PLANNING SCHEME POLICY 2 – INFRASTRUCTURE WORKS

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1.0 HEALTHY WATERS

1.1 RELATIONSHIP WITH THE PLANNING SCHEME

(1) This part sets out:

(i) particular standards called up as acceptable outcomes in 9.3.1 Healthy Waters Code. These are contained in the following subsections:
1.2.1 Stormwater drainage design

(ii) information council may request to demonstrate compliance with the performance outcomes of the code. These are contained in the following subsections:
1.2.2 Stormwater quantity management plans
1.3.1 Stormwater quality management plans
1.4.2 Artificial waterbody (AWB) assessment
1.5.2 Erosion and sediment control assessment

(iii) guidance for applicants on approaches to stormwater management and erosion and sediment control. These are contained in the following subsections:
1.2.3 Upstream connections
1.3.2 Water quality
1.4.2 Artificial waterbodies
1.5.2 Erosion and sediment control

1.2 STORMWATER DRAINAGE DESIGN

1.2.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO1.2, AO3.1 and AO6.1 in the Healthy Waters Code. These standards represent the “acceptable outcome” which meets the performance outcomes set out in the code.

1.2.1.1 General

(1) Stormwater drainage is designed using the following standards unless otherwise specified or modified by the requirements set out in this section:

- Queensland Urban Drainage Manual (current edition)
- Australian Rainfall and Runoff (current edition)

(2) Use of the standard drawings in section 8 of this policy will be deemed to satisfy the acceptable outcomes required by QUDM, unless otherwise specified or modified by the requirements set out in this section.

(3) The following standards can be used where the standards listed above do not provide adequate information to satisfy the requirements of stormwater drainage design unless otherwise specified or modified by the requirements set out in this section:

- Austroads Guide to Road Design Part 5: Drainage - General and Hydrology Considerations (current edition).

(4) The minimum pipe size for all stormwater infrastructure to be transferred into council ownership is 375mm diameter.

(5) Where scour protection around structures is required it must be in the form of grouted stone pitching.

(6) Private inter-allotment drainage is restricted to a maximum of 4 allotments after which it must discharge to a lawful point of discharge (refer section 1.2.1.2 of this policy).

1.2.1.2 Lawful point of discharge

(1) In addition to section 3.4 and 3.5 of QUDM, designs that require downstream properties to accommodate stormwater flows to allow stormwater to discharge at a particular location (the lawful point of discharge) must provide written consent from downstream property owner/s and private easements over the drainage system provided in accordance with section 1.2.1.5 of this policy.

1.2.1.3 Design standards

(1) The design storm event for the minor drainage system is in accordance with Section 7.3.1 of QUDM.

(2) The design storm event for the major drainage system is the 1% annual exceedance probability (AEP) (100 year ARI).

1.2.1.4 Hydrology and hydraulics

(1) Increased runoff from a development site must be mitigated on site unless it can be demonstrated that there is capacity within the existing stormwater network or at the lawful point of discharge to cater for the additional runoff in the major design storm event (1% AEP).

(2) Design calculations are undertaken in accordance with the requirements in Section 4 of QUDM unless otherwise specified below.

(3) Where determining the time of concentration in urban and rural catchment areas the following applies:
- (i) the kinematic wave equation is not to be used to estimate overland flow time;
- (ii) unless the actual velocity in the piped drainage system is determined, the adopted pipe velocity must not be less than 3m/s for the purpose of estimating pipe travel time; and,
- (iii) for small open creek catchments (<100 ha), minor channel or creek flow times may be initially determined by assuming an average stream velocity of 1.5 m/s.

1.2.1.5 Easements

(1) Easements over stormwater drainage are in accordance with section 3.8 of QUDM unless otherwise specified below.

1.2.1.5.1 Easements in favour of Council

(1) Stormwater drainage infrastructure to be transferred into council ownership is to be located on council managed land that has direct access from adjoining council managed land or a road reserve and should not rely on drainage easements.

(2) In circumstances where this is not possible and council stormwater infrastructure must be located on private property, the following easements in favour of Council are required:

- (i) for single pipes 375mm-900mm (inclusive) in diameter, a minimum 3m wide easement;

- (ii) for pipes larger than 900mm in diameter, multi-cell pipes or box culverts, an easement that allows 1m clearance from the outside edge of the pipe/culvert on both sides, or 3m total easement width, whichever is the greater;

(iii) for easements over open drains or channels, a width which can accommodate maintenance berms along the top of the channel in accordance with section 9.7.2 of QUDM;

(iv) for overland flow paths, a width which accommodates the full design flow width and takes into account freeboard.

(3) Where Council stormwater infrastructure is located within private property and access from a road reserve is not available, a 3.0m wide access easement is provided between the road reserve and the drainage easement to provide maintenance access to the infrastructure.

1.2.1.5.2 Private easements

(1) For inter-allotment drainage (where required in accordance with section 7.13.3 of QUDM), a private easement minimum 1.5m wide is required over the drainage in favour of upstream property owners.

1.2.1.6 Safety fencing

(1) Safety fencing is provided in accordance with sections 5.11 and 12.4 of QUDM unless otherwise specified below.

(2) Safety fencing in accordance with IPWEA standard drawing GS-044 is to be provided for hard drainage structures where a fall of 1m or more could be reasonably expected.

1.2.1.7 Alignment

(1) Where stormwater drainage infrastructure is located within the road reserve it is in accordance with standard drawings R-RCC-9 and R-RCC-10, in all other circumstances infrastructure should be located:
(a) generally within the properties they serve;
(b) 0.7 metres to 1.2 metres (measure from the centre of access chambers) from property boundaries, clear of fences and sewer maintenance holes;
(c) for connection points, located 0.5 metres to 1.0 metres from the lowest property boundary; and,
(d) for inter-allotment drainage, 0.5 metres from the side and rear property boundaries.

(2) Gully pits are located as required in accordance with QUDM and generally on the projection of the lot side boundaries.

1.2.1.8 Overland flow

(1) The width of overland flow paths located between lots or within park land is a minimum of 15 metres and should be determined by the calculation of the flows during the major storm event (1% AEP) for the contributing catchment.

1.2.2 Information that Council may request

This section sets out information that Council may request to demonstrate compliance with the performance outcomes for stormwater drainage design in the Healthy Waters Code.

1.2.2.1 Stormwater quantity management plan

(1) A stormwater quantity management plan may be required to demonstrate how stormwater will be managed within a catchment where development is likely to alter the stormwater runoff, volume, velocity, duration or frequency.

(2) Stormwater management plans should be prepared in accordance with Section 2 of QUDM unless otherwise specified below.

(3) All stormwater drainage investigations and designs must be undertaken by a suitably qualified Registered Professional Engineer Queensland (RPEQ).

(4) An electronic copy of all modelling files used to demonstrate compliance with the design objectives must be provided to the council with the development application.

1.2.2.2 Concept site-based stormwater quantity management plan

(1) A conceptual site based stormwater management plan must include:
- (a) an assessment of the site which includes:
  - (i) a site plan showing:
    - contours;
    - development boundaries;
    - catchment details (including sub-catchments where relevant);
    - flow paths;
    - existing and proposed drainage infrastructure;
    - overland flow path areas;
    - drainage invert levels;
    - stormwater detention systems;
    - easements;
    - the lawful point of discharge;
    - flood levels for the 10, 5, 2 and 1% AEP flood;
    - details of the proposed impervious/pervious surfaces (%)
  - (ii) earthworks details including:
    - conceptual earthworks;
    - cross-sections at regular intervals showing the extend of cut and fill works to confirm earthworks and no loss of floodplain storage (where relevant);
  - (iii) development scale plan layout indicating:
    - catchment details;
    - conceptual drainage network with invert levels;
    - location of stormwater treatment/detention measures;
    - location of other existing and proposed services;
  - (iv) information on pre and post development flood volumes.

