied on request.
- (f) maintenance requirements for oil and grit separators are regularly cleaned out and removed to appropriate disposal points.
- (g) Council requires that discharges from these traps including overflows are diverted to wastewater treatment facilities under a trade waste permit or to a holding tank;
- (h) oil and grease separators are not suitable for the removal of dissolved or emulsified oils and pollutants such as coolants, soluble lubricants, glycols and alcohols. There is significant risk of re-suspension of accumulated sediments during heavy storm events. Accordingly, Council requires that oil and grease separator units be installed off line with a high flow by-pass.

SC6.14.3.8 Design requirements – stormwater harvesting and reuse

- (1) The following documents provide design requirements with respect to stormwater harvesting and reuse systems:-
- (a) *HWP Water by Design - Stormwater Harvesting Guidelines* (2011); and
 - (b) *Queensland Development Code* Mandatory Part 4.2 & 4.3.
- (2) For systems that are to be dedicated to Council as public assets it is to be demonstrated that there is an overriding community benefit resulting from the stormwater harvesting system. A detailed operations and maintenance budget is required to be prepared for the project life and financial assurances must be in place to operate and maintain the system for the project life.
- (3) Private stormwater harvesting schemes may be implemented at the applicant's discretion as part of achieving the outcomes of the **Stormwater management code**. However, there are no specific requirements mandating use of these systems or specific stormwater capture and reuse targets.

SC6.14.3.9 Stormwater management plans

- (1) This section sets out the information requirements for Council to assess the development application in the context of the development design standards and in reference to the planning scheme codes. Hydraulic and flooding issues that affect a development site are considered to be a constraint for the site, and consequently the submission of a report addressing concerns of flooding needs to be submitted in response to the codes at REC and/or MCU stage and not left to be addressed at OPW stage.
- (2) Stormwater Management Plans (SWMP) are required to document how the development will achieve the Acceptable Outcomes of the codes. The core principle in preparing a SWMP is to provide all the necessary information for Council to be able to make a decision. The detail required with a SWMP may differ for the various types of development applications.
- (3) SWMPs may not be approved by Council if they incorporate open drains that will demand considerable maintenance, will be difficult to maintain, or utilise specialised equipment or if other alternatives are physically possible. Background information and design approach are provided in the QUDM.
- (4) Stormwater runoff water quality controls and best management practices are to consider whole of life costs prior to adoption. A management plan or proposed maintenance schedule is to be supplied to Council for these facilities.
- (5) The site development requirements set out in **Section SC6.14.3.5 (Design requirements – stormwater drainage)** are to apply in all cases.

- (6) Where a SWMP is required for a development the following information must be included:-
- (a) a plan or plans at a scale of 1:200, 1:500 or 1:1000 showing:-
- (i) site location;
 - (ii) existing contours at sufficient intervals to adequately define general drainage paths, catchment boundaries and estimated 1% AEP flood contours for local area and regional flood plans;
 - (iii) physical improvements on the site;
 - (iv) location, dimensions, elevations and details of the stormwater network and any stormwater quality management devices;
 - (v) location of proposed stormwater discharge point(s) from the site, both during construction and following completion of the development;
 - (vi) location and size of any proposed land disturbance works in relation to existing stormwater corridors, or proposed stormwater network or facility;
 - (vii) any proposed natural channel designs, including incorporation of existing natural vegetation;
 - (viii) any proposed easements or reserves internal or external to the site;
 - (ix) details, including location and sizing, of any proposed detention/retention storages, including on-site detention schemes; and
 - (x) details of proposed stormwater and/or wastewater recycling scheme, including water balance calculations;
- (b) supporting information including:-
- (i) description of how stormwater runoff is to be managed for the entire site, whether or not a staged development is proposed. This may include a flood study on any relevant watercourse;
 - (ii) description of the topographic, vegetative and soil conditions for the site;
 - (iii) description of the adjacent properties (in particular, the upstream catchment and the downstream receiving properties) and any existing structures, buildings, stormwater infrastructure or improvements located on these properties;
 - (iv) a letter of approval from the adjacent (or downstream) property owner(s) accepting that the development proposes to discharge an altered or concentrated flow of stormwater runoff onto their property. Failing this, stormwater flows must be kept to pre-developed runoff peak rates and overall catchment response, or else the development will not be permitted to proceed;
 - (v) description of the method used in selection of soil erosion and sediment control measures for the development and commencement and completion dates of any stages; and
 - (vi) sufficient engineering detail to demonstrate that the proposed infrastructure meets the requirements of design;
- (c) depending on the nature of the development application, the following additional information to that described in (a) and (b) above may be required:
- (i) plans to include:-
 - (A) the enclosed stormwater system (shown on plan, long section, watershed and details);
 - (B) construction and design details for structural controls. These should generally be in accordance with information provided by the IPWEAQ Standard Drawings – Drainage Section;
 - (C) detailed modeling on the determination of detention/retention requirements for the site; and
 - (D) longitudinal and cross sections of the open stormwater system including natural watercourses are to be provided;
 - (ii) additional supporting information may include:-
 - (A) all calculations needed to design the system and associated structures, including pre and post development velocities and peak rates of discharge of stormwater runoff at all existing and proposed points of discharge from the site;
 - (B) inflow and outflow hydrographs for all stormwater retarding facilities;
 - (C) the expected timing of flood peaks through the downstream stormwater system to be assessed when planning the use of retarding facilities;
 - (D) in determining downstream effects from the stormwater system and stormwater quality management facilities of the development, hydrological-hydraulic engineering studies are to extend downstream to a point where the proposed development represents less than 10% of the total catchment;

