

## **SC6.1.7 Design standards**

### **SC6.1.7.1 General**

#### **SC6.1.7.1.1 Precedence of Reference Documents**

Where conflict occurs between referenced documents, the following is the order of precedence of the documents:

1. Federal statutes
2. State Statutes
3. Local Laws
4. This Planning Scheme Policy
5. Australian Standards
6. State Guidelines & Specifications
7. Federal Guidelines & Specifications

Referenced documents shall be the latest editions at the date of the decision notice of the MCU or ROL unless the date is specifically included in the reference.

#### **SC6.1.7.1.2 Joins to existing works**

All new works including for roads, drainage, sewerage and water reticulation, are to join smoothly with existing works. Joins to existing works shall be described in design drawings and calculations in sufficient detail to demonstrate that road geometry, drainage and all other design criteria are satisfied.

##### ***Guideline: Need for smooth joins***

*If a compliant join to existing works cannot be achieved, reconstruction of the existing works, at the Developer's cost, may be required.*

At locations where new roads or streets join existing pavements, the existing pavement is to be cut back to a point where full pavement depth is achieved on the existing pavement. The excavation of the existing pavement shall be saw cut to allow a sound joint to be achieved. Existing pavement shall be cut back a minimum of 300mm or until structurally sound, full depth pavement material is found, whichever is greater.

##### ***Guideline: Existing pavements***

*The outer edges of many Council roads are not constructed to carry the loadings that may arise when new intersections or widenings are constructed. Design and construction of such works must make allowance for this.*

#### **SC6.1.7.2 Site, road and street layout**

##### **SC6.1.7.2.1 The Transport Network**

The general concepts of *Complete Streets – IPWEAQ* are to be applied to the street network. Site and road layouts within the local government area are to conform to the philosophies, design principles, performance criteria and deemed-to-comply criteria of *Queensland Streets – Design Guidelines for Subdivisional Streetworks – IMEAQ, 1993*, where applicable, except as varied in this planning scheme policy or through the conditions of development approval.

Rural Residential layouts and roads are to be designed as a hybrid of streets and roads with the predominant design concepts dictated by the number of Lot accesses per 100 metres of road. Designers should request the Engineer to provide the design principles applicable to particular Rural residential developments prior to submitting the MCU or ROL development application.

##### **SC6.1.7.2.2 Road and Street Hierarchy**

0 states the Council's road width, grades, pavement design & pavement marking criteria for each classification in the road hierarchy.

##### **SC6.1.7.2.3 Geometric design**

- (1) The geometric design of streets should be based on *Queensland Streets*, except as specifically varied hereafter.

- (2) The geometric design of roads should be based on relevant TMR or AUSTRROADS design manuals, except as specifically varied hereafter. Where there is confusion in design requirements, the Engineer shall be responsible for the decision as to which is to apply.

#### **SC6.1.7.2.4 Design Speed**

- (1) The principles of *Complete Streets* and *Queensland Streets* should be applied to the proposed street layout to confirm the nominated design speed has been achieved. Design speeds should be as recommended in *Queensland Streets*, unless specified otherwise by the Engineer.
- (2) Either:
  - (a) the layout is to inherently achieve the nominated design speed; or
  - (b) speed restriction devices are to be added to achieve the nominated speed.

#### **SC6.1.7.2.5 Horizontal Alignment**

- (1) Horizontal alignment should generally comply with the requirements of *Queensland Streets*, TMR or AUSTRROADS design manuals, as applicable.
- (2) Super-elevation should be provided on roads classified Collector and above, and for rural and rural residential roads and streets.

#### **SC6.1.7.2.6 Design and Check Vehicles**

The design vehicle/s is/are to be nominated in the design report. Design vehicle swept path is not to cross road centrelines whilst providing minimum clearance of 0.5m from kerbs to outer and inner wheel paths and clearances to signs and other street furniture.

The check vehicle is allowed to cross road centrelines while providing clearance of 0.5m from kerbs to outer and inner wheel paths and clearances to signs and other street furniture.

For urban residential road designs, the minimum allowable design vehicle is a "Heavy Rigid Truck – wheelbase 5.0m, turning circle 19.0m" and the minimum allowable check vehicle is a "Prime Mover and Semi-trailer (19m) Radius 15m".

For other road designs, the design and check vehicles should be approved by Council's Engineer prior to road design commencing.

**Table SC6. 2 Road width, grades, pavement design and pavement marking criteria**

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6		Column 7	Column 8	Column 9	Column 10	Column 11		Column 12		Column 13		
Street / Road type	No. of lots	Reserve width (Absolute Min) (m)	Carriage-way width (m)	Verge Width (min) (m)	Grade (%)		Design ESAs (Min)	Unbound Pavement thickness (Min) (mm)	AC thickness (Min) (mm)	Total pavement (Min) (mm)	Base course (note 2)		Sub-base		Pavement Markings		
					Absolute Max	Desired Max					CBR	TMR Type	CBR	TMR Type	Centre	Edge	
Urban Arterial	Specified by Engineer	22	12	5.0	12	6	6.0x10 <sup>6</sup>	405	45	450	80	2.1	45	2.3	Yes	Yes	
Urban Sub-Arterial	Specified by Engineer	22	12	5.0	12	8	4.9x10 <sup>6</sup>	385	45	430	80	2.1	45	2.3	Yes	Yes	
Urban Distributor	301-1000	20	12	4.0	12	10	1.5x10 <sup>6</sup>	295	45	340	80	2.1	45	2.3	Yes	Yes	
Urban Collector, Bus Route	76-300	20	8.0	4.0	16	12	1.0x10 <sup>6</sup>	280	30	310	80	2.1	45	2.3	No	No	
Urban Collector	76-300	20	7.5	4.0	16	12	5.6x10 <sup>5</sup>	250	30	280	60	2.2	35	2.4	No	No	
Urban Local	0-75	16	6.0	4.0	16	12	1.5x10 <sup>5</sup>	200	30	230	60	2.2	35	2.4	No	No	
Industrial Collector	121-300 lots or 30 ha max	22	14	4.0	8	6	4.9x10 <sup>6</sup>	385	45	430	80	2.1	45	2.3	Yes	Yes	
Industrial Local	0-120 lots or 10ha max	20	12	4.0	10	6	2.3x10 <sup>6</sup>	325	45	370	80	2.1	45	2.3	Yes	Yes	
CBD		As specified by the Gympie Regional Council															
			Carriageway Width														
			Lane (x2) (m)	Shldr (x2) (m)													
Rural Arterial Road and Rural Residential Arterial Road	Specified by Engineer	22 <sup>1</sup>	3.5	2.5	8	6	7.5x10 <sup>6</sup>	465	2 coat chip seal	465	80	2.1	45	2.3	Yes	Yes	
Rural Sub-Arterial Road and Rural Residential Sub-Arterial Road	Specified by Engineer	22 <sup>1</sup>	3.5	1.5	10	8	5.2x10 <sup>6</sup>	440	2 coat chip seal	440	80	2.1	45	2.3	Yes	Yes	
Rural Distributor Road and Rural Residential Distributor Road	201-600	22 <sup>1</sup>	3.5	1.0	10	8	1.5x10 <sup>6</sup>	340	2 coat chip seal	340	80	2.1	45	2.3	Yes	Yes	
Rural Collector Road, Bus Route and Rural Residential Collector Road, Bus Route	41-200	20 <sup>1</sup>	3.5	1.0	16	12	1.0x10 <sup>6</sup>	310	2 coat chip seal	310	80	2.1	45	2.3	Yes	Yes	
Rural Collector Road and Rural Residential Collector Road	41-200	20 <sup>1</sup>	3.0	1.0	16	12	5.6x10 <sup>5</sup>	280	2 coat chip seal	280	60	2.2	35	2.4	No	No	
Rural Local Road and Rural Residential Local Road	0-40	20 <sup>1</sup>	3.0	0.5	16	12	1.5x10 <sup>5</sup>	230	2 coat chip seal	230	60	2.2	35	2.4	No	No	

Note 1: Cut/Fill batter points to be clear of property boundaries by minimum of 3.0m on cul-de-sac heads & intersections and 4m elsewhere.