- (b) the lawful point of discharge (including consent from downstream properties where required);
- (a) proposed no-worsening measures;
- (b) the pre-development and post-development stormwater quantity characteristics and any potential development impacts assessed;
- (c) a description of the modelling method and methodology used in any hydraulic or hydrologic modelling, or in the sizing of infrastructure;
- (d) a description of all stormwater and overland flow management measures and stormwater infrastructure; and,
- (e) future ownership details of stormwater and drainage infrastructure.

1.2.2.3 Detailed site-based stormwater quantity management plan

(1) In addition to 1.2.2.2 above, a detailed site based stormwater management plan must include:
- (a) a detailed design of all stormwater quantity management methods and infrastructure;
- (b) the location and connection details;
- (c) detailed engineering drawings showing:

(i) the areas of earthworks including cross-sections at regular intervals showing the extend of cut and fill works to confirm earthworks and no loss of floodplain storage (where relevant);
(ii) proposed site contours, road layout and lot arrangement;
(iii) location, size and type of proposed stormwater quantity management measures including all invert levels;
(iv) maintenance access; and,
(v) location of lawful points of discharge.

1.2.3 Guidance for applicants

This section sets out guidance for applicants to assist in achieving compliance with PO5 (6) of the Reconfiguring a Lot Code.

1.2.3.1 Upstream connections

(1) Where a neighbouring property capable of further development upstream of the subject site falls to the rear, an easement for stormwater drainage purposes in accordance with section 1.2.1.4.2 of this policy is provided in favour of upstream properties to facilitate access to a lawful point of discharge (refer section 3.4 of QUDM for further information).

1.3 WATER QUALITY

1.3.1 Information that Council may request

This section sets out information that Council may request to demonstrate compliance with the performance outcomes for water quality in the Healthy Waters Code.

1.3.1.1 Stormwater quality management plans

(1) A stormwater quality management plan may be required to demonstrate how the development can achieve the load reduction requirements in AO9.1 of the Healthy Waters Code.

(2) Stormwater treatment devices are to be designed in accordance with the following standards:
- Water by Design Water Sensitive Urban Design Technical Design Guidelines
- Water by Design Bioretention Technical Design Guidelines
- Water by Design MUSIC Modelling Guidelines
- Water by Design Maintaining Vegetated Stormwater Assets
- Water by Design Transferring Ownership of Vegetated Assets

(3) Use of the standard drawings in section 8 of the policy will be deemed to satisfy the acceptable outcomes.

(4) In lieu of modelling, the default bio-retention treatment area to comply with load reduction targets in AO9.1 of the Healthy Waters Code is 1.5% of the contributing catchment area.

(5) A stormwater quality management plan must include:
(a) where modelling had been undertaken, an electronic copy of the MUSIC model;
(b) a summary of the MUSIC analysis results including descriptions of each treatment train for each sub-catchment;
(c) details of each treatment device including the treatment area and design flows;
(d) a scale plan and section drawings showing:
(i) how stormwater is conveyed to the stormwater treatment devices;
(ii) the location of all stormwater treatment devices including filter areas and batters;

(iii) conceptual design levels for each treatment device and receiving drainage invert levels;
(iv) scour protection and coarse sediment management devices;
(v) batters and embankments;
(vi) maintenance access;
(vii) likely maintenance intervals;

(e) details of the required monitoring and maintenance of the device;
(f) proposed measures to protect water quality during the construction phase; and,
(g) details of whether the stormwater treatment system will be privately maintained or transferred into Council ownership.

1.3.2 Guidance for applicants

(1) Stormwater treatment devices are generally not to be constructed within the road reserve.

1.4 ARTIFICAL WATERBODY ASSESSMENT

1.4.1 Information that Council may request

This section sets out information that Council may request to demonstrate compliance with PO2 in the Healthy Waters Code.

(1) Where an artificial waterbody exists within a development site and it is proposed to be retained, an assessment of the value and risk of the waterbody along with any proposed changes to the configuration of the waterbody will be required. The assessment must include the following:

(a) Determine the value of the waterbody using the Table 1 – Determining the relative value of an artificial waterbody.

Council may request an ecological report to assist in supporting the flora and fauna associations score. This report must contain (at minimum):
(i) details of any ecological corridors and connections in the area;
(ii) types of flora and fauna;
(iii) habitat value of the dam and surrounding vegetation; and,
(iv) impacts on flora and fauna.

(b) Determine the risk of the waterbody based on its current function and proposed future use using Table 2 – Determining the relative risk of an artificial waterbody.

Council may require the following to be submitted:
(a) a geotechnical report signed by an RPEQ to assist in supporting the structural integrity score;
(b) water quality testing of the parameters listed in Table 3 from a NATA qualified laboratory to assist in supporting the water quality score.

(c) Where the score for value is 14 or more and the score for risk is 9 or less, the waterbody should be retained in its current configuration and any proposed remedial works undertaken as required. Details of the proposal must be submitted to Council as part of the development application.

In all other circumstances (i.e. where the value is less than 14 and/or the risk is more than 9) the waterbody should not be retained in its current configuration. In this instance an alternative solution must be provided (refer section 1.4.2 of this policy).

Table 1: Determining the relative value of an artificial waterbody

Type of Value	Score	Criteria
Connectivity	7	The waterbody provides an essential link for ecological connectivity and native wildlife movement.
	4	The waterbody provides a desirable/potential link for ecological connectivity and/or native wildlife movement.
	1	The waterbody provides no ecological connectivity and does not provide a functional corridor for native wildlife movement.
Flora and Fauna Associations	7	The waterbody provides essential flora and fauna associations which must be maintained.
	4	The waterbody provides flora and fauna associations which are desirable to be maintained.
	1	The waterbody provides low/no flora and fauna associations.
Amenity	5	The waterbody in its current configuration provides the community with an asset that can be used for passive recreation.
	3	The waterbody in its current configuration (or as a result of rectification works proposed) will provide the community with an asset that can be used for passive recreation.
	1	The waterbody provides a low level of amenity and would not be an asset to the community.

Note: Waterbodies to be retained in their current configuration must be high value and low risk.

Table 2: Determining the relative risk of an artificial waterbody

Type of Risk	Score	Criteria
Structural Integrity	5	The waterbody is not structurally sound.
	1	The waterbody is structurally sound or works proposed will ensure the waterbody is structurally sound and can be certified as such.
Water Quality	5	Water quality is within the acceptable range for all testing parameters.
	3	Water quality is within the acceptable range for the majority of the testing parameters or remedial works can be undertaken to ensure that the water quality is within the acceptable range for the majority of the testing parameters.
	1	Water quality is not within the acceptable range for most testing parameters.
Safety	5	When assessed against the method outlined in Appendix A of *Rectifiying Vegetated Stormwater Assets* (Water by Design), a score of 22 or more is achieved.
	4	When assessed against the method outlined in Appendix A of *Rectifiying Vegetated Stormwater Assets* (Water by Design), a score of 17-21 is achieved.
	3	When assessed against the method outlined in Appendix A of *Rectifiying Vegetated Stormwater Assets* (Water by Design), a score of 12-16 is achieved.
	2	When assessed against the method outlined in Appendix A of *Rectifiying Vegetated Stormwater Assets* (Water by Design), a score of 7-11 is achieved.
	1	When assessed against the method outlined in Appendix A of *Rectifiying Vegetated Stormwater Assets* (Water by Design), a score of less than 7 is achieved.
Maintenance Access	5	Appropriate maintenance access is not and cannot be provided.
	3	Appropriate maintenance access is (or will be) provided to three or fewer of the following: inlets, outlets, body of water and perimeter of the waterbody.
	1	Appropriate maintenance access is (or will be) provided to all of the inlets, outlets, body of water and perimeter of the waterbody.
Weeds and Pests	5	The waterbody contains declared weeds and/or pests.
	3	The waterbody contains weeds and/or pests and works are proposed to remove these weeds and/or pests.
	1	The waterbody contains no weeds or pests.