- (E) if the SWMP and/or design report indicates that there may be a stormwater or flooding problem at the exit from the proposed development or at any location between the exit point and the point downstream where the development represents less than 10% of the total catchment, Council may require:-
 1. water surface profiles plotted for the conditions of pre and post development for the minor system design event;
 2. water surface profiles plotted for the conditions of pre and post development for the major system design event;
 3. elevations of all structures potentially damaged by the minor and/or major system design event flows; and
 4. roughness factors (n) used for the main channel and overbank areas of the stormwater system including natural waterways is to be shown on the longitudinal and cross sections. Photographic reference is also to be provided to assist the maintenance of the vegetation to ensure the roughness factor is maintained to prevent flooding from overgrown drainage systems and natural waterways;
- (F) analysis of all stormwater management facilities and all major portions of the conveyance system through the proposed development (that is, channels, culverts and the like), using the minor and major system design events and for design conditions and operating conditions which can reasonably be expected during the life of the facility;
- (G) designation of all easements needed for inspection and maintenance of the stormwater system and stormwater management facilities;
- (H) evidence that upstream and/or adjacent flood levels will not be aggravated;
- (I) evidence that the existing downstream stormwater network will adequately cater for the altered stormwater runoff conditions (if any);
- (J) geotechnical advice on the stability of any basin or dam wall and any soft-lined batters steeper than 1(v) in 2.5(h) and greater than 2.0m deep;
- (K) the estimated 1% AEP flood contours for all flows on natural stormwater corridors, designed channels or overland flowpaths;
- (L) details, including hydrological, hydraulic and structural, of any interim stormwater requirements for staged subdivisions or developments; and
- (M) all model files are to be submitted electronically accompanying the written report.

Stormwater quality requirements

- (7) While under-treatment which achieves less than the targets is an acceptable compromise for a particular sub-catchment (on the basis that overall the targets are met), no treatment at all for a sub-catchment is not acceptable. If under-treatment or no treatment is proposed for an area, then compelling justification of why the constraints prevent this is required.

Stormwater quality modelling

- (8) Stormwater quality modelling must be undertaken in accordance with the HWP Water by Design MUSIC Modelling Guidelines.
- (9) The performance of the MUSIC Version 5 bioretention treatment node is heavily dependent on the Total Nitrogen (TN) and orthophosphate content of the filter media. TN and orthophosphate concentrations of the filter media is to be representative of the TN and orthophosphate concentrations of the filter media over the design life of the filter media. Test results are to be submitted to support the TN and orthophosphate concentrations of the filter media used. Alternatively the MUSIC V3 treatment node may be used without submitting any test results.