Note 2. Minimum base course thickness to be 125mm

#### **SC6.1.7.2.7 Grades**

- (1) The absolute minimum grade for all roads which will ultimately include kerb and channel should be 0.3%.
- (2) The minimum grade for all roads which will ultimately have earth table drains should be 0.5% except that the Engineer may approve, in exceptional cases, the road formation having a flatter grade, provided the table drains have a minimum grade of 0.5%, achieved by widening the table drains at their standard side slopes.
- (3) Roads constructed without kerb and channel and completely in embankment may have zero grade. Maximum grades are nominated in 0.
- (4) Individual road sections with grades between the “Desired Maximum” and the “Absolute Maximum” grades nominated in 0 are to be no more than 50m in length. In addition, no more than 20% of the length of a road is to have grades between the “Desired Maximum” and the “Absolute Maximum” grades nominated in 0.

#### **SC6.1.7.2.8 Vertical Alignment**

- (1) A vertical curve, of parabolic form, should be provided at every change of grade, where the algebraic change of grade exceeds:
  - (a) Local and Collector Roads and Streets - 1.0%
  - (b) Distributor, Sub-Arterial, Arterial - 0.6%
- (2) Every effort should be made to provide vertical curves as long as possible, for improved appearance.
- (3) The vertical alignment of:
  - (a) streets should be based on Queensland Streets, and
  - (b) rural roads should be based on AUSTRROADS design manuals.
- (4) In general, a minimum 10.0 metre radius vertical curve should be provided where the side road joins the through road at three way intersections.
- (5) The tangent point of a vertical curve in the side road may be located at 1.0 metre inside of the kerb line of the through road. The Engineer may approve the use of a concrete invert in lieu of a vertical curve.
- (6) Roads should be designed in accordance with relevant TMR or AUSTRROADS design manuals.
- (7) The situation where a crest vertical curve masks the commencement of a horizontal curve, is to be avoided, as such a combination is potentially dangerous.

#### **SC6.1.7.2.9 Crossfall**

- (1) Carriageway crossfalls for streets should conform to the requirements of *Queensland Streets*. Should one-way crossfalls be proposed special considerations will be required to retain stormwater flows within the channel to avoid any aquaplaning of vehicles, and to ensure that the integrity of the downstream footpath levels are able to be maintained.
- (2) Spray sealed pavements and shoulders should have minimum crossfalls of 3.0%.
- (3) Median crossfalls—the maximum crossfall applicable to grassed medians on divided roads should be desirably 1 in 6 with an absolute maximum of 1 in 4. Refer also TMR design manuals. However, at median openings, the pavement crossfall should not exceed 5%.
- (4) The longitudinal grade is to be considered in relation to high vehicles turning through an intersection.
- (5) The maximum adverse crossfall along a driven path shall be 7%.
- (6) Crown line rounding (as recommended in AUSTRROADS) is not permitted.

#### **SC6.1.7.2.10 Carriageway cross-section**

- (1) Carriageway cross-sections for streets shall conform to the recommendations of *Queensland Streets* and Council's Standard Drawings and the minimum widths given in 0.
- (2) Split level roads should be avoided.

Where it is not possible to comply with the above requirements, written approval should be obtained from the Engineer prior to proceeding with the design.

#### **SC6.1.7.2.11 Truncations**

Truncations of the real property boundaries should be provided at speed restriction devices, bends and intersections, such that roadway and footpath widths are maintained at not less than the normal widths at any point unless approved otherwise by the Engineer.

#### SC6.1.7.2.12 Pavement tapers

Pavement tapers to existing construction should be designed in accordance with the current AUSTRROADS design manuals based on the design speed. Detailing should include lengths, typical section(s), linemarking and signing. Tapers should be constructed to the same standard as the proposed full road pavement.

#### SC6.1.7.2.13 Frontage streets/roads

- (1) Where the frontage street/road to a development is unsealed or unformed at the time of development approval it should be constructed to full width formation as set out in 0 with half width plus 1.0m bitumen seal, from the nominal kerb line to the bitumen edge with grassing over the balance of the formation.

<b>Guideline:</b>
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<i>A greater width may be specified in conditions of subdivision approval.</i>
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- (2) An existing sealed frontage street/road to a development should be reconstructed to one half of the full width of the street/road unless it can be demonstrated to the satisfaction of the Engineer that the existing pavement is adequate for the ultimate design conditions, in which case the pavement should be widened only, with kerb and channel provided on the alignment nominated in the development approval conditions, or by the Engineer.

#### SC6.1.7.2.14 Intersections

- (1) All new intersections should be three way intersections unless otherwise approved by the Engineer.
- (2) An AUSTRROADS 2006 Part 4 Intersections at Grade BAL intersection is to be provided where the side road AADT  $\geq 50$ .
- (3) Four-way intersections should be designed only at the junctions of Arterial and Arterial Roads where future signalisations or roundabouts are proposed.
- (4) Intersections on streets should be designed and located in accordance with *Queensland Streets*.
- (5) Intersections on roads should be designed in accordance with AUSTRROADS after design criteria have been nominated by the Engineer. Kerbing is required on the return radii.
- (6) Truncations should be provided to real property boundaries to maintain minimum verge widths and sight distances. Refer Queensland Streets.

#### SC6.1.7.2.15 Channelisation

- (1) Warrants for the provision of channelisation at intersections will be traffic volumes and intersection layout, and the Engineer will determine at which intersection channelisation is required.
- (2) In general, channelisation will normally be required to be provided at:
  - (a) all arterial to arterial intersections;
  - (b) all sub-arterial to arterial intersections;
  - (c) most distributor to sub-arterial intersections;
  - (d) occasional distributor to distributor intersections.
- (3) Due to the many variations of both traffic requirements (e.g. turning volumes) and intersection geometry that may occur, it is not possible to set standards that are applicable to all situations.
- (4) However, when channelisation is required, refer to the current TMR design manuals and AUSTRROADS publications.
- (5) Unless approved otherwise by the Engineer all channelisation should be designed to accommodate the design vehicle, providing a clearance of not less than 0.5 metres between the extremities of the vehicle path (i.e. vehicle extremity, not wheel tracks) and kerbs, pavement edges and/or centreline.
- (6) For 'Design Semi-trailer Turning Path Diagram' refer to Austroads Design Vehicles and Turning Templates for a 19.0 metre semi-trailer. This vehicle is to have a swept path clear of above ground obstacles.

<b>Guideline:</b>
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<i>It is to be noted that many major intersections are now required to be designed to the B Double Semi Trailer Turning Path. The Engineer should nominate when this criteria should apply.</i>
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#### **SC6.1.7.2.16 Traffic islands**

- (1) Traffic islands are preferably indicated by raised kerbs, however other physical barriers or pavement marking may be appropriate in certain circumstances.
- (2) Islands may be classified as:
  - (a) channelising (or directional) islands;
  - (b) roundabouts;
  - (c) median islands;
  - (d) medians;
  - (e) separators;
  - (f) pedestrian refuge islands.
- (3) For details on islands and their classification, refer to the Manual of Uniform Traffic Control Devices (Qld).
- (4) Raised kerbed islands less than 12.0m<sup>2</sup> or less than 2.0 metres width between kerb faces should be constructed with minimum 100mm thickness, N32 reinforced concrete on a 10MPa concrete fill on the base course. The surface treatment should be coloured or coloured patterned concrete as approved by the Engineer.
- (5) Raised kerbed islands greater than 12.0m<sup>2</sup> and wider than 2.0 metres may include a 600mm wide concrete edge strip around the full perimeter and provided with alternative surface treatments as approved by the Engineer.
- (6) Notwithstanding the above provisions, where the fall across an island is greater than 1 in 4, the island should be surfaced with concrete or other treatment approved by the Engineer.
- (7) Sub-soil drainage, to the AUS-SPEC Sub-soil Drainage specification for pavement, is to be provided in islands where surface treatment other than concrete is proposed. The drainage should be connected to an underground drainage system with provision for maintenance to Council's requirements.
- (8) Traffic islands should be designed in accordance with the current AUSTROADS design manuals. Particular attention should be given to sight distance when commencing islands at horizontal curves and vertical curves.
- (9) Planted garden beds will not be accepted in traffic islands. Feature trees may be proposed in large traffic islands such as in roundabouts provided they do not compromise road safety in any way. Where feature trees are provided in traffic islands, root barriers are required to protect all adjacent concrete, pavement and stormwater infrastructure.

#### **SC6.1.7.2.17 Auxiliary lanes**

The pavement of a left or right turn auxiliary lane shall not be less than 3.0 metres wide. Where kerb is used these widths shall be increased by at least 0.3 metres and preferably 0.6 metres.

#### **SC6.1.7.2.18 Median openings**

On collector roads median openings should be provided at all intersections except at intersections with very minor streets. On sub-arterial and arterial roads, the minimum spacing of median openings should be approximately 400 metres, however criteria will be provided by the Engineer for specific developments.