Note: Waterbodies to be retained in their current configuration must be high value and low risk.

Table 3: Water quality indicators for artificial waterbodies

Total N (ug/L)	Total P (ug/L)	Chl-a (ug/L)	Do % sat	Turb (ug/L)	pH	Cond (uS/com)
720	28	9	57-90	5-10	6.3-7.1	167

1.4.2 Guidance for applicants

(1) Where an artificial waterbody exists within the limits of a development, consideration should be given as to whether the waterbody can be reconfigured to form part of the stormwater drainage design and/or treatment using the criteria outlined in Table 2.7 of the *Water by Design Waterbody Management Guideline 2013 Module 2*.

(2) Where a waterbody is not retained in its current configuration, details of the proposed changes to the waterbody should be provided to Council including an assessment of:
   (a) any impacts to the surrounding environment as a result of the works associated with the proposal including during the construction phase as well as long term as a result of changes to the existing waterbody;
   (b) any downstream impacts associated with the removal/reconfiguration of the waterbody; and,
   (c) the expected whole-of-life maintenance requirements.

1.5 EROSION AND SEDIMENT CONTROL

1.5.1 Information that Council may request

This section sets out information that Council may request to demonstrate compliance with the performance outcomes for erosion and sediment control in the Healthy Waters Code.

(1) Erosion and sediment control is to be undertaken in accordance with the following standard:

- IECA (2008) - Best Practice Erosion and Sediment Control published by the International Erosion Control Association (Australasian Chapter).

1.5.1.1 Erosion Hazard Assessment (EHA)

(1) An erosion hazard assessment must be undertaken to determine the degree of risk and to identity the documents required to be submitted to Council.

(2) The erosion hazard assessment should be undertaken in accordance with Appendix A of this policy and must be undertaken by a person with suitable qualifications or experience in erosion and sediment control, which include:
   (i) completed training or qualifications in soil erosion and sediment control such as an advanced specialised training course in erosion and sediment control, provided under the auspices of a reputable body such as the International Erosion Control Association (IECA); or
   (ii) professional affiliation with engineering, soil science or scientific organisation (e.g. International Erosion Control Association, Engineers Australia, Australian Water Association, Stormwater Industry Association); or
   (iii) at least two years' experience in the management of erosion and sediment control that can be verified by an independent third party.

(3) Where low erosion risk is identified, best practice erosion and sediment control must be implemented in accordance with IECA (2008) (to assist refer to IECA – Book 5 – Field Guide).

(4) Where a medium or high degree of risk is identified, a concept erosion and sediment control plan should be submitted at the operational works application stage.

1.5.1.2 Erosion and Sediment Control Plan/Program

1.5.1.2.1 General

(1) The erosion and sediment control assessment process (in regard to submission of documentation to Council) is depicted in Table 3 below.

Table 3: The erosion and sediment control (ESC) assessment process

Prior to lodging an application		At application Stage	5 days prior to the pre-start meeting or works commencing, whichever is the sooner.	During construction
Determine erosion risk by conducting an EHA	Low Risk Site	Submit EHA forms	No further action	Follow IECA – BPESC document and refer to field guides
	Medium Risk Site	Submit EHA forms and concept ESC plan	Submit ESC program prepared by an RPEQ[1] or CPESC Provide contact details[2]	Provide inspection certificates at hold points as conditioned in development approval and/or at the request of Council. The inspection certificate must be certified by an RPEQ[1] or CPESC.
	High Risk Site	Submit EHA forms and concept ESC plan	Submit ESC program prepared by an RPEQ[1] or CPESC & certified by a CPESC Provide contact details[2]	Provide inspection certificates at hold points as conditioned in development approval and/or at the request of Council. The inspection certificate must be certified by an RPEQ[1] and a CPESC.

EHA - Erosion hazard assessment,
IECA - International erosion control association
CPESC - Certified professional in erosion and sediment control
BPESC - Best practice erosion and sediment control

1.5.1.2.2 Concept erosion and sediment control plan

(1) A concept erosion and sediment control plan must demonstrate the following:
- (a) the design, intensity, configuration and establishment of development is compatible with the physical constraints of the site and receiving environment;
- (b) the feasibility of effective erosion and sediment control measures being implemented is substantiated, throughout construction including consideration of the impacts of the overall development until permanent stabilisation of the site occurs;
- (c) overview strategy for the site outlining the sequence of development, and temporary and permanent management mechanisms, until commissioning of permanent design features (staging summary);
- (d) whether sediment control devices will be located within the future stormwater treatment systems (i.e. bioretention basins and wetlands); and

[1] Where engineering structures (either temporary or permanent) such as inlets, outlets, spillways and sediment basin embankments form part of an Erosion an Sediment Control Plan/Program, the design certification and inspection of such structures must be undertaken and certified by a Registered Professional Engineer of Queensland (RPEQ).
[2] The name and contact details of the landowner, superintendent and principal contractor must be provided including the registered business name and ABN/ACN for each party and after hours contact details of a representative of the site. Any changes to these parties during construction must be notified to Council in writing within 5 business days of the change occurring.

(e) a contoured site plan(s) showing a conceptual treatment train, the natural features of the site and proposed control structures, including the proposed location and preliminary size of:
  (i) area of disturbance;
  (ii) stockpiling locations;
  (iii) external catchment diversions;
  (iv) sediment basins;
  (v) channels which convey site runoff to sediment basins; and
  (vi) compensatory erosion and sediment controls for areas which cannot be drained to the sediment basin.

(2) Additional information requirements are listed in Table 4.

Table 4: Additional requirements of the concept erosion and sediment control plan

Where	Demonstrate
Located within a waterway corridor mapped within the relevant overlay maps of the planning scheme	• How impacts on the waterway have been minimised through appropriate route selection and type of crossing and how construction of the crossing will be managed in accordance with the IECA 2008, Best Practice Erosion and Sediment Control – Appendix I.
External contributing stormwater catchment area of 1 ha or greater.	• That clean stormwater from up-slope external catchment(s) can be diverted around or through the site without causing either an increase in sediment concentration of the flow, or erosion on site or off site. Alternatively, if it is not feasible to divert clean stormwater from up-slope external catchment(s) around or through the site, the Concept ESC Plan must demonstrate that there is sufficient land area available to install and operate a sediment basin which is sized to accommodate the stormwater run-off from the whole up-slope catchment.
Land disturbance of 1 ha or greater	• There is sufficient land area available to install and operate an appropriately sized sediment basin. • The run-off from all disturbed areas can be directed to a sediment basin throughout construction and until such time as the up-slope catchment is adequately stabilised against erosion.
Proposing works below 5 m AHD	• There is sufficient land area available to install and operate an appropriately sized sediment basin. • The run-off from all disturbed areas can be directed to a sediment basin throughout construction and until such time as the up-slope catchment is adequately stabilised against erosion. • It is feasible to install sediment basins which will have sufficient storage volume to contain the design storm event i.e. the sediment basin will not be inundated with groundwater.
Proposed works on land having a slope of greater than 15% or mapped within the landslide hazard overlay of the planning scheme	• There is sufficient land area available to install and operate an appropriately sized sediment basin. • The run-off from all disturbed areas can be directed to a sediment basin. • Preliminary engineering sections of proposed sediment basins showing that they may be practically implemented on the slopes proposed. • Preliminary earthworks plan showing proposed extent of land disturbance. • Geotechnical report which assesses the probability of landslip instability as a result of the construction phase ESC measures.