Hydrological requirements

- (10) Design flows are to be determined assuming the catchment is fully developed. Catchment development is to be in accordance with the appropriate stormwater management plan or catchment management plan in the first instance or in areas where these do not exist, the planning scheme.
- (11) Council specific information is to be used to determine catchment responses.
- (12) For major/minor stormwater system requirements refer to QUDM. A minor road in the Council area is defined as one with < 3000 AADT while a major road is defined as having > 3000 AADT.
- (13) QUDM presents the concept of major system and minor system design. It presents appropriate AEPs and notes that a local authority may vary the design AEPs to suit local conditions.

- (14) The boundaries of catchments and sub-catchments are to be determined in accordance with QUDM. Council has additional information within its GIS system to assist in the determination of catchment and sub-catchment areas. Boundaries should be verified by site inspection and certified as correct.
- (15) For urban catchments, the coefficient of runoff will be determined in accordance with **Table SC6.14.3H (C₁₀ vs development category)**.

Table SC6.14.3H C₁₀ vs development category

Development Category	C₁₀	f_i
Central business	0.90	1.00
Commercial and industrial	0.88	0.90
Significant paved areas e.g. roads and carparks	0.88	0.90
Urban residential - High density	0.88	0.90
Urban residential - Low density (including roads)		
Average lot	0.82	0.60
< 450 m ²	0.76	0.30
≥ 450 m ² and < 650 m ²		
≥ 650 m ²		
Urban residential - Low density (excluding roads)		
Average lot	0.81	0.55
< 450 m ²	0.75	0.25
≥ 450 m ² and < 650 m ²		
≥ 650 m ²		
Rural or Rural residential	0.74	0.20
Open space and parks, etc.	0.70	0.00

- (16) For developments that include rural or bushland catchment areas, the Queensland DTMR Road Drainage Design Manual section 3.5.3.3 Table 3.5 is to be used in determining the coefficient of runoff.
- (17) Time of concentration for urban catchments:-
- is to be calculated in accordance with QUDM;
 - where inlets are applied, the standard inlet times (QUDM) will be applied for urban areas, except where approval is given to utilise other methods. The average slopes referred to are the slopes along the predominant flow paths for the catchment in its developed state; and
 - the kinematic wave and the Bransby-Williams equations are not to be used. The time of concentration must take due account of partial area effects in accordance with QUDM, particularly where there is open space within a residential area or for developments with significant directly connected impervious areas.
- (18) Time of concentration for rural catchments is to be calculated in accordance with the Queensland DTMR Road Drainage Design Manual section 3.5.3.2.

Hydrological modelling

- (19) The catchment is to be modelled using a hydrological modelling package. The applicant will be required to justify to Council the advantages of any particular model chosen for the analysis. The applicant will need to demonstrate to Council's satisfaction that the chosen software is suitable to model all open channel components within the catchment. (Council requires the choice of model to be an off-the-shelf item, standard software, such that Council can access the model data in future through the purchase of its own software).
- (20) The model network should include all major stormwater and waterways in the catchment and is to take into account the physical characteristics of the catchment and waterways for all cases assessed. The sub-catchment areas need to be confirmed to best represent flow estimates at critical locations.
- (21) Comparison of the computed peak flows (hydrological model) against the Rational Method is required. Availability of recorded flood level information for calibration purposes is to be

Note—relevant guideline documents in existence or available over the life time of this planning scheme policy should be referenced and used where appropriate. The above list is not exhaustive and the use of locally based guidelines by a recognised authority or agency would take preference to those developed regionally or nationally.

SC6.14.4 Water supply infrastructure

SC6.14.4.1 Purpose

The purpose of this section of the **Planning scheme policy for development works** is to provide guidance on standards applying where potable water is to be provided for development.

SC6.14.4.2 Application

- (1) Council through Unitywater (a business jointly owned by the Council and Moreton Bay Council) provides reticulated water to the region.
- (2) The Level of Service Impact Assessment Specification is the framework by which Unitywater may require information to assess development applications, due diligence requests or other information that may impact upon Unitywater’s ability to achieve the desired standard of service (DSS) for customers as defined in Unitywater’s current water supply and sewerage growth management strategies.
- (3) The specification sets out information requirements essential to assess the existing and future effects on the performance and capacity of water assets including the identification of infrastructure needs, costs and timings associated with deviation from population assumptions/sequencing underpinning Unitywater’s current long term infrastructure planning.