#### **SC6.1.7.2.19 Pavement Markings**

Pavement markings associated with channelisation and signs should be provided in accordance with the *Manual of Uniform Traffic Control Devices (Qld)*.

#### **SC6.1.7.2.20 Roundabouts**

- (1) Roundabouts may be proposed as a design solution or nominated in the development approval conditions and should be subject to approval by the Engineer.
- (2) Design of roundabouts should be in accordance with AUSTROADS and the Council's standards.
- (3) The maximum design speed through a roundabout should be 40km/h, however the provisions of *Queensland Streets* apply for roundabouts in streets.
- (4) The Engineer will determine the design criteria for the roundabout, e.g. number of traffic lanes, radius of centre island etc. Preliminary layouts should be submitted to the Engineer for examination prior to final design.
- (5) Raised splitter islands should be provided at all approaches to roundabouts.
- (6) Centre islands of roundabouts should be constructed to a similar standard as traffic islands except that where the design allows the tracking of heavy vehicles across the island, a suitable pavement/wearing surface should be provided.

#### **SC6.1.7.2.21 Cul-de-sac turning areas**

- (1) Turning areas at the end of dead-end streets shall be designed in accordance with *Queensland Streets*.
- (2) The minimum kerb or bitumen edge radii on a cul-de-sac head in residential and rural residential developments shall be:
  - (a) approach curve tangential to the turning circle – 20 metres;
  - (b) the turning circle – 10.5 metres.
- (3) Turning areas at the end of the cul-de-sac in industrial developments should be full turning circles based on criteria nominated by the Engineer for the specific application, with the following minimum kerb radii:
  - (a) approach curve tangential to the turning circle – 30 metres.
  - (b) the turning circle – 12.5 metres.
- (4) “T” or “Y” shaped turning areas are generally not to be used, particularly where multiple allotments are accessed via the turning area. Where a “T” or “Y” shaped turning area is approved by the Engineer, grade and cross fall shall be no more than 7%.
- (5) Where the construction of a road is being staged, a temporary cul-de-sac head is required, unless otherwise specified. Minimum dimensions for a temporary cul-de-sac as specified by Council. Temporary cul-de-sac heads are to be located on road reserve. Bitumen surface is required unless otherwise approved by Council. Carriageway Surfacing

#### **SC6.1.7.2.22 Carriageway Surfacing**

- (1) Flexible pavements in urban areas are to be fully primed prior to laying TMR specification asphalt. In industrial developments asphalt thickness shall be a minimum of 45mm.
- (2) Pavements in rural and rural residential areas shall be two coat chip sealed, except all roundabouts and cul-de-sac heads and throats shall be surfaced with minimum 30mm thick TMR specification asphalt.

#### **SC6.1.7.2.23 Verges**

- (1) For the purposes of this Planning Scheme Policy, verge is defined as follows:
  - (a) for a road with kerb and channel, that portion of the road reserve between the back of kerb and the property boundary,
  - (b) for a road without kerb and channel, that portion of the road reserve between the limit of earthworks (i.e. top of the cut batter or toe of embankment fill) to the property boundary.
- (2) The cross-section of the verge should conform to the Council's Standard Drawings unless otherwise approved by the Engineer.
- (3) Verge widths should be in accordance with 0 Road Width, Grades, Pavement Design & Pavement Marking Criteria unless otherwise approved by the Engineer.
- (4) It should be noted that the road reserve widths given in 0 are absolute minimums. Greater widths may be needed to accommodate the required road and verge profiles.
- (5) When the conditions of development approval require the construction of a concrete footpath, it should be 1.2 metres in width or 2.5 metres where required as a shared footpath/bikeway and located in accordance with Council's Standard Drawing. (Note: in coastal areas, the minimum footpath width shall be 1.5 metres.)
- (6) Where the power reticulation authority and telecommunications provider share a joint use trench, conduits should be located in accordance with the current policies of those Service Providers.
- (7) Where verges have been disturbed / re-profiled, they should be covered full width with approved topsoil to a depth of not less than 100mm lightly compacted and seeded with approved grass. Where kerb and channel is constructed, turf shall be placed for a minimum width of 600mm behind the kerb.
- (8) Concrete pathways should be constructed on road verges for roads assessed by Council as Collector and above.

#### **SC6.1.7.2.24 Pathways**

- (1) The minimum width of land dedicated to Council for a pathway should be 4.0 metres. Concrete paving should conform to the Council's Standard Drawings and will generally be 1.2 metres minimum width, located no less than 0.5 metres from either side.
- (2) The concrete pavement within a pathway should generally be constructed to the adjacent kerb and channel together with a kerb ramp.

- (3) Approved timber bollards should be installed in accordance with IPWEAQ standard drawings to restrict vehicular access at the ends of pathways.
- (4) Where pathways are utilised for overland flow purposes they are to be sloped towards the centre and designed to meet flow requirements.

#### **SC6.1.7.2.25 Bikeways**

- (1) The minimum width of land dedicated to Council for a bikeway should be 5.0 metres with 2.5 metres wide concrete paving unless otherwise approved by Council.
- (2) The design should be carried out in accordance with the Manual of *Uniform Traffic Control Devices (Qld)* and AUSTROADS. Entrance control, deflections and slowdown points should be in accordance with IPWEAQ standard drawings.
- (3) Bikeways located in parks should be constructed above the 1 year ARI stormwater flow unless approved otherwise by the Engineer.

#### **SC6.1.7.2.26 Kerb and channel**

- (1) Concrete kerb and channel shall be constructed with 32MPa concrete.
- (2) The standard kerb and channel for streets should be M1 in accordance with Council's Standard Drawings.
- (3) For urban streets approved without kerb and channel, type E1 flush concrete edge restraint should be used on both sides of the pavement.
- (4) Barrier type kerb and channel with 450mm minimum channel (B1) in accordance with Council's Standard Drawing should be used in the following cases:
  - (a) Industrial Roads, heavy duty barrier type should be used (i.e. standard barrier type, with additional 50mm base thickness);
  - (b) Sub-Arterial and Arterial Roads;
  - (c) Shopping Centres, and in locations where high pedestrian volumes are likely e.g. traffic signals, on the frontage of schools and major sporting facilities and parks, where, greater pedestrian safety is required.
  - (d) Noses of median islands where required to protect traffic signals or other infrastructure and any other locations where required by the Engineer.
- (5) Semi-Mountable type kerb or kerb and channel should be used in the following cases:
  - (a) for Medians and Traffic Islands – semi-mountable or low profile kerb type in accordance with Council's Standard Drawing;
  - (b) for Roundabouts (centre island only), a low profile kerb type in accordance Council's Standard Drawing.
- (6) Where proposed construction adjoins existing kerb and channel the Engineer should decide whether the existing profile should be extended or whether the new construction will be tapered smoothly to the existing kerb and channel.
- (7) The grading of kerb and channel will normally conform to the road centreline grading. However, at locations where the kerb and channel grading diverts from the centreline grade, such as at intersections or on super-elevated curves, grades may vary.
- (8) Minimum channel grade shall be 0.3%.
- (9) Long vertical curves shall be provided at all changes of grade.
- (10) At all changes in horizontal alignment, kerbs and kerb and channel should be constructed with horizontal alignment. To improve appearance where small deflections occur (e.g. on tapers), horizontal curves should be as long as possible. Refer also to current TMR or AUSTROADS design manuals.
- (11) Kerb ramps should be provided in accordance with IPWEAQ Standard Drawings at all kerb returns, at park entrances and at any other locations where required by the Engineer.
- (12) Where stormwater discharge into kerb and channel is approved, kerb adaptors shall be hot dipped galvanised steel and separated by 25mm spacers (refer SC6.1.7.5.2(4)(a)).

#### **SC6.1.7.2.27 Signs and road markings**

- (1) Permanent signing and road marking should be in accordance with the current *Manual of Uniform Traffic Control Devices* and where relevant, AUSTROADS design manuals, and to the satisfaction of the Engineer.
- (2) Temporary or construction signing and road marking provided in the Traffic Management Plan should be in accordance with the *Manual of Uniform Traffic Control Devices* and to the satisfaction of the Engineer. Temporary line marking shall not be installed on the finished wearing surface of a road.
- (3) In all drawings, the relevant sign reference number from the *Manual of Uniform Traffic Control Devices* shall be shown with each sign;



- (4) All signs and pavement markings should be adequately dimensioned to ensure accurate setting out.
- (5) All signposts set into concrete slabs should be socketed and wedged in accordance with IPWEAQ standard drawings.
- (6) Vandal proof bolts and fittings should be used on all permanent signing.
- (7) Street name signs shall be black legend on a white background as per IPWEAQ standard drawings.
- (8) Non-standard signs and Entry Statements are to be assessed by the Engineer as part of the Operational Works Application.
- (9) Signs and other devices which may be construed as advertising are not permitted on road reserves. Entry Statements for developments are not permitted on road reserves.