1.5.1.2.3 Detailed erosion and sediment control plan/program

(1) A detailed erosion and sediment control program must contain information on what controls are required to be implemented throughout all stages of the development from site establishment to project completion. Typically a separate plan is required for each phase of the development including:
- (a) site clearing;
- (b) bulk earthworks;
- (c) civil construction;
- (d) services installation
- (e) final stabilisation including decommissioning of sediment basins.

(2) A detailed erosion and sediment control plans must:
- (a) be based on an assessment of the physical constraints and opportunities of the development site, including soil, landform type, gradient and hydrology;
- (b) be supported by analysis of on-site soils undertaken in accordance with IECA (as amended), Chapter 3.5 and Appendix C;
- (c) provide a set of contour drawings showing existing and design contours, the real property description, north point, roads, site layout, boundaries and features. Contours surrounding the site should also be shown so that catchment boundaries can be considered;
- (d) be at a suitable scale for the size of the project (as a guide around 1:1000 at A3 for a 2 hectare development and 1:500 at A3 for a 3000m^2 development);
- (e) provide background information including site boundaries, existing vegetation, location of site access and other impervious areas and existing and proposed drainage pathways including discharge points;
- (f) show the location of stormwater drainage systems;
- (g) include details on the nature and specific location of works and controls (revegetation, cut and fill, run-off diversions, stockpile management, access protection, site office location), timing of measures to be implemented and maintenance requirements (extent and frequency);
- (h) show all areas of land disturbance, the way that works will modify the landscape and surface and subsurface drainage patterns (adding new, or modifying existing constraints);
- (i) for each phase of the works (including clearing, earthworks, civil construction, services installation and landscaping) detail the type, location, sequence and timing of measures and actions to effectively minimise erosion, manage flows and capture sediment, including the stabilisation of up-slope catchments prior to sediment basin removal;
- (j) identify the riparian buffers and areas of vegetation which are to be protected and fenced off to prevent vehicle access;
- (k) indicate the location and provide engineering details with supporting design calculations for all necessary sediment basins and ESC-related drainage structures;
- (l) indicate the location and diagrammatic representations of all other necessary erosion and sediment control measures;
- (m) identify the clean and disturbed catchments, and flow paths, showing:
  - (i) diversion of clean run-off;
  - (ii) collection drains and banks, batter chutes and waterway crossings;
  - (iii) location of discharge outlet points; and
  - (iv) water quality monitoring locations;
- (n) show calculated flow velocities, flow rates and capacities, drain sizing and scour/lining protection, and velocity/energy checks required for all stormwater diversion and collection drains, banks, chutes, and outlets to waterways;
- (o) show waterways (perennial and non-perennial) and detail of stabilisation measures for all temporary waterway crossings;
- (p) locate topsoil and/or soil stockpiles;
- (q) prescribe non-structural controls where applicable, such as minimising the extent and duration of soil exposure, staging the works, identifying areas for protection, delaying clearing until construction works are imminent etc;

(r) include a maintenance schedule for ensuring ESC and stormwater infrastructure is maintained in effective working order at all times, particularly just prior to, during and after wet weather (refer IECA 2008, Chapter 6 and Chapter 7);
(s) include an adaptive management program to identify and rectify non-compliances and deficiencies in environmental performance (refer IECA 2008, Chapter 6 & Chapter 7), including notification to City of any non-compliance and the corrective actions taken by the applicant within 48 hours of the non-compliance;
(t) provide details of chemical flocculation proposed, including equipment, chemical, dosing rates and procedures, quantities to be stored and storage location, and method of decanting any sediment basin;
(u) demonstrate how post-construction bioretention devices will be adequately protected against sediment ingress during land-disturbing activities, including where applicable the transition from construction-phase sediment basins to post-construction phase bioretention basins.

1.5.1.2.4 Inspections/hold points

(1) For medium and high risk development sites, inspection certification must be provided to Council in the form provided (Appendix A) within 5 business days of the inspection.

(2) Inspection certificate must be produced at the nominated hold points below and at any other time in accordance with the conditions of the development approval (refer to IECA 2008 Chapter 7.8 for discussion on hold points and using inspection and test plans):
(a) immediately prior to the commencement of bulk earthworks;
(b) immediately prior to live connection of new stormwater drainage infrastructure works to the existing stormwater/waterway system;
(c) immediately prior to any instream works or disturbance within a waterway;
(d) immediately prior to decommissioning of any sediment basin or transitioning from a sediment basin to a water sensitive urban design bioretention device;
(e) immediately prior to any request for survey plan sealing, on defect or off defect inspection; and,
(f) at intervals not exceeding 1 month.

(3) The inspection certificate must be true and accurate assessments of the findings and a copy must be kept on site together with copies of all specific directions issued in relation to the certification.
(a) Where inspection indicates a non-conformance, a non-conformance report is to be provided to Council which includes: details of the nature and cause of non-conformance;
(b) details of the required corrective actions; and,
(c) corrective actions which must be carried out within 24 hours where practicable or as agreed with the construction superintendent.

1.5.2 Guidance for applicants

1.5.2.1 Erosion Control

(1) In addition to IECA 2008, design to avoid non-essential exposure of soil, development should:
(a) restrict the extent of clearing to that necessary for access to, and safe construction of the approved works;
(b) protect vegetative cover in all other areas of the site; and
(c) minimise the duration of soil exposure by:
(i) only clear vegetation immediately prior to an area being actively worked;
(ii) stage works to minimise the area of soil exposed at any one time;
(iii) effectively stabilise[3] cleared areas if works are delayed or works are not intended to occur immediately;

[3] An effectively stabilised surface is defined as one that does not:

(a) have visible evidence of soil loss caused by sheet, rill or gully erosion; or

(iv) effectively stabilise areas at finished level without delay and prior to rainfall;
(v) In areas being actively worked and effective stabilisation is not feasible, implement a full suite of erosion and sediment controls, to maximise sediment capture and minimise erosion; such that all forms of erosion, other than splash erosion (raindrop impact) and sheet erosion, do not occur. Where such controls would impede construction activities, ensure contingency measures are available on site and are implemented that are sufficient to achieve the same outcome, prior to rain;
Note: this does not apply to major erosion and sediment controls such as sediment basins. Major controls should be installed before other works commence; and,
(vi) effectively stabilise steep areas, such as stockpiles, batters and embankments, without delay and prior to rainfall. Staged stabilisation is expected on large batters and embankments. In areas being actively worked, where this is not feasible, ensure that sediment controls are installed and surface stormwater flows are managed such that erosion of stockpiles, batters or embankments is not caused.

(2) Erosion and sediment controls should not be constructed within the riparian zone, unless it is not feasible to locate them elsewhere. Work within waterways is only to be:
(a) undertaken in accordance with IECA 2008 Best Practice Erosion and Sediment Control, Appendix I – Instream works;
(b) undertaken during the lower rainfall months; and,
(c) disturbance is promptly rehabilitated, conforming to the natural channel form, substrates and riparian vegetation as far as possible.

(3) Prior to the sealing of the plan of survey for the development, all site surfaces are to be effectively stabilised[3] using methods that will continue to achieve effective stabilisation in the medium to long term. A site is determined to be effectively stabilised if at the time of the plan sealing inspection if stabilisation methods are:
(a) consistent with IECA 2008;
(b) appropriate for slopes and slope lengths;
(c) providing a minimum of 70% soil coverage (when viewed perpendicular to the soil surface) across any square metre of the site disturbance area and;
(d) have no evidence of erosion, sedimentation or water contamination

(4) If at the time of request for plan sealing, the method of stabilisation has not achieved a stability that has a high probability of enduring in the medium to long term (for example, inadequate grass cover or permanent landscape works are incomplete) the following will be taken into consideration in determining whether the site is capable of achieving medium- to long-term stability:
(a) evidence of soil amelioration having been adequately undertaken;
(b) evidence of an adequate seed mix of annual and perennial grass species being applied at an adequate rate;
(c) evidence that appropriate grass strike and growth has been achieved for the type of stabilisation method selected.