SC6.14.4.3 Standard drawings

- (1) The *Water Supply Code of Australia* WSA 03-2002 drawings detail a number of infrastructure options and arrangements. A number of these options are not compatible with current Unitywater practice. The acceptance, modification or deletion of the WSA drawings is set out in **Table SC6.14.4A** below.

Table SC6.14.4A WSA drawing numbers

WSAA Drawing Numbers	Status	Remarks
WAT-1100	Not adopted	Use SCW 385 – drawing under development
WAT-1101	Not adopted	Use SCW 380 – drawing under development
WAT-1102	Adopted	Valve to be directly off tee
WAT-1103	Adopted	Valve to be directly off tee
WAT-1104	Adopted	1.) 63 OD PE water mains in cul de sac heads only. 2.) 63 OD PE water mains to be looped using entire head of Cul de sac.
WAT-1105	Adopted	
WAT-1106	Not adopted	Use SCW 350, MWD 355 and SCW 360.
WAT-1107	Not adopted	Use SCW 355
WAT-1108	Not adopted	Use SCW 360
WAT-1109	Not adopted	Use SCW 350
WAT-1200	Adopted	
WAT 1201	Adopted	
WAT-1202	Adopted	
WAT-1203	Adopted	
WAT-1204	Adopted	
WAT-1205	Adopted	
WAT-1206	Not Adopted	
WAT-1207	Adopted	Hydrant tees are to be restrained in accordance with socketed valve restraints.
WAT-1208	Adopted	
WAT-1209	Adopted	
WAT-1210	Adopted	
WAT-1211	Adopted	
WAT-1212	Adopted	

Schedule 6

WSAA Drawing Numbers	Status	Remarks
WAT-1213	Adopted	
WAT-1214	Adopted	
WAT-1300	Not adopted	Use SCW 365
WAT-1301	Not adopted	Use SCW 320
WAT-1302	Not adopted	Use SCW 320 & SCW 325
WAT-1303	Not adopted	Use SCW 320 & SCW 325
WAT-1304	Not adopted	Use SCW 320 & SCW 325
WAT-1305	Not adopted	Use SCW 320 & SCW 325
WAT-1306	Not adopted	Use SCW 320 & SCW 325
WAT-1307	Adopted	
WAT-1308	Not adopted	
WAT-1309	Not adopted	Use SCW 330
WAT-1310	Adopted	
WAT-1311	Adopted	
WAT-1312	Adopted	
WAT-1313	Adopted	
WAT-1400	Adopted	
WAT-1401	Adopted	
WAT-1402	Adopted	
WAT-1403	Adopted	
WAT-1404	Adopted	
WAT-1405	Adopted	
WAT-1406	Adopted	
WAT-1407	Adopted	
WAT-1408	Adopted	
WAT-1409	Not adopted	

- (2) The alignments and details for water and sewerage mains and service conduits should be in accordance with **Table SC6.14.4B (Service corridors and alignments)**.

Table SC6.14.4B Service corridors and alignments

Public Utilities – Typical Service Corridors and Alignments	Remarks
SEQ R-100	Public utilities in Verges, Service Corridors & Alignments
SEQ R-101	Public Utilities – Typical Service Conduit Sections

SC6.14.4.4 Planning and design

- (1) The standards in this section have been developed to define the particular requirements of Unitywater in relation to the *WSAA National Codes*. Only details that differ from that of the *WSAA National Codes* are provided.
- (2) These standards shall be read in conjunction with, and take precedence over, the *WSAA Water Supply Code of Australia – WSA 03-2002* to define the technical requirements of Unitywater in relation to the planning, design and construction of water supply systems (refer **Table SC6.14.4C (Variations to the WSAA national codes)**).