#### **SC6.1.7.2.28 Road edge guide posts and roadside barriers**

- (1) Road edge guide posts should be provided at all locations where concrete kerb and channel is not constructed e.g. half road construction, tapers, ends of roads, etc.
- (2) Guide posts shall conform to TMR standards for manufacture and construction.
- (3) Guardrails and wire ropes shall be installed in accordance with TMR Standard Drawings.
- (4) For the warrants and locations of guardrails, refer to AUSTROADS.
- (5) There may be circumstances where the Engineer will require guardrails in locations which do not meet the AUSTROADS' warrants.

#### **SC6.1.7.3 Earthworks**

##### **SC6.1.7.3.1 Clearing**

- (1) Clearing of vegetation shall not commence prior to obtaining Approval to Commence work from the Engineer.
- (2) Clearing should generally be kept to a minimum. Trees and vegetation of significance should be identified prior to design in order that damage/disturbance may be minimised through appropriate design.
- (3) Roadways clearing should be limited to the limits of approved earthworks plus 1 metre lateral clearance.
- (4) Specific eucalyptus and imported pine tree species are to be cleared from roadways and park areas unless otherwise required by the Engineer.
- (5) Allotment clearing should be limited to the minimum areas required to safely construct services such as sewers and inter-allotment drainage and the limits of approved earthworks to allotments plus 1 metre lateral clearance.
- (6) No trees should be damaged or removed from areas to be dedicated to the control of Council without the prior written approval of the Engineer.
- (7) Trees on existing roads should not be damaged or removed without the approval of the Engineer. All trees on existing roads affected by the works should be shown and details given of what is proposed to protect or relocate the trees.
- (8) Prior to any clearing, all existing and future parkland should be delineated to ensure its protection from unauthorised clearing.
- (9) Subject to specific on-site approval from the Engineer, dead, dying or dangerous trees, and trees likely to be dangerous when mature should be removed from areas to be dedicated to the control of Council.
- (10) All felled trees and vegetation on the site should be removed from fill areas prior to the commencement of earthworks. The Engineer should be notified when this work has been completed.
- (11) Proposed methods of disposal of felled trees and vegetation should be subject to the written approval of the Engineer. Burning of cleared material is not an acceptable means of disposal and will not be approved.

#### **Guideline: "Disposal of cleared material"**

*The following means of disposal are suggested:*

- *processing through a woodchipper;*
- *disposal for firewood;*
- *disposal for landscaping purposes;*
- *transport to alternative site for breaking down materials.*

### SC6.1.7.3.2 Filling

- (1) If any land is to be filled the following conditions are to be complied with:
  - (a) "No person should be permitted to fill any land where, in the opinion of Council, such filling would detrimentally affect the area available in any natural or artificial watercourse for either present or estimated future flood flows, or would detrimentally reduce the volume within a flood plain available for the storage of flood waters."; and,
  - (b) "No person should be permitted to fill any land if such filling may detrimentally affect the existing natural drainage of any of the surrounding land."
- (2) Every allotment should be filled and drained where necessary, such that the whole of the allotment is drained and such that an area is available above the adopted flood line as determined by Council's policy.

**Guideline:**

*Drainage and filling would ordinarily be carried out to the satisfaction of the Council Engineer. Proponents should also note that development approvals usually require new allotments to be flood free, in accordance with the planning scheme's specific outcomes and probable solutions.*

- (3) All filling is to be carried out in accordance with AS 3798 Guidelines on Earthworks for Commercial and Residential Developments. The inspection and frequency requirements for earthworks on allotments shall be nominated as Level 2 in accordance with Section 8 of AS 3798 on the Inspection and Testing Plan. (Note that filling of dams is covered in SC6.1.7.3.8.)

**Guideline: Uncontrolled fill**

*Where filling of allotments has occurred prior to the Development Approval or prior to obtaining an Approval to Commence Work, the Consulting Engineer will be required to demonstrate that the fill meets the requirements of Level 2 AS3798. Should this not be possible, it is likely that the fill will need to be removed and replaced.*

### SC6.1.7.3.3 Allotment earthworks – access and crossfall

- (1) Steep slope of the natural surface can result in difficulty in providing vehicular access to allotments fronting the road. Driveway grades should be limited for safety and amenity and meet the grades contained in 0.

**Table SC6. 3 Standards for driveway grades**

COLUMN 1	COLUMN 2	COLUMN 3
Type of Driveway	Desirable grade	Absolute maximum grade
Residential	16.6%(1 in 6)	25% (1 in 4)
Industrial	10% (1 in 10)	16.6% (1 in 6)

- (2) Allotments should be self-draining and have a minimum fall of 1 in 100. Refer also to 0 Inter-allotment drainage.

### SC6.1.7.3.4 Batter treatments

- (1) Cut and fill batters on verges beside kerb and channel shall not exceed 1 on 6 slope in accordance with Council's Standard Drawing.
- (2) Cut and fill batters should not straddle allotment boundaries unless otherwise approved by the Engineer. Where land adjoining a development is effected, approval will only be given if written evidence is provided from the owner of the affected allotment providing no objection to the proposed straddling. Where cut or fill batters are proposed to extend into new allotments created by the development, batters must be no steeper than 1 in 6.
- (3) Cut and fill batters should not extend into existing or proposed parkland or bushland reserve unless specifically approved by the Engineer. In general cut and fill batters should be limited to a maximum slope of 1 in 4 (1 in 6 in park), such that stabilisation is achieved by topsoiling and grassing which can be maintained by conventional tractor slasher.
- (4) In roads, fill batters to a maximum slope of 1 in 2 may be approved, subject to submission of an acceptable landscape treatment.

- (5) In roads, cut batters to a maximum slope of 1 in 1.5 may be approved subject to geotechnical advice confirming structural and erosive stability, and an acceptable landscape treatment.
- (6) Where batters steeper than 1 in 4 are required, the alternative of a retaining structure, fully contained on private land, with structural certification by a structural Engineer, may be considered by the Engineer.
- (7) Batters on private property should not exceed 1:4. Batters up to 1:2 may be approved subject to submission of an acceptable landscape treatment. Acceptable landscape treatments can be discussed with Council engineers to determine requirements.

#### **SC6.1.7.3.5 Retaining walls**

- (1) Retaining walls that are not works for new subdivisions (reconfiguring a lot) are defined as building works in the *Sustainable Planning Act 2009*. They are not operational works and must be assessed under the provisions of the *Building Act 1975*.
- (2) Designs for retaining walls including rock walls greater than 1m in height or retaining any surcharge (earth or structures above the wall) are to be structurally certified and submitted to the Engineer for approval.
- (3) Retaining walls should generally be constructed with a minimum 150mm clearance from property boundaries. A lesser dimension may be approved by the Engineer depending on the prevailing circumstances e.g. urban CBD area.
- (4) Council will not accept retaining walls on any Council controlled land, including road reserves.
- (5) Walls which are to retain allotments above adjoining allotments, including road and other reserves, must be constructed of rock, concrete or masonry. Timber retaining walls will not be accepted within two metres of allotment boundaries.
- (6) A risk assessment, certified by the RPEQ, shall be provided with regard to pedestrian/traffic safety for retaining walls higher than 1.0m.

#### **SC6.1.7.3.6 Earthworks to parkland**

All earthworks proposed within proposed or existing parkland should comply with the requirements of an acceptable and approved Landscape Design.

#### **SC6.1.7.3.7 Compaction**

Compaction of earthworks should be in accordance with AUS-SPEC as set out in Council's Inspection and Testing Plan.

#### **SC6.1.7.3.8 Treatment of dams**

- (1) Where a dam is to be retained within a rural or rural residential allotment, it must be wholly contained within the lot such that the ponded area is no closer than 6.0m to any property boundary. By-wash flows are to enter the natural gully prior to exiting the lot. Dam walls must be wholly located within the lot containing the ponded area.
- (2) Dams to be filled should be dewatered and all unsuitable material removed from the site and spoiled at a location approved by the Engineer.
- (3) The integrity of the drainage lines to and from the dam should be ensured.
- (4) An alternative drainage path should be included into the drainage design to replace the drainage path to the dam provided prior to its being filled.
- (5) The backfill is to be approved selected fill compacted in layers not exceeding 150mm in depth to a Level 1 compaction certified as set out in AS 3798. Certificates are to be supplied from a NATA registered soil testing laboratory showing that the specified standard of compaction has been achieved throughout the filling.
- (6) Where strong evidence exists (e.g. aerial photography or ground contours) that a dam has been filled prior to the Development Approval or prior to Approval to Commence Work, and
  - (a) the dam was located under a potential building envelope or road reserve, and
  - (b) Level 1 compaction cannot be certified,
 then the fill shall be removed and replaced such that Level 1 compaction can be certified. This work will be at the proponent's cost.