(5) Where hydromulch is used as the method of temporary stabilisation, it is important that perennial as well as annual grasses are well established at the time of plan sealing to reduce the risk of instability of the site in the medium to long term.

(b)) lead to sedimentation; or

(c) lead to water contamination.

1.5.2.2 Drainage Control

(1) Ensure that all concentrated stormwater flows including drainage lines, diversion drains, channels, spillway and batter chutes are managed onto, through, and at release points from the site in all rain events up to and including the average recurrence interval defined within IECA 2008 Table 4.3.1 without causing:
   (a) water contamination;
   (b) sheet, rill or gully erosion; and,
   (c) sedimentation; or damage to structures or property.

(2) In addition to IECA 2008 design to:
   (a) ensure clean stormwater is diverted or managed around or through the site without increasing the concentration of total suspended solids or other contaminants in the flow and without causing erosion (on site or off site). Were this cannot occur ensure that sediment controls are to be designed with sufficient capacity to accommodate the additional volume (diverting clean stormwater runoff into a sediment basin is not acceptable because it will cause an increase in the volume and frequency of contaminated releases from the sediment basin); and,
   (b) ensure sheet flows of stormwater are managed such that sheet and rill erosion is prevented or minimised.

(3) Temporary vehicular crossings of waterways should be designed and constructed to convey pipe flows as defined within IECA 2008 Table 4.3.1, and remain structurally stable for all rainfall events up to the 10-year average recurrence interval event of critical duration.

1.5.2.3 Sediment Control

(1) Sediment control to be based on monthly rainfall erosivity ratings as defined within IECA 2008 Table 4.5.2.

(2) Ensure measures have been implemented such that the runoff from all disturbed areas flows to a sediment basin or basins. Where it is not feasible to divert runoff from small disturbed areas of the site to a sediment basin, implement compensatory[4] erosion, drainage and sediment controls prior to rainfall to ensure that erosion of those of areas does not occur.

(3) Ensure sediment does not leave the site on the tyres of vehicles.

(4) Sediment basins are to be designed in accordance with Appendix B – Sediment basin design and operation, IECA (2008), unless noted otherwise in this policy:
   (a) ensure each sediment basin has the capacity to treat flows to current best-practice standards[5] and as a minimum to contain all the stormwater run-off from the 85th percentile five day rainfall depth equal to 40 mm, unless a higher standard is prescribed in the development approval condition(s);
   (b) provide sediment storage volume in accordance with Table B8 (Appendix B, IECA 2008) or as a minimum store at least 2 months sediment from the receiving catchment, as determined using the Revised Universal Soil Loss Equation (RUSLE);
   (c) ensure sediment basins are maintained with sufficient storage capacity to capture and treat the run-off for the design rainfall depth. Where sediment basins are proposed to be oversized for storage of captured water for re-use, install survey markers in each such basin to clearly indicate the level that water within the basin must be lowered to, in order to meet the storage capacity specified in requirement above;

[4] Compensatory controls are erosion, drainage and sediment controls which compensate for the lack of sediment basin and are applied such that the type, timing, placement and management of controls minimise the potential for water contamination and environmental harm. This is primarily achieved by reducing the risk of erosion and subsequent sediment release, for example by turfing or mulching and managing concentrated flows in the area.

(d) ensure sediment basins are dewatered to the appropriate level as soon as practicable after each rainfall event and no longer than 5 days after a rainfall event (see also below);
(e) ensure stormwater captured in sediment basins is treated prior to discharge to minimise the concentration of contaminants released from the site, having due regard to forecast rainfall, and ensuring that releases are in accordance with the release limits specified below;
(f) ensure sediment basins and associated structures such as inlets, outlets and spillways are effectively stabilised and structurally sound for ARI rainfall events defined within Appendix B, IECA 2008; and,
(g) ensure accumulated sediment from basins and other controls is removed and disposed of appropriately without causing water contamination.

(5) All releases of stormwater captured in a sediment basin, unless otherwise noted in this policy, should not exceed the following limits:
(a) 50 mg/L of total suspended solids (TSS) as a maximum concentration;
(b) turbidity (nephelometric turbidity units or NTU) value less than 10% above background[6]; and,
(c) pH value must be in the range 6.5 to 8.5 except where, and to the extent that, the natural receiving waters lie outside this range.

(6) The concentration of TSS released by dewatering may only exceed 50 mg/L where it can be demonstrated and supported through documentation that:
(a) further significant rainfall is forecast to occur before the TSS concentration is likely to be reduced to 50 mg/L;
(b) releasing a higher concentration of total suspended solids will result in a better environmental outcome by providing storage for the capture and treatment of run-off from the imminent rainfall and run-off;
(c) all reasonable and practicable steps have been taken to treat the water within best-practice time frames;
(d) flocculent has been appropriately applied and the concentration of TSS in the captured water has already significantly decreased;
(e) the development is in full compliance with this policy;
(f) the water treatment and release is supervised by an appropriate experience person; and,
(g) written notice of the release is provided to Council within 24 hours of the release.

(7) It is recommended that a site-specific relationship between turbidity and suspended solids is determined for each sediment basin. Where an appropriately qualified person has demonstrated a significant relationship between NTU and TSS, testing for compliance with release limits, can be conducted on site with a calibrated turbidity meter. A report showing relationship results must be provided to Council prior to any water releases occurring based on turbidity. This has the advantage of providing immediate assessment to justify a release rather than waiting for laboratory results to confirm concentration levels and compliance. A sample of release water is to be kept on site and provided to Council on request. Note that post-release TSS validation is appropriate to demonstrate that the NTU/TSS correlation is being maintained.

[6] Background refers to receiving water quality immediately upstream of the site water entry point at the time of the release. Where there is no immediate upstream receiving water at the location and time of the release, then a point immediately upstream of the sites receiving water that is not influenced by the site. When water is not present at this point the turbidity release limit (NTU) will be equal to the release limit for 50 mg/L total suspended solids (TSS) based upon the onsite correlation between TSS and NTU or site based historical data obtained prior to the release.

2.0 INFRASTRUCTURE WORKS

2.1 RELATIONSHIP WITH THE PLANNING SCHEME

(1) This part sets out:

(i) particular standards called up as acceptable outcomes in 9.3.2 Infrastructure Works Code. These are contained in the following subsections:
2.2.1 Electrical reticulation and telecommunications infrastructure
2.3.1 Street and path lighting
2.4.1 Waste management

(ii) information council may request to demonstrate compliance with the performance outcomes of the code. These are contained in the following subsections:
2.4.2.1 Waste management plan
2.4.2.2 Construction management plan

2.2 ELECTRICAL RETICULATION AND TELECOMMUNICATIONS INFRASTRUCTURE

2.2.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO13.1 in the Infrastructure Works Code. These standards represent the “acceptable outcome” which meets the performance outcome set out in the code.

(1) In addition to the standards of the relevant authority and the Queensland Public Lighting Construction Manual, the following additional standards apply.

(2) Electricity reticulation is to be provided as an underground service in urban areas, with overhead supply being permitted only in rural areas or in the following circumstances:
(a) where an existing dwelling house is to remain within the limits of a development or reconfiguration, then any existing overhead electricity services to the building do not need to be converted to underground services; or,
(b) where a reconfiguration creates no more than 2 lots (1 into 2 lot reconfiguration or boundary realignment); or,
(c) where a reconfiguration in an area where overhead power is existing creates 3 or more lots (1 into 3 lot reconfiguration or more) and:
(i) overhead electricity reticulation is already established;
(ii) no new property poles or poles within the road reserve are required to service the sites;
(iii) there is no extension to the overhead mains or any “flying fox” overhead service connection;
(iv) the proposed overhead service connection does not cross a road; and,
(v) the proposed overhead service connection does not cross a premises, other than the premises being serviced.