Table SC6.14.4C Variations to the WSAA national codes

Part	Variations
Pt 1 – 1.5.2 Water Agency	Add to WSAA requirement:- <ul style="list-style-type: none"> For development proposals, Unitywater may request that a water supply network analysis be undertaken to determine (a), (b) and (c).
Pt 1 – 2.1 System Planning Process	Add to WSAA requirement:- <ul style="list-style-type: none"> The designer shall liaise with Unitywater prior to commencement of the design.
Pt 1 – 2.2 Demands	Replace WSAA requirement with:- <ul style="list-style-type: none"> Water demands shall be determined in accordance with Unitywater's "Level of Service Impact Assessment Specification".
Pt 1 – 2.2.3 Peak Demands	Replace WSAA requirement with:- <ul style="list-style-type: none"> The designer shall liaise with Unitywater to obtain the peak demand factors.

Table SC6.17B Urban transport corridors

Note—this table applies to transport corridors within the Urban area as identified on Strategic Framework Map SFM 1 (Land use elements). The transport corridors are mapped on Figure 9.4.8A (2031 Functional Transport Hierarchy) of the Transport and parking code.

Criteria		Arterial Roads			Sub-arterial Roads			District Streets		Neighbourhood Streets		Local Streets			
		Highway / Motorway	Arterial Road	Arterial Main Street	Distributor	Controlled Distributor	Sub-Arterial Main Street	District Collector Street	District Main Street	Neighbourhood Collector Street	Mixed Use Collector Street	Access Street	Mixed Use Access Street	Access Place	Access Laneway
Typical adjacent land use	residential	not sensitive to traffic	building & site design to minimise noise from traffic	not sensitive to traffic			•		•		•	•		•	
	mixed use						•	•	•	•					
	commercial														
Typical catchment (detached dwelling lots or equivalent)							300 to 1000		up to 300		up to 75		up to 15		
Minimum reserve width (metres) increase to accommodate utilities, public transport, WSUD etc, without reducing landscaping, pathways, signage etc.		40-100	40-60	39.4	29.6 (2 lane) 37 (4 lane)	24 (2 lane)	29.8	26.8 29.8 if median	24.8 27.8 if median	21-25.4	23.4	15.3-16.6	20	14	6.5
Design speed (km/h) minimum for roads		80-110	70	60	70	60	50								
Design environment (km/h) speed appropriate for safety, amenity and convenience for the subject street								60	40	50	40	30	30	30	20
Maximum desirable volume / capacity ratio by location		0.75	0.85	0.85	0.85	0.85	0.85								
Maximum traffic volume (vehicles/day) * may increase to 10,000 if no direct vehicle access	per lane		9000	9000	9000	9000	9000								
	per road							5000 10000 if median	5000* 15000 if median	3000	5000	750	3000	150	
Vehicle property access + only via service roads or signalised intersections that meet spacing requirements ++ subject to safety and locational criteria		none	major development only +	limited to existing	major development only ++	ideally none, limited to existing and consolidated (forward in/out) where no alternate	rear/side preferred, consolidated (forward in/out), direct (if median and reversing into parking lane for detached dwellings) ++			rear/side preferred, direct ++		direct ++			
General traffic lanes * operates as single moving lane for passing		2-6	2-4	2-4	2-4	2-4	2-4	2	2	2	2	2	2	2*	2*