#### **SC6.1.7.3.9 Haul Routes**

- (1) To manage the impact on council roads and nuisance to residents, agreed haul routes are required for the import and/or export of earth or other materials in excess of 15,000 cubic metres.

- (2) An assessment of the haul route/s shall be made by the RPEQ consulting engineer to determine the suitability for the intended traffic considering the existing condition of the road (with photographic evidence of the condition of the road), and a copy of the assessment provided to council for approval prior to the commencement of the use. Rehabilitation works will be required where haulage vehicles have damaged pavements or other infrastructure.

#### SC6.1.7.4 Stormwater Drainage

##### **Guideline:**

*QUDM is the basis for the design of stormwater drainage in the local government area. Stormwater drainage designed in accordance with the objectives, design philosophy, methods and recommendations of QUDM, except where modified by this planning scheme policy, is likely to comply with the specific outcomes stated in the Infrastructure and Operational Work (excluding advertising device) Code. The local government's information requirements in relation to drainage are contained in SC6.1.6.3.1 of this policy.*

##### SC6.1.7.4.1 Design Criteria

Stormwater drainage shall be designed and constructed in accordance with the *Queensland Urban Drainage Manual (QUDM)* to the following standards:

- (1) Design storms:
  - (a) Major drainage system – ARI = 100 years
  - (b) Minor drainage system –
    - (i) for streets or roads up to and including Collector roads where the catchment area does not exceed 5 hectares – ARI = 5 years;
    - (ii) for any street or road where the catchment area exceeds 5 hectares, and for Arterial or sub-arterial streets or roads – ARI = 10 years.
- (2) Flow widths:
  - (a) refer to the QUDM;
  - (b) for other streets and roads – 3.0m from invert of kerb and channel;
  - (c) bypass flows around kerb returns and invert crossings – maximum 30 l/s.
- (3) Overland flow paths:
  - (a) Overland flow paths are to be provided at all sag points. Calculations to support weir flow over the kerb are to be submitted by the Consultant. Particular attention is required to the verge cross fall and shape at the flow path.
  - (b) Overland flow paths shall be located on non-private land, e.g. Roads, parks, reserves or shall be fully contained (including freeboard) within easements on private land. Depth times velocity (DV) factors shall satisfy QUDM requirements.
  - (c) Freeboard (to the allotment level) above a  $Q_{100}$  flow shall be provided. For flow depths below 300mm, 100mm freeboard is acceptable. For flow depths above 300mm, 300mm freeboard is required. Calculations showing flows, depth and velocities are to be provided.
  - (d) In cases where no overland flow path is available, pipes shall be designed to convey 4 times the  $Q_{100}$  flow. Overland flow paths must be provided wherever possible.
- (4) Where drainage works pass through privately owned land:
  - (a) The minor system stormwater drainage path through a lot shall be piped. For urban developments the pipe shall extend the full depth of the lot. For rural residential developments, the pipe shall extend past the likely house construction envelope;
  - (b) All drainage works plus discharge area shall be contained within a stormwater drainage easement. Minimum easement width is to be 4.0 metres.
- (5) Pipe Flow Velocities (flowing full) as per 0.
- (6) Outlet velocities greater than 3.0m/sec require scour protection measures to be designed and implemented.
- (7) The maximum catchment area for piped drainage systems shall be 30Ha. Flow paths for catchments greater than 30Ha are to be within drainage or park reserves or widened road reserves which allow for dual carriageways with a central depressed median.

**Table SC6. 4 Pipe flow velocities**

COLUMN 1	COLUMN 2
Desirable Velocity	Absolute Velocity
Minimum 1.2m/sec	0.9m/sec
Maximum 3.5m/sec	5.0m/sec

#### SC6.1.7.4.2 Rural & Rural Residential Drainage

- (1) Where under-road cross road drainage is required, the design shall be in accordance with TMR design procedures for a 10 year ARI. The road formation is to be protected so that no damage occurs during a 20 year ARI event.
- (2) Table drains are to be free flowing with a minimum grade of 0.5% and to be designed so that the building footprints are not subjected to 100 year ARI flows. Property access drainage is to be designed so that table drain flows contain either a 2 year ARI event (in the case of the adjoining road ADT  $\leq$  2000) or a 10 year ARI event (where the adjoining road ADT  $>$  2000) without overtopping the road and so that there is no damage to the access or road during a 20 year ARI event.
- (3) Table Drains in erosive soils or on grades greater than 8.0% are to be protected to prevent erosion or scour.
- (4) Where cross road drainage discharges into private property in rural residential developments and where overland flows could potentially encroach onto a future building footprint, drainage conduits are to extend to 10 metres beyond the building footprint or 75% of the depth of the lot, whichever is the greater distance.

#### SC6.1.7.4.3 Gully pits and access chambers

- (1) All gully pits are to be grated side entry pits in accordance with Council's Standard Drawing.
- (2) Anti-ponding pits on curves are to be depressed and grated.
- (3) Where possible, gully pits are to be located to reduce the likelihood of conflict with future driveway locations.
- (4) Access chambers and field inlet pits ( $>300$ dia pipes) are to be in accordance with IPWEAQ drawings.
- (5) Access chambers and field inlet pits ( $\leq 300$ mm pipes) are to be in accordance with Council's standard drawing.
- (6) Gully to gully connections are permissible at the heads of lines and for pipes up to and including 900mm diameter.
- (7) Freeboard within structures is to be a minimum of 150mm above the Water Surface Elevation (WSE) for the design storm.
- (8) All metal components installed below HAT plus 0.5m shall be manufactured and installed to minimise corrosion; e.g. heavy hot dipped galvanised with no field welds or marine grade aluminium.
- (9) The preferred location for large conduits and manholes is in the road verge and not as stated in QUDM.

#### SC6.1.7.4.4 Pipes

- (1) Pipes used within road and drainage reserves may be either reinforced concrete or fibre reinforced concrete (FRC) type with wall thickness and class to suit the prevailing ground conditions. All pipes are to be backfilled in accordance with AUS-SPEC specifications for the class of pipe nominated by the consultant. FRC pipes are not to be used in coastal areas and in these areas the use of polymer pipes will be considered by the Engineer.
- (2) Minimum pipe sizes as per 0.

**Table SC6. 5 Minimum standard for pipe sizes**

COLUMN 1	COLUMN 2
Type of pipe	Dimension
Low flow pipes	225mm diameter with pits every 30 metres
Gully connections	375mm diameter (300mm diameter accepted at head of line only for maximum length of 30 metres)
Between access chambers	375mm diameter

- (3) Pipes are to be flush joined with joints wrapped with approved material.
- (4) Rubber jointed pipes or pipe manufacturer's proprietary external bands to be used where soil types are of a granular nature.
- (5) Minimum clear cover is to be 450mm subject to backfilling requirements.
- (6) The minimum vertical and horizontal clearance between a stormwater pipe and any other pipe or service conduit are to be 150mm.
- (7) All pipes installed below HAT plus 0.5m shall have saltwater cover.

#### SC6.1.7.4.5 RCBCs

- (1) All RCBCs installed on Arterial and Sub-Arterial roads are to be manufactured to MRTS24. RCBCs installed on all other roads and streets and in easements and reserves may be manufactured to MRS 11.24 10/03 or MRTS24.
- (2) The minimum dimension of RCBCs is 375mm.
- (3) All RCBCs installed below HAT plus 0.5m shall have saltwater cover.

**Guideline:**

*It is strongly recommended that preliminary catchment plans, runoff coefficients and times of concentration be presented to the Engineer for approval in principle, prior to commencing detailed design. Agreement on legal point of discharge, locations and widths of easements, drainage reserves and tail water conditions should also be confirmed prior to proceeding with detailed design.*

*SC6.1.6.3.1 contains the local government's information requirements with respect to drainage calculations and catchment plans.*

#### SC6.1.7.4.6 Open Channel Flows

- (1) Open channel flows shall be designed in accordance with the QUDM with calculations provided.
- (2) Channels are to be located in drainage or road reserves or easements designed to meet a  $Q_{100}$  flow.
- (3) Freeboard above a  $Q_{100}$  flow shall be provided in accordance with the QUDM. For flow depths below 300mm, 100mm freeboard is acceptable.