(3) All existing conductors of 33kV and higher may remain overhead. However if the developer wishes to remove high voltage feeder lines, the necessary approvals are obtained direct from the relevant authority. New or relocated 33kV or higher systems may be overhead at the discretion of the relevant authority.

(4) Electricity and telecommunications services are located in accordance standard drawing R-RCC-6 and R-RCC-7.

(5) The quantity of conduits installed within a development must cater for future adjacent developments and/or mains upgrades. For infill development where underground electricity is required, conduits must be extended along the full frontage to cater for future extension of the underground network.

(6) For rear lots with access easements, conduits must be installed for the full length of the access easement.

(7) Water meters, where possible, are located on alternate boundaries to electrical pillar boxes. Where these services are located on the same boundary, the water meter must be located a minimum of 600mm from the electrical pillar box.

(8) Where underground electrical infrastructure is required to cross a road carriageway it is –
(i) at right angles where possible;
(ii) in no case less than 45 degrees to the road axis;
(iii) located on boundaries alternate to water reticulation crossings.

(9) Development involving the dedication of parks provides electrical infrastructure pillars on the verge of the road reserve adjoining the park to provide power supply for lighting or other services and facilities.

(10) New transformers are pad-mount transformers and are located within road reserves excised from properties.

2.3 STREET AND PATH LIGHTING

2.3.1 Standard called up as acceptable outcomes

This section sets out the standards called up in AO13.1 in the Infrastructure Works Code. These standards represent the "acceptable outcome" which meets the performance outcome set out in the code.

(1) Street and path lighting is designed in accordance with the following standard unless otherwise specified below:
- AS1158 – Lighting for Roads and Public Spaces (as amended)

(2) The location of new lighting within the road reserve and parks must take into account existing houses and light spillage must be minimised through street lighting layout and the use of shields.

(3) Street lights are to be located on alternate boundaries to fire hydrants.

(4) Lighting within parks is to be provided:
(a) at intervals along paths that traverse parkland;
(b) at points of conflict; and,
(c) at park entrances.

2.3.2 Guidance for applicants

(1) The required street lighting category may be required to minimise the effects on adjacent fauna and marine life.

2.4 WASTE MANAGEMENT

2.4.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO15.1 and AO16.1 in the Infrastructure Works Code. These standards represent the "acceptable outcome" which meets the performance outcomes set out in the code.

2.4.1.1 Waste Generation

(1) Waste generation is calculated in accordance with the generation rates for each use in Table 1 below.

(2) For other uses not contained within Table 1, a waste management plan (in accordance with section 2.4.2.1 of this policy) may be required to establish the expected waste generation for the particular use.

Table 1: Waste generation rates

Use	General waste[7] generation	Recycling waste[8] generation	Other requirements
Multiple dwelling **Retirement facility** **Residential care facility**	120L/dwelling/week	60L/dwelling/week	Green waste[9] bins are to be provided at the rate of 1 x 240L green waste bin per 100m^2 of communal open space and landscaping
Multiple dwellings (3 stories or more)	100L/dwelling/week	70L/dwelling/week	Green waste[9] bins are to be provided at the rate of 1 x 240L green waste bin per 100m^2 of communal open space and landscaping
Short term accommodation	60L/occupant/week	30L/occupant/week	
Office	30L/100m^2 GFA/ day	40L/100m^2 GFA/day	
Hotel/Club: • **residential portion** • **dining areas** • **licensed bar area**	• 5L/bed/day • 50L/100m^2 GFA/day • 50L/110m^2 GFA/day	• 5L/bed/day • 50L/100m^2 GFA/day • 25L/100m^2 GFA/day	Allow for waste oil storage Allow for baling of paper and cardboard
Food and drink outlet	660L/100m^2 GFA/day	330L/100m^2 GFA/day	Allow for waste oil storage Allow for baling of paper and cardboard
Shop and other business premises	50L/100m^2 GFA /day	25L/100m^2 GFA /day	Allow for baling of paper and cardboard
Industrial premises/ warehouse	60L/100m2/day	30L/100m^2 GFA /day	

[7] General waste – waste, other than domestic clean-up waste, greenwaste, recyclable waste, interceptor waste or waste discharged to a sewer, produced as a result of the ordinary use or occupation of domestic or commercial premises.

[8] Recyclable waste – means clean and inoffensive waste that is declared by the local government to be recyclable waste for the area. Examples of waste that may be declared to be recyclable waste— glass bottles, newspaper, cardboard, steel and aluminium cans

[9] Green waste – means grass cuttings, trees, bushes, shrubs, loppings of trees, bushes or shrubs, or similar matter produced as a result of the ordinary use or occupation of premises.

2.4.1.2 Waste Bins

(1) The required container sizes should be calculated based on the following collection frequencies:
   (a) maximum of one collection per week for non-residential developments;
   (b) one collection of waste per week for residential developments; and
   (c) one collection of recycling per fortnight for residential developments.

(2) The size of wheelie bins and bulk bins available is in accordance with Table 2 below.

Table 2: Waste bins sizes

Bin type	Bin capacity (L)	Truck type	Length (mm)	Width (mm)	Height (mm)
Wheelie bin[10]	140 (waste only)	Side lift	560	610	920
	240	Side lift	740	580	1100
	340 (recycling only)	Side lift	840	650	1080
Bulk bin[11]	660	Rear lift	1260	780	1400
	1100	Rear lift	1240	1070	1330
	1500	Front lift	2040	1041	1330
	2250	Front lift	2020	1441	1430
	3000	Front lift	2040	1441	1460
	4000	Front lift	2040	1631	1700

2.4.1.3 Bin Storage Areas

(1) The wheelie bin and bulk bin storage point is the area allocated to the permanent storage of waste bins and may or may not be where the bin is serviced. A storage point may be a common or an individual storage point however bin storage areas are to remain separate for residential and commercial components of a development.

(2) Storage areas are to be designed to accommodate the types of waste bins available from Council as set out in Table 2.

(3) Wheelie bin and bulk bin storage points must;
   (a) allow the bins to be serviced in-situ or easily transported to a separate servicing point;
   (b) be located a minimum of 5 metres from any window, door or fresh air intake within the development or any adjoining site;
   (c) be screened with outward opening doors or a roller door to ensure bins are not visible from a public place;
   (d) not be located in a structure unless it is in:
      (i) a purpose built storage area, which is air locked, fly and vermin proofed and used solely for the storage of waste; or
      (ii) a well-ventilated area of a basement and not within 30m of an opening to a food premises or food handling area; or
      (iii) an open-air carport;
   (e) have safe access for residents and bin collection contractor;
   (f) be of a sufficient size to accommodate the required number of bins and allow for access and manoeuvring of the bins as follows:
      (i) wheelie bins – allow $1m^2$ per bin;
      (ii) bulk bins – allow a minimum of 0.5m clearance around each bin.

[10] These are two wheeled mobile garbage bins, made from high density polyethylene (HDPE).
[11] Bins open along length.

(4) Additionally, bulk bins storage areas must:
- (a) be constructed with a hardstand concrete base with a maximum surface gradient of 1:20;
- (b) be roofed and designed to prevent entry of rainwater;
- (c) for bins greater than 1.5m^3, be a servicing point (unless the bins are proposed to be mechanically towed to the servicing point by the property manager).

(5) Where a common storage point for wheelie bins for two or more dwellings is proposed, it must be constructed with a concrete base and store no more than 10 waste and 10 recycling bins.

2.4.1.4 Bin Servicing Points

(1) For multiple dwellings with 10 or fewer dwellings where wheelie bins are proposed, the bin servicing location is in accordance with Table 3 below.