Schedule 6

Criteria	Arterial Roads			Sub-arterial Roads			District Streets		Neighbourhood Streets		Local Streets			
	Highway / Motorway	Arterial Road	Arterial Main Street	Distributor	Controlled Distributor	Sub-Arterial Main Street	District Collector Street	District Main Street	Neighbourhood Collector Street	Mixed Use Collector Street	Access Street	Mixed Use Access Street	Access Place	Access Laneway
Transit / bus lanes		•		○	○	○	○	○	○	○				
Pathways (minimum, metres) + local 2.5m, district and regional 3m, if shown on Figure 9.4.8B(i) (2031 Active Transport Network) and/or Sunshine Coast My Maps * fully paved through centres	grade separated	3 both sides	both sides*	3 both sides		both sides*	2 one side 3 other side +	both sides*	2 both sides +		1.8 one side+	both sides*	+	none
On-road cycling lane width (metres) may not be required if: + design speed ≤30km/h and no traffic signals * not part of an on-road cycle route shown on Figure 9.4.8B(ii) (2031 Active Transport Network) and/or Sunshine Coast My Maps	refer DTMR	2	2	2 carside 1.8 kerbside	1.5 carside 1.8 kerb-side	1.5 carside 1.8 kerb-side +*	1.5 carside 1.8 kerbside	1.5 carside 1.8 kerb-side +	1.5 carside 1.8 kerbside*	1.5 carside 1.8 kerb-side+	none - low speed, low volume traffic environment appropriate for shared use			
Pedestrian/ cyclist crossings at intersections, bus stops, pathways and other crossing desire lines	refuge	•	•	•	•	•	•	•	•	•		•		
	signalised zebra - comply with DTMR TRUM manual, may be considered midblock	•	•	•	•	•	•	•	•	•				
Public transport	grade separated	•	•											
	bus routes and stops (separate right-of-way or mixed with traffic)		•	•	•	•	•	•	if no rear lane access	•			○	
	bus priority measures * desirable		○*	•	○	•*	•	if no median	○	○		○		
On-street parking	unmarked								if no rear lane access		•		•	
	indented parking both sides			•		•		•	if rear lane access	•		•		
	parking lane both sides			•		•	•	•						
	parking lane (where permitted) no parking / prohibited	•	•		•									•
Intersection treatments accommodate pedestrians and link cycle lanes and pathways	priority T		•	•	•	•	•	•	•	•	•	•	•	•
	priority 4-way													○
	roundabout		•	•	•	•	•	•	•	•	•	•		
	traffic signals		preferred	•	•	•	•	•	•	•	•	•		
grade separated	•	•												