#### SC6.1.7.4.7 Detention Basins

- (1) It should be noted that detention basins, while acceptable, are not a preferred drainage solution and may not be used without prior written approval of Council or the Engineer.
- (2) Detention basins are to be designed in accordance with QUDM to criteria nominated by the Engineer for specific applications.
- (3) Detention basins are to be constructed within lands under the control of Council, unless otherwise approved by Council.

#### SC6.1.7.4.8 Stormwater Quality

- (1) Designers are to consider incorporating soft stormwater quality treatment within developments. Examples of soft treatments are:
  - (a) retained / reinstated natural drainage paths
  - (b) vegetated (not concrete or rubble lined) overland flow paths
  - (c) swale drains in Rural Residential areas
- (2) In commercial and industrial developments, stormwater quality improvement devices shall be on private land (i.e. not on Council land) and owned and maintained by the landowner/s.
- (3) Desired water quality objectives for stormwater quality improvement devices are given in 0.

**Table SC6. 6 Desired discharge water quality objectives**

COLUMN 1	COLUMN 2
Test	Reduction from untreated post-development conditions
Total Suspended Solids (TSS)	80%
Total Phosphorus (TP)	60%
Total Nitrogen (TN)	40%
Gross pollutants	90%

#### SC6.1.7.4.9 Fish and Fauna Passage

- (1) Fish passage must be provided in all crossings of waterways where required by the State government.
- (2) Fauna passage, through culverts or over roads and streets should be provided in areas of ecological significance (HEV & above as defined in State Planning Policies).

### SC6.1.7.5 Inter-allotment drainage

#### SC6.1.7.5.1 General

- (1) Inter-allotment drainage shall be provided for every allotment in urban environments that does not drain directly to its frontage.
- (2) Inter-allotment drainage shall be contained within an easement 2.0m (minimum) in width. The easement shall be in favour of the upstream lots connected to the system.
- (3) Inter-allotment drainage systems are to be designed in accordance with QUDM with the following additional / clarified requirements.
- (4) The effects of roof and allotment drainage system on the existing downstream drainage network are to be determined in accordance with QUDM. Detention systems may be required.
- (5) The following are standard requirements. Council may require higher or lower levels of inter-allotment drainage in specific cases.

#### Reconfiguring a lot

- (6) New allotments in the following zones are to be provided with QUDM Level III inter-allotment drainage systems: Residential Choice, Low, Medium and High Impact Industry, Tourist Accommodation, and all Centre Zones.
- (7) New allotments in the following zones are to be provided with QUDM Level II inter-allotment drainage systems: Residential Living and Character Residential Zones.
- (8) Where allotments will receive runoff from existing upstream lots where no inter-allotment drainage is in place, specific engineering designs, including inter-allotment drains are required to ensure protection of the newly created lots
- (9) Where allotments drain to existing downstream lots and no inter-allotment drainage is in place:
  - (a) Inter-allotment drainage is to be provided and appropriate easements secured or;
  - (b) Specific engineering designs, limiting the quantity, duration and concentration of flows to the pre- development conditions are required.

#### Material Change of Use

- (10) Residential Choice, Industrial, Tourist Accommodation and Centre Zone developments shall have a minimum of QUDM Level IV roof and allotment drainage.
- (11) Where a development drains to existing downstream land and no suitable inter-allotment drainage is in place, specific engineering designs, limiting the quantity, duration and concentration of flows to the pre-development conditions are required.

#### SC6.1.7.5.2 Materials

- (1) Pipe bedding and backfill:
  - (a) as specified in WSA codes – Sewer Reticulation for uPVC pipes; or
  - (b) as specified in AUS-SPEC.
- (2) Pipe materials:
  - (a) uPVC sewer pipe minimum class SN8; or
  - (b) uPVC drainage pipe PLASCOR or equivalent, of equivalent class to uPVC sewer class SN8;
  - (c) RC pipe class "1" rubber ring jointed;
  - (d) FRC pipe class "1" rubber ring jointed;
  - (e) uPVC pipes may be either rubber ring jointed or solvent weld jointed;
  - (f) polymer pipe e.g. "Rib Loc", "Ribstruct" or equivalent;
  - (g) standard manufacturers fittings – used in all cases;
  - (h) site fitted saddles are not permitted.
- (3) Inspection access chambers:
  - (a) Inspection access chambers may be precast or cast insitu concrete boxes, or precast FRC or RC pipe systems to the dimensions shown in 0.

**Table SC6. 7 Inspection access chambers**

COLUMN 1	COLUMN 2	COLUMN 3
Maximum Depth to Invert (mm)	Boxes – Internal Dimensions (mm)	FRC or RCP Systems
900	600 x 600	450mm diameter max.
> 900	600 x 1200	600mm diameter max.
Minimum Wall Thickness	100+	N/A

- (b) FRC and RCP systems are to be constructed by embedding the lower precast shaft section into a wet cast-in-situ concrete base, cut outs for pipe penetrations are to be made using concrete saws/drills in such a manner as to minimise damage to the adjacent pipe materials.
  - (c) Lids to cast-in-situ access chambers are to be light duty (generally) close fitting bolt down cast iron or galvanised steel, concrete infill type (Gatic Light Duty, Polycrete Broadstel or similar) of approximately the same internal dimensions as the access chamber.
  - (d) Lids to FRC and RCP access chambers are to be the manufacturer's proprietary concrete or concrete infill type.
  - (e) Infill concrete is to be Class N25.
  - (f) Lids must sit 25 - 50mm proud of the finished ground surface.
  - (g) Lids are to be marked "stormwater" impressed into the concrete infill.
  - (h) Grated lids with provision for bolting down may be required where provision is made for overland flow to enter the piped system or where the pit depth is greater than 600mm.
  - (i) All inspection access chambers are to be free draining and not pond water.
- (4) Footpath Crossings:
- (a) Where discharge is into the kerb and channel, steel rectangular hollow sections separated by 25mm minimum spacers welded together and hot-dip galvanised are to be used.
  - (b) These pipes are to be placed on compacted sand bedding and where they discharge through the kerb. Kerb adaptors are to be used and shall be hot-dipped galvanised steel separated by 25mm (min) spacers.

#### **SC6.1.7.5.3 Location and alignment**

- (1) Inspection access chambers are to be 0.5m from rear or side boundaries within the properties served.
- (2) Inspection access chambers are required in the following instances:
  - (a) 90 – 100 metre spacing;
  - (b) changes of grade;
  - (c) changes of direction;
  - (d) changes of pipe diameter;
  - (e) ends of lines;
  - (f) 0.5 metres to 1.5 metres from boundaries, subject to conflict with sewer access chambers.

#### **SC6.1.7.5.4 Connection Points**

Requirements for connection points:

- (1) at least one of minimum 100mm diameter located 0.5m from lowest property boundary;
- (2) connection direct to access chambers are preferred;
- (3) connection points on line are to be in the form of a "Y" junction, bend and, access chamber as for a sewer connection. In each case the connection point shall be capped with a screw on or push on cap.

#### **SC6.1.7.5.5 Outlets**

- (1) Inter-allotment drainage system:
  - (a) should connect directly to the trunk drainage system e.g. gully pit or access chamber;
  - (b) up to 4 lots may discharge to kerb and channel via galvanised steel rectangular hollow sections, located within 0.5 metres of allotment side boundary, measured square off back of kerb and channel.
- (2) Individual discharge to street (refer IPWEQ standard drawing):
  - (a) where inter-allotment pipe drainage is not provided, hot dipped galvanised kerb adaptors at the rate of 1 per 20 metres of frontage are to be installed with one adaptor located within 0.5 metres of lowest side allotment boundary, measured square off the back of kerb and channel;
  - (b) any additional adaptors are to be located 15 metres apart.

#### **SC6.1.7.5.6 Cover**

- (1) The general minimum cover to pipe shall be 300mm, however this may not be possible where discharging to kerb and channel. The minimum cover to house connections shall be 300mm.
- (2) Subject to the previous paragraph, the depth of the house connection shall be determined as follows:
  - (a) determine the longest run of house drain to the connection point possible within the allotment;
  - (b) allow 0.3 metres cover to the house drain at the head of the line;
  - (c) allow minimum grade of 1 in 100 for the house drain.