Table 3: Multiple dwelling bin servicing location

Number of Multiple Dwellings	Road Frontage	Bin servicing point
1-10	Minor[12]	Kerbside
	Major[13]	Kerbside or On-site
11+	Minor12	On-site
	Major13	

(2) On-site wheelie bin and bulk bin servicing points must:
- (a) be constructed with a hardstand concrete base with a maximum surface gradient of 1:20 (excludes kerbside servicing points) ;
- (b) be constructed so that all internal roads/accessways can withstand the weight of the fully loaded waste collection vehicle;
- (c) allow for a 0.5m clearance from all obstructions;
- (d) not obstruct parking areas, loading zones and pedestrian areas while servicing the bins;
- (e) where a development site fronts more than one road, the waste collection vehicle must access the site from the lower order road;
- (f) be clearly separated from car parking bays, loading bays, footpaths and pedestrian areas;
- (g) be clear of speed control devices; and,
- (h) be located a minimum of 5 metres from any window, door or fresh air intake within the development or any adjoining site.

(3) On-site and kerbside wheelie bin servicing points must:
- (i) for kerbside collection, allow 1m of road frontage per wheelie bin directly in front of the development (if this cannot be provided the bins must be serviced internally);
- (j) enable all wheelie bins to be serviced by the waste collection vehicle without the need for the operator to leave the vehicle; and,
- (k) allow adequate unobstructed overhead space for the swinging arm action of the side-lift waste collection vehicle (refer Table 4 for servicing height).

(4) On-site and kerbside bulk bin servicing points must allow adequate unobstructed overhead space for the swinging arm action of the front-lift or rear-lift (depending on the size of the bulk bin) waste collection vehicle (refer Table 4 for servicing height).

(5) The waste collection vehicle operating dimensions and required clearances listed in Table 4 are used when designing and locating servicing points.

(6) Where roads temporarily terminate (eg. for staged development), a temporary turning solution which can accommodate the waste collection vehicle must be provided.

[12] Minor roads include rear laneways, access places, access streets and collector streets.
[13] Major roads include major collector streets, sub-arterial and arterial roads.

Table 4: Waste collecting vehicle clearances (not including obstructions)

Collection vehicle type	Travelling height (m)	Width (m)	Length (m)	Servicing height[14] (m)	Total tonnage (max)	Turning radius (m)
Side load (wheelie bins)	4.0	2.5	10.3	5.2	23	11.5 (wall–wall[15]) 10.5 (kerb-kerb[16])
Front lift (bulk bins)	4.3	2.5	10.5	6.4	27.5	13.2 (wall–wall[15]) 12.3 (kerb-kerb[16])
Rear lift (bulk bins)	4.0	2.5	9.9	4.0	22.5	11.2 (wall-wall[15]) 10.5 (kerb-kerb[16])

2.4.1.5 Waste Carting

(1) Waste carting for wheelie bins and bulk bins is required where bins are not serviced in-situ and must be transported from the bin storage area to the bin servicing point.

(2) Bulk bins up to and including $1.5m^3$ in size can be manoeuvred to the servicing point for collection by the property manager.

(3) Bulk bins greater than $1.5m^3$ in size requiring manoeuvring to the servicing point must be mechanically towed by the property manager.

(4) The waste carting route must:
- (a) not extend through any habitable portion of a building, a food premises, or any other place that the person carting the bin would not have authority to enter or through any visitor or resident designated car park;
- (b) be constructed with a hardstand surface that allows for easy and smooth bin movement and must not have any steps or lips; and,
- (c) be located no more than 20m from the storage area.

2.4.1.6 Bin Wash Down Facilities

(3) Spill and bin wash down facilities are provided as follows:
- (a) residential development – access to a grassed area for washing of bins; however, if it is necessary for a bin wash facility to be connected to sewer it must be constructed as for a commercial development;
- (b) commercial development – the storage area is graded to fall to a drainage point which is connected to sewer, is roofed and bunded to prevent stormwater ingress; and,
- (c) bin storage area is to be provided with a hose cock for the cleansing of bins.

(4) Waste removal systems within buildings meet the following requirements:
- (a) developments 3 storeys or more in height must utilise a waste chute to transport waste from each floor to a waste storage point;
- (b) developments 3 storeys or more in height must utilise either a recyclables chute or a recycling bin located on each floor adjacent to the waste chute to transport recyclables from each floor to the waste storage point; and,
- (c) where used, waste chutes must meet the requirements set out in Table 7:

[14] Servicing height – means the height required for vehicles to service the bins (including bin height).
[15] Wall to wall – means the minimum radius required for the body of the vehicle to turn (i.e. within an enclosed/walled area).
[16] Kerb to kerb – means the minimum radius required for the wheels of the vehicle to turn (i.e. body of vehicle will overhang roadway during turn).

Table 7: In-building waste removal systems

Design element	Requirement
Waste Chute[17]	Waste chutes (including the shaft) must: (a) be compliant with the National Construction Code (NCC); (b) have adequate strength for its purpose, including additional reinforcing where necessary at joins, bends and hopper intersections; (c) be insect and vermin proof; (d) be constructed and installed to prevent the following during use and operation of the system: (i) transmission of vibration to the structure of the premises; (ii) excessive odour – there must not be a noticeable odour beyond the waste disposal and storage points; (iii) excessive noise to the occupants of the building; (e) comply with the waste chute manufacturer's technical specifications and/or operational limitations, including installation design features and ancillary equipment required to prevent blockages and noise disturbances; (f) be fitted with a shutter at the base of the chute for closing off the chute manually during bin exchange and automatically in case of fire; (g) be fitted with fire sprinklers; and, (h) have chute pipes with access provided at appropriate levels and a nylon brush or similar appliance on a pulley system, for clearing obstructions and cleansing.
Waste disposal point[18] (at the chute)	The waste disposal point must: (a) be located on each residential floor in a position which is: (i) freely ventilated in the open-air (sheltered balconies), or in a dedicated room or compartment; (ii) easily accessible by the occupants of each apartment; (iii) separated from any habitable portion of a building or place used in connection with food preparation or storage; (iv) located to ensure the handle of the hopper is at least 1200 millimetres above finished floor level. (v) be fitted with a hopper door that automatically returns to the closed position after use; (vi) designed to permit free flow of waste into the chute; (vii) constructed so that the diameter or largest dimension of the service opening (the diagonal of a rectangular opening) does not exceed three-quarters (3/4) of the diameter of the chute with which the hopper is connected; (viii) the floor adjacent to the hopper is paved with a durable impervious material with a smooth finished surface; and, (ix) chute door is two hour fire rated.
Waste storage room[19]	The waste storage room must: (a) allow unobstructed access for removal of the containers to the service point and for positioning of the containers correctly in relation to the waste chute; (b) provide additional space for compactors (where required); (c) not be located adjacent to or within any habitable portion of a building or place used in connection with food preparation (including food storage); (d) be fitted with doors that are wide enough to allow for the easy removal of the largest container to be stored; (e) be designed and constructed of impervious material with a smooth

[17] Waste Chute - A duct in which waste descends from one point to another

[18] Waste disposal point - The point where waste is disposed of into the chute, also known as the waste hopper. It consists of a fixed frame and hood unit, covered with a hinged or pivoted door.

[19] Waste storage room - The room at the base of the chute used for the storage of waste bins.

Design element	Requirement
	finish (including the walls, ceiling, floor) to allow for easy cleaning; (f) be provided with a hose cock immediately outside the room for cleaning bins and the room; (g) be insect and vermin proof; (h) have a constructed hardstand floor area which is graded to fall to a drainage point/s and is connected to sewer in accordance with trade waste requirements; (i) have adequate artificial lighting; (j) where refrigerated rooms are fitted, provide an approved alarm device outside which is controllable only from within the room; and, (k) bins must have a reinforced bottom plate.