Schedule 6

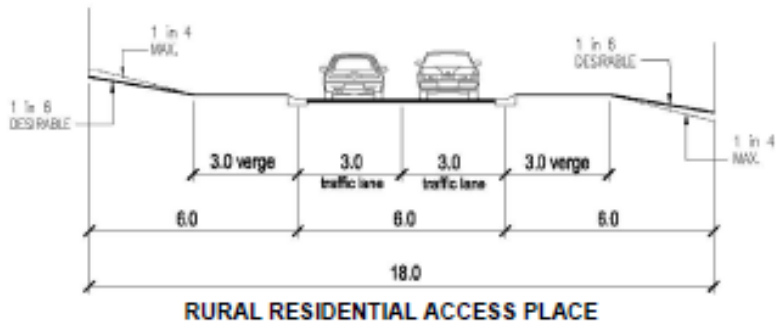
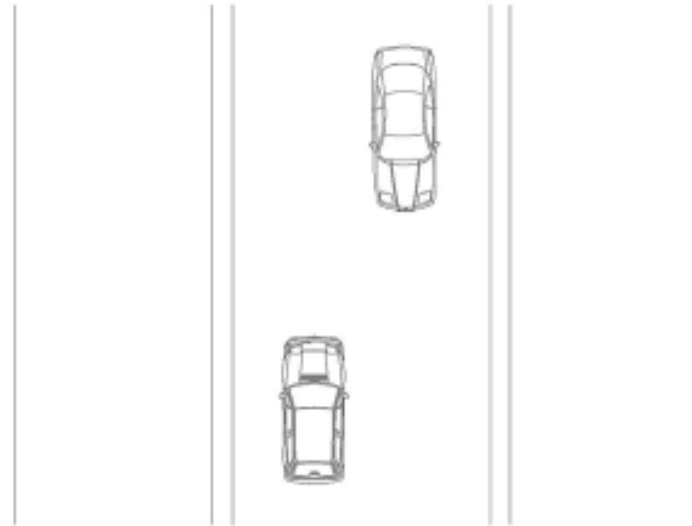
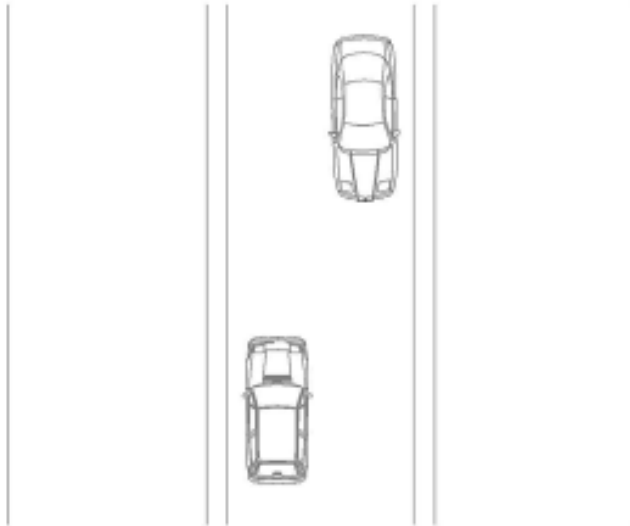
Criteria		Arterial Roads			Sub-arterial Roads			District Streets		Neighbourhood Streets		Local Streets				
		Highway / Motorway	Arterial Road	Arterial Main Street	Distributor	Controlled Distributor	Sub-Arterial Main Street	District Collector Street	District Main Street	Neighbourhood Collector Street	Mixed Use Collector Street	Access Street	Mixed Use Access Street	Access Place	Access Laneway	
Median		•	•	desirable	•	desirable	desirable	localised where required, if not entire street		•						
May intersect with usually a corridor one classification higher or lower. Other intersections only where there is no alternative, subject to other design requirements.	access laneway											•	•	•	•	
	access street							○	○	•	•	•	•	•	•	
	neighbourhood collector						○	○	•	•	•	•	•	•	•	
	mixed use collector						○	○	•	•	•	•	•	•	•	
	district collector				•	•	•	•	•	•	•	•	•	•	•	
	sub-arterials		•	•	•	•	•	•	•	•	•					
arterials	•		•	•	•	•	•	•	•	•						
highways		•														
Minimum intersection spacing (metres) + 150 if constrained by existing development * same side, # opposite side		1.5-2km	0.5-1km	>150	300	300+	150	100* 80# 100 if median	100	60* 40#	60	60* 40#	40	40	40	40
Stopping distance (metres)		Austroads guidelines									42	30	20	20	20	10
General minimum sight distance (metres)		Austroads guidelines									84	60	40	40	40	20
Street leg length (metres)	Desirable			150		150	100	150	100	100	100	75	75	75		
	Maximum			180		180	155	180	120	≤140	120	75	75	75		
End conditions (km/h)								≤25		≤25						
Desirable maximum grade (%)		specific	5	5	8	8	8	8	8	12	6	12	6	12	12	
Absolute maximum grade (%) + up to 20% for ≤100m over the entire street, if constrained and limited heavy vehicle use		consideration	6	7	10	10	10	12 (10 if >5,000vpd)	12 (10 if >5,000vpd)	15 (12 if rear lane access)	12	15+	12	15+	15+	
Freight route		primary (except through populated areas)	yes	yes	yes	selected routes		restricted access		no	restricted access	no				
Dangerous goods route			restricted access		restricted access			restricted access		no	restricted access	no				
Longitudinal drainage	kerb & channel			•		•	•	•	•	•	•	•	•	•	•	
	swale	•	•		•			•								
Street lighting		Refer AS1158.3.1: 2005														

Note ○ Optional at discretion of Council.

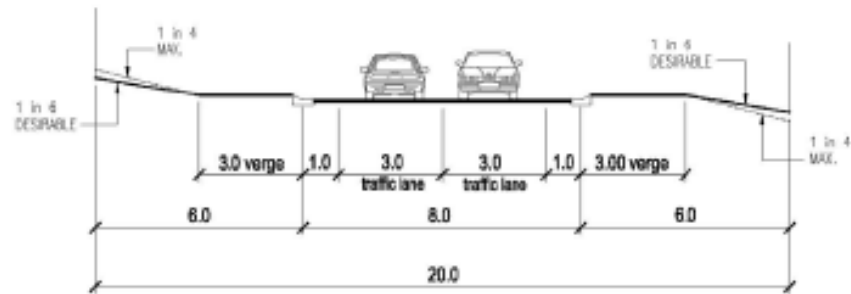
Note—DTMR current guidelines or standards apply to planning and design of State-controlled roads.

Note—DTMR approval is required where any additional access is sought or existing access is modified to a State-controlled road.