### **SC6.1.7.6 Pavements**

#### **SC6.1.7.6.1 General**

Both flexible and rigid pavements may be used. The total required pavement thickness shall be based on:

- (1) if a flexible pavement–
  - (a) *Austrroads Pavement Design Manual*; or,
  - (b) *ARRB Design of new pavements for Light Traffic – 95% confidence level*.
- (2) if a rigid pavement–
  - (a) *AUSTROADS Pavement Design: A Guide to the Structural Design of Road Pavements*
  - (b) *Cement & Concrete Association of Australia – Technical Notes for Concrete Road Pavements*.
- (3) if a segmented pavement–
  - (a) the manufacturer's guidelines.

#### **SC6.1.7.6.2 Materials testing**

- (1) All materials testing shall be carried out by a NATA registered materials tester using the procedures described in the following manuals or codes of practice:
  - (a) TMR;
  - (b) SAA Standards Association of Australia.
- (2) Where a test is described in more than one of these references, the procedure which is described in the first of these references shall be used.

#### **SC6.1.7.6.3 Design life**

A minimum design life of 20 years shall be adopted for all roads and streets.

#### **SC6.1.7.6.4 Design traffic loading**

Unless determined otherwise by the Engineer, the minimum number of design Equivalent Standard Axles (ESAs) for the various road categories shall be as shown in 0 Road Width, Grades, Pavement Design & Pavement Marking Criteria. The designer is to calculate the design traffic, taking particular account of staged construction traffic, building traffic and fully developed traffic. The greater of the calculated traffic and 0 traffic is to be used.

#### **SC6.1.7.6.5 Minimum pavement thickness**

- (1) The pavement thickness shall be either the designed thickness using the above method and inputs, or the minimum pavement thickness shown in 0, whichever is greater.
- (2) If a pavement is to be laid on fill, sufficient tests must be taken on the fill material to determine the appropriate pavement thickness. Tests taken on the original soil present, prior to fill being placed, will not be used for pavement depth determination.

#### **SC6.1.7.6.6 Material specifications**

- (1) All materials used in construction of the road pavement are to comply with the requirements of Specification No. *MRTS05 – Unbound Pavements* of the TMR Specifications, unless approved otherwise by the Engineer.
- (2) All pavements constructed on Arterial, Sub-arterial and Distributor roads shall comply with the maximum degree of saturation specified in the TMR Specifications. Pavements on lower order roads are not required to be tested for degree of saturation.
- (3) Soil aggregate shall comply with the minimum soaked CBR outlined in 0 Road Width, Grades, Pavement Design & Pavement Marking Criteria.

#### **SC6.1.7.6.7 Subgrade evaluation**

Subgrade evaluation shall be undertaken in accordance with the procedures outlined in TMR *Pavement Design Manual*.

#### **SC6.1.7.6.8 Design CBR**

The design CBR is determined by reference to the TMR *Pavement Design Manual*. Gympie shales shall have a design CBR no higher than 5%, even if material tests indicate a higher figure.

#### **SC6.1.7.6.9 Sub-soil drainage**

- (1) Sub-soil drainage is to be provided at all locations where the bottom of the pavement is below the natural surface in all sub-grade materials other than free-draining sand.
- (2) Sub-soil drains are to be provided under all kerb types including raised medians.
- (3) Where the road centreline is approximately parallel to the contours, a side drain will be required on the high side of the road. Where the centreline is approximately at right-angles to the contours, mitre drains may be required.
- (4) Details and locations of sub-soil drainage shall be in accordance with Council's standard drawings, unless otherwise approved.

#### **SC6.1.7.7 Water Supply & Sewerage Reticulation**

##### **SC6.1.7.7.1 Sewerage reticulation**

The design standards for sewerage reticulation works are stated in *WSA Sewerage Code of Australia*, as modified by the Council addendum stated in SC6.1.10 WSA Addenda.

**Guideline:**

*Under the Water Reliability and Supply Act a local government may issue a notice to an owner of premises within its service area requiring connection to its infrastructure. Under the Plumbing and Drainage Act, a local government may issue a notice requiring an owner to install an on-site sewerage facility on premises.*

##### **SC6.1.7.7.2 Water supply reticulation**

The design standards for water reticulation works are stated in *WSA Water Supply Code of Australia*, as modified by the Council addendum stated in SC6.1.10 WSA Addenda.

##### **SC6.1.7.7.3 Sewage pumping stations and pressure mains**

The design standards for sewage pumping station works are stated in *WSA Sewage Pumping Station Code of Australia*, as modified by the Council addendum stated in SC6.1.10 WSA Addenda.

#### **SC6.1.7.8 Lighting & Services**

##### **SC6.1.7.8.1 Street lighting**

- (1) As a minimum, street lights are to be provided within the road reserve at intersections, traffic calming devices and at the throat of cul-de-sacs as follows:

**Guideline:**

*Street lighting should be based on the desired level of service considering past and future needs and its costs and benefits.*

- (a) if in the Residential Living and Character Residential Zones:
    - (i) CFL32D watt lights not more than 50 metres apart on an Urban Local Street; and
    - (ii) S 70 watt lights not more than 80 metres apart on an Urban Collector Street; and
    - (iii) for any other road classification designs are to be prepared generally in accordance with AS/NZ 1158; or
  - (b) if in the Tourist Accommodation, Industry and Centre Zones, street lighting provision complies with AS/NZ 1158.
  - (c) if in Rural Residential developments, 70 watt sodium vapour lights at all intersections traffic calming devices and at the throat of culs-de-sac only.
  - (d) For all zones, intersection lighting in accordance with AS/NZ 1158 is required where determined by the engineer.
  - (e) Streetlights installed in, or adjacent to, existing urban or residential areas (or in any other location where stray light may effect existing residences) shall be aeroscreened to minimise the impact on neighbouring properties.
- (2) Developers are to meet the cost of installing street lighting to the standards in this policy regardless of whether overhead or underground power is used.
  - (3) Street lighting is to be activated on completion.
  - (4) The developer is to pay electricity charges to street lighting, as follows:
    - (a) paid as a lump sum prior to the Council's approval of the plan of subdivision;

- (b) for not less than one year after activation; and
- (c) calculated as per the Power reticulation authority tariff at the time of payment.

#### **SC6.1.7.8.2 Electricity and telecommunications**

- (1) Joint use of trenching of underground power and telecommunications cables is acceptable.
- (2) In Rural & Rural Residential areas, a service corridor of generally 4.0 metres width shall be provided between the earthworks batter point and the property boundary. A 3.0 metre bench may be accepted in particular cases.

#### **SC6.1.7.8.3 Electricity and Water**

Electricity and water reticulation are to be on opposite sides of the carriageway except when the number of lots on one side is less than half the number of lots on the opposite side and at the heads of cul-de-sacs.

#### **SC6.1.7.8.4 Parking and Manoeuvring Areas**

- (1) Off street car parks and internal driveways must be designed and constructed in accordance with AS2890 – “Parking Facilities”.
- (2) Off street car parks and driveways shall provide for safe and functional access for pedestrians, including trolleys, prams and wheelchairs (as applicable) as well as vehicles.
- (3) Access for service vehicles shall be designed for the largest vehicle likely to use the site allowing sufficient area for manoeuvres including when adjacent parking spaces are occupied and requiring a maximum of one reversing manoeuvre.
- (4) Off street carparks and loading areas etc. are to be designed to ensure all vehicles enter/exit the site in a forward direction.

#### **SC6.1.7.9 Driveways and Vehicle Cross-overs**

##### **SC6.1.7.9.1 Safety and functioning of the road network**

- (1) Driveways and cross-overs are to be located and designed in accordance with AS 2890.1 and in urban areas having a frontage of:
  - (a) less than 40 metres – one cross-over is provided; or
  - (b) more than 40 metres – no more than two cross-overs are provided and the cross-overs are separated by a minimum of 12 metres.
- (2) A vehicle crossing for one property is not to encroach on the frontage of any adjacent property except by written agreement of the two adjacent property owners and subject to the approval by the Council.
- (3) The existing speed environment of the existing road shall not be compromised by any proposed vehicle cross-overs.

<b>Guideline:</b>
<i>Concrete footpath crossovers should be constructed according to the Standard Drawings.</i>

##### **SC6.1.7.9.2 Levels and gradients**

- (1) Where the level of the property at the road boundary is level with or lower than that of the top of the kerb, the crossing should achieve a level of at least 40mm above the top of the kerb within 1.6 metres of the property alignment.
- (2) Driveway profiles within the road reserve shall comply with the relevant cross sections for either urban or rural as shown on the Council Standard Drawings.
- (3) For maximum gradients on driveways refer to 0 Standards for Driveway Grades.