Appendix **SCS6.17A** Typical street and road cross sections

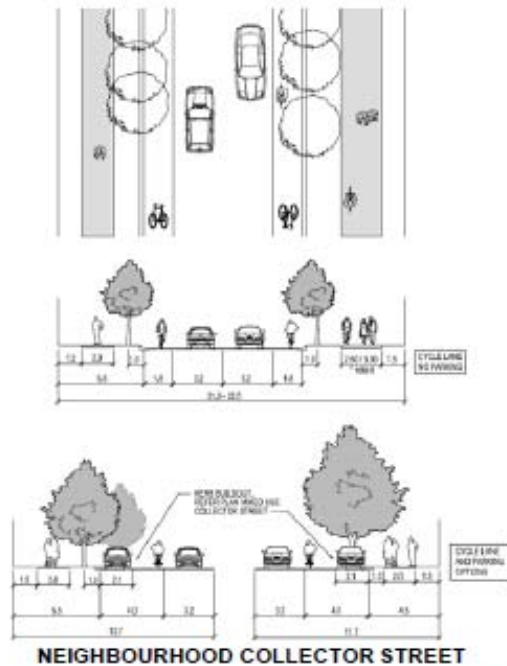


RURAL RESIDENTIAL ACCESS PLACE

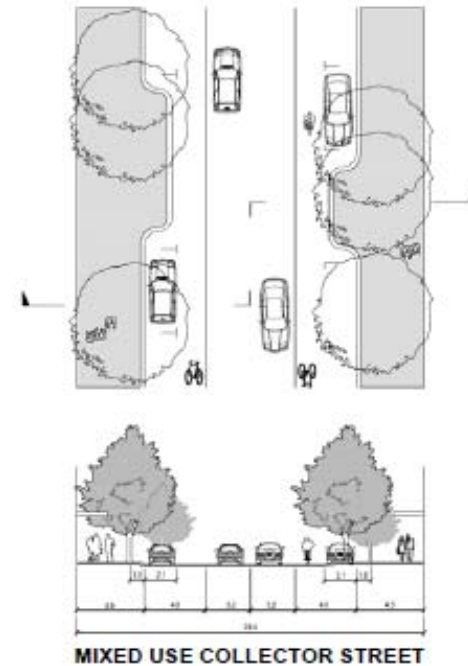


RURAL RESIDENTIAL ACCESS STREET

Schedule 6



NEIGHBOURHOOD COLLECTOR STREET



MIXED USE COLLECTOR STREET

Notes—

1. Multiple cross sections are available depending on the combination of features in the street, including on-street parking, cycle lanes, street trees, a designated cycle route and indented bus stops as explained in the following notes.
- 4-2. Cycle lanes may not be required if the street is not part of a designated cycle route as shown on Figure 9.4.8B(ii) (2031 Strategic Network of Pedestrian and Cycle Links (On Road Cycleways)).
- 2-3. Where parking is required, additional width is to be added to one or both sides of the cross section depending on parking demand determined by frontage activity.
- 3-4. Where Council and TransLink agree that there is no likelihood that a street will become a future bus route and the street is not part of a designated cycle route, the carriageway width can be reduced to a minimum 8.0m to cater for on-street parking on one side.
- 4-5. Indented bus stops, associated infrastructure and required pathways can be accommodated by using a combination of local street reserve widening, cycle lane width and parking lane width where provided and shall comply with, *Road Planning and Design Manual* or *Austrroads Guide to Road Design*.
- 5-6. Indented bus stop tapers may contain driveways. However consider sight lines in the location of any streetscaping.
- 6-7. Pathways to be a minimum width of 2.0m unless part of a designated cycle route as shown on Figure 9.4.8B(i) (2031 Strategic Network of Pedestrian and Cycle Links (Pathways)) where local hierarchy shared pathway width shall be a minimum of 2.5m and district or regional hierarchy shared pathway width shall be a minimum of 3.0m. Asymmetric verge widths may be used.
- 7-8. The wider shared pathway shall be located on the side that best serves the expected demand and network connections.

Sunshine Coast Planning Scheme 2014

Note—

Verges to be paved full width on both sides of the street to allow for all weather use and concentrations of pedestrians and cyclists.