##### **SC6.1.7.9.3 Change in gradient**

- (1) The rate of change in the driveway gradient is not to exceed 1:8 for a minimum length of 1 metre.
- (2) The driveway is to meet the road reserve at:
  - (a) the level of the existing verge in urban areas; or
  - (b) the surface level of the road reserve in rural areas.

##### **SC6.1.7.9.4 Widths and construction standards**

- (1) The width of cross-over is to be not less than the minimum stated in Council’s Standard Drawings.
- (2) The cross-over is constructed to the profiles in Council’s Standard Drawings.

- (3) The width of driveway to a single allotment is to be not less than that stated in Council's Standard Drawings. The width of commercial driveways shall be between 5.5 and 8.0m wide unless otherwise approved.
- (4) Access connection strips and easements containing single user access driveways are to be constructed to the following minimum standards:
  - (a) Residential and Character Residential – 2.7m wide, 125mm reinforced concrete for full length, in a minimum 6m wide strip.
  - (b) Tourist Accommodation, Centres, Industrial and Community Purposes – 3.5m wide, 150mm reinforced concrete for full length, in a minimum 6m wide strip.
  - (c) Rural Residential – 3.0m wide unsealed pavement in a minimum 10m wide strip except where slopes exceed 12% or the driveway is within 20m of an existing or proposed dwelling in which cases a two coat bitumen seal is required.
  - (d) Rural – 3.0m wide unsealed pavement except where slopes exceed 12% or the driveway is within 60m of an existing or proposed dwelling site, in a minimum 10m wide strip. 3.0m wide two coat bitumen seal for slopes exceeding 12% or where the driveway is within 60m of and existing or proposed dwelling site.
- (5) Multiple user access easement connection strips are to be constructed as follows:
  - (a) Residential and Character Residential – 2.7m wide, 150mm reinforced concrete for full length, in a minimum 6m wide strip.
  - (b) Tourist Accommodation, Centres, Industrial and Community Purposes – 3.5m wide, 150mm reinforced concrete for full length, in a minimum 6m wide strip.
  - (c) Rural Residential – 3.0m wide asphaltic concrete or bitumen seal for full length, in a minimum 10m wide strip. Where the access strip is greater than 100m long, a passing bay shall be provided at approximately the half-way point.
  - (d) Rural – 3.0m wide two coat bitumen seal for full length, in a minimum 10m wide strip.

#### **SC6.1.7.9.5 Loading**

Driveways are to be constructed to the minimum standards in Council's Standard Drawings whether for residential or other than residential use. The designer is to ensure that the pavement and crossover will carry the required loadings.

#### **SC6.1.7.9.6 Protection of and access to utilities**

- (1) Underground services beneath driveways and cross-overs are to be protected in accordance with the relevant Australian Standards.
- (2) Where the driveway or cross-over is to be located closer than 300mm from an existing utility infrastructure access cover, specific approval for altering the height of access cover will be required from the relevant authority.

#### **SC6.1.7.9.7 Sight Distances**

- (1) Property accesses shall be located to achieve the minimum sight distances given in Council Standard Drawing R-15. The sight distance is to be measured from a point 3m back from the edge line / edge of bitumen /edge of formation for unsealed roads and 1.15m above finished surface level to a point 1.15m above pavement level in the centre of the traffic lane.
- (2) The Engineer shall determine the appropriate 85<sup>th</sup> percentile speed for the road and may require sight distances in excess of the above, particularly where heavy vehicles will use the access.

#### **SC6.1.7.10 Erosion & Sediment Control**

- (1) Erosion and sediment control measures are to be designed and provided in accordance with the International Erosion Control Association (Australasia) 2008's *"Best Practice Erosion and Sediment Control for Building and Construction Sites"*. Designs for erosion and sediment control shall be submitted to Council with development applications for operational work.

The erosion and sediment control measures:-

- (a) are to be in place and fully operational during periods of rain and at the end of each day,
- (b) shall be inspected at least weekly and following rain events to ensure they are operating efficiently, and
- (c) maintained until soils are stabilised on the site.

## SC6.1.7.11 Refuse

### SC6.1.7.11.1 General and Recyclable Waste Generation

- (1) The waste generation identified in **Error! Reference source not found.** represent the minimum rateable requirements for the prescribed activities.
- (2) One (1) standard refuse service consists of one (1) 240L general waste container, serviced once per week and one (1) 240L recyclable waste container serviced once per fortnight.
- (3) When calculating waste requirements, round up the projected waste generation value to the nearest achievable waste service.
- (4) **Error! Reference source not found.** is to be used for guideline purposes only. Actual waste requirements may vary depending on individual circumstances and recycling practices. Council's Authorised Officers will make an assessment for the need and frequency of all services.

**Table SC6. 8 Guidelines for general waste and recyclable waster generation**

Type of Development	Estimated General Waste Generation	Estimated Recyclable Waste Generation	Notes on the Use of Bin Type
<b>Residential</b>			
Single Detached Dwelling	240L/week	120L/week	
Multi Residential (including Duplex) <ul style="list-style-type: none"> <li>• 1-2 bedroom</li> <li>• 3 bedroom and above</li> <li>• Relocatable Home Park</li> </ul>	120L/dwelling/week	60L/dwelling/week	
Shared Residential <ul style="list-style-type: none"> <li>• Backpacker/Farm Stay Accommodation</li> <li>• Boarding/Guest House</li> <li>• Caravan Park</li> </ul>	40L/bed/week 60L/room/week 60L/site/week	20L/bed/week 20L/room/week 20L/site/week	
<b>Commercial</b>			
Office Building	10-30L/100m <sup>2</sup> /day	20-40L/100m <sup>2</sup> /day	
Hotels/Motels/Clubs <ul style="list-style-type: none"> <li>• Accommodation / Residential Area</li> <li>• Dining Area</li> <li>• Licensed Bar Area</li> </ul>	5-10L/room/day 50L/100m <sup>2</sup> /day 20L/100m <sup>2</sup> /day	1L/room/day 10L/100m <sup>2</sup> /day 50L/100m <sup>2</sup> /day	Allow for: <ul style="list-style-type: none"> <li>• Waste oil storage</li> <li>• Bailing of paper/cardboard</li> <li>• Grease trap</li> </ul>
Retail Food Premises <ul style="list-style-type: none"> <li>• Butcher Shop</li> <li>• Delicatessen Shop</li> <li>• Fish &amp; Seafood Shop</li> <li>• Fruit &amp; Vegetable Shop</li> <li>• Restaurant / Café / Takeaway Food Shop</li> <li>• Supermarket / Convenience Shop</li> <li>• Shopping Mall</li> </ul>	90L/100m <sup>2</sup> floor area/day 120L/100m <sup>2</sup> floor area/day 90L/100m <sup>2</sup> floor area/day 240L/100m <sup>2</sup> floor area/day 120L/100m <sup>2</sup> floor area/day 200L/100m <sup>2</sup> floor area/day Combination to suite development	Variable Variable Variable 120L/100m <sup>2</sup> floor area/day Variable 100L/100m <sup>2</sup> floor area/day Combination to suit development	
Other Retail Premises <ul style="list-style-type: none"> <li>• Shop less than 100m<sup>2</sup> floor area</li> <li>• Shop more than 100m<sup>2</sup> floor area</li> <li>• Showroom</li> </ul>	25L/100m <sup>2</sup> floor area/day 50L/100m <sup>2</sup> floor area/day 40L/100m <sup>2</sup> floor area/day	25L/100m <sup>2</sup> floor area/day 50L/100m <sup>2</sup> floor area/day 10L/100m <sup>2</sup> floor area/day	Allow for: <ul style="list-style-type: none"> <li>• Bailing of paper/cardboard</li> </ul>
Service Premises <ul style="list-style-type: none"> <li>• Hairdressers/Beauty Salons</li> <li>• Commercial</li> </ul>	60L/100m <sup>2</sup> floor area/day 10L/100m <sup>2</sup> floor area/day	Variable 10L/100m <sup>2</sup> floor area/day	

Type of Development	Estimated General Waste Generation	Estimated Recyclable Waste Generation	Notes on the Use of Bin Type
Industrial Premises <ul style="list-style-type: none"> <li>• Warehouse</li> <li>• Factories</li> </ul>	50L 60L	Variable Variable	Allow for: <ul style="list-style-type: none"> <li>• Bailing of paper/cardboard</li> <li>• Waste oil storage</li> <li>• Waste metal storage</li> <li>• Waste tyres</li> </ul>