2.4.2 Information that Council may request

This section sets out information that Council may request to establish the waste requirements for a development.

2.4.2.1 Waste Management Plan

(1) A waste management plan may be requested by Council to support a development application and demonstrate that the proposed development can comply with the standards called up in AO14.1 and AO15.1 of the Infrastructure Works Code.

(2) A waste management plan must provide the following information:
- (a) a brief description of the development and site location;
- (b) identification of wastes generated during the construction and demolition (if applicable) phases including;
  - (i) a list of activities that may generate wastes;
  - (ii) types and estimated volumes of materials generated from each activity including hazardous characteristics;
  - (iii) how waste materials will be dealt with;
  - (iv) the disposal point or method for the disposal of each waste type;
  - (v) details of how waste materials will be separated on site.
- (c) a site plan (with dimensions) showing:
  - (i) the location of existing and proposed buildings;
  - (ii) landscaping areas;
  - (iii) site access points;
  - (iv) bin storage points;
  - (v) bin servicing point;
  - (vi) where bins are to be collected on site, the swept path of waste collection vehicle;
  - (vii) turning circle for each turn within the development required to be performed by waste collection vehicle showing clearance dimensions from buildings, fences, infrastructure and landscaping;
- (d) an estimate of weekly volumes of waste material generated in accordance with Table 1 – waste generation rates;
- (e) the proposed bin types and sizes at each storage point;
- (f) allocation of responsibility for waste management;
- (g) bin carting routes and distances (where applicable); and,
- (h) a chute diagram from top storey to waste storage room and location on each floor (where applicable).

2.5 CONSTRUCTION MANAGEMENT

2.5.1 Information that Council may request

This section sets out information that Council may request to demonstrate compliance with the performance outcomes for construction management in the Infrastructure Works Code.

2.5.1.1 Construction Management Plan

(1) A construction management plan may be required for developments involving construction and/or demolition activities which may impact the surrounding environment and residents. The plan must address the proposed measures to these impacts and must include the following:
- (a) public safety, amenity and site security;
- (b) construction hours;
- (c) noise and vibration management;
- (d) air and dust management;
- (e) stormwater and sediment control;
- (f) waste management;
- (g) traffic management; and,
- (h) schedule of works.

2.6 EXCAVATION AND FILLING

2.6.1 Guidance for applicants

This section provides guidance for applicants on how to achieve compliance with PO1 of the Infrastructure Works Code and PO8 of the Landscaping Code.

2.6.1.1 General

(1) Where located adjacent to Council managed land, all retaining walls (including any associated footings) must be wholly located with private property.

2.6.1.2 Retaining walls between lots

(2) Retaining walls located between lots within a development that are greater than 1.5m in height must be stepped/terraced to incorporate a minimum of 0.75m of landscaping between the two walls. The lower wall and landscaping area should be fully contained within the lower lot and should be of a height which allows maintenance of the landscaping area from the ground level of the property on the low side and the upper wall (including any associated footings) and fence should be fully contained within the upper lot.

3.0 TRANSPORT, SERVICING, ACCESS AND PARKING

3.1 RELATIONSHIP WITH THE PLANNING SCHEME

(1) This part sets out:

(i) particular standards called up as acceptable outcomes in 9.3.5 Transport, Servicing, Access and Parking Code. These are contained in the following subsections:

3.2.1 Driveways
3.3.1 Road Design
3.4.1 Internal Accessways
3.5.1 Pedestrian and Cycle Path Design
3.6.1 Car Parking, Servicing and Site Access Design

(ii) information council may request to demonstrate compliance with the performance outcomes of the code. These are contained in the following subsections:

3.3.2 Traffic Impact Assessment

(iii) further guidance for applicants is contained in the following subsections:

3.2.2 Driveways

3.2 DRIVEWAYS

3.2.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO1.1 in the Transport, Servicing, Access and Parking Code. These standards represent the “acceptable outcome” which meets the performance outcome set out in the code.

(1) Driveways are designed in accordance with standard drawings in section 8 of the policy and the following standards unless otherwise specified below.

- Australian Standard 2890: 2009 - Parking facilities
- Austroads: Guide to Road Design

(2) Driveway crossovers are located:

(a) a minimum of 1m from the kerb transition of a stormwater gully pit;
(b) a minimum of 1m from power poles and street lights;
(c) a minimum of 300mm from any utility infrastructure, access covers or other infrastructure;
(d) a minimum of 2m from existing street trees;
(e) to allow a minimum of 10m of uninterrupted kerb length approaching a bus stop; and,
(f) in accordance with Table 1.

Table 1: Driveway Access Locations

Type of Frontage Road	Adjacent Feature	Minimum Separation of Driveway from Adjacent Feature
Access Place and Access Street	Minor intersection	6 metres from kerb tangent point
	Major intersection	20 metres from kerb tangent point
	Median island Other driveways	10 metres from island nose 3 metres along kerb
Collector, Major Collector, Sub-Arterial and Arterial Roads	Minor intersection	10 metres from kerb tangent point
	Major intersection	30 metres from kerb tangent point
	Median break	15 metres from median nose
	Other driveway	15 metres along kerb
	Traffic signals	Clear of queue areas and turning lanes

(3) Driveway crossovers must be finished with a non-slip surface material which does not create an uneven or slippery hazard for pedestrians.

3.2.2 Guidance for applicants

(1) For reconfiguring a lot applications where the location of domestic driveways is considered to be constrained or requires more than one lot to share a driveway, driveways may be required to be constructed prior to the development being accepted on maintenance.

3.3 TRAFFIC IMPACT

3.3.1 Information that Council may request

3.3.1.1 Traffic impact assessment

This section sets out information that Council may request to demonstrate compliance with PO3 and PO4 of the Transport, Servicing, Access and Parking Code.

(1) Where applicable, a detailed traffic impact assessment and report may be required to assess the impact that traffic associated with the proposed development will have on the adjoining road network.

(2) All traffic impacts assessments and reports must be prepared by a suitably qualified Registered Professional Engineer of Queensland (RPEQ).

(3) A traffic impact assessment must include (at minimum):
- (a) details of the traffic impact on surrounding development and the adjacent transport network including:
  - (i) design year covering a 10 year planning horizon from the date of completion of the development;
  - (ii) clearly presented statistical details of the proposed development;
  - (iii) traffic generations of the proposed development, both daily and peak hours;
  - (iv) directional distribution of generated traffic, travel pattern and vehicle classification;
  - (v) current traffic volume/full turning movement volumes on affected existing roads and intersections. Vehicular volumes are classified into cars and commercial vehicles and are projected forward at appropriate growth rates;

(vi) impact of the development on pedestrian and bicycle movements, including access to existing linkages;
(vii) analysis of intersections using the computer software program SIDRA or similar. Details to include:
(viii) intersection treatment;
- method of control;
- delay;
- capacity;
- traffic volume;
- saturation levels;
- queue lengths; and,
- copies of input, output and graphical intersection layout from SIDRA or equivalent;

(b) conceptual plan of intersection configurations showing:
(i) lane layouts;
(ii) turning radii;
(iii) storage lengths;
(iv) auxiliary lanes;
(v) medians;
(vi) shoulders;
(vii) footpaths/bikeways and other relevant information;
(viii) for signalised intersections, the same analyses and conceptual plans as per item (a)(vii); together with signals phasing diagrams from SIDRA or similar output;
(ix) any adverse effects on safety issues, capacities and levels of service of intersections and the road network and appropriate ameliorative measures suggested;
(x) all assumptions and references made in the traffic analyses.
(c) proposed access to the development;
(d) maintenance of traffic flow efficiency and safety standards;
(e) maintenance of pedestrian and bicycle flow efficiency;
(f) parking impacts associated with the proposed development; and,
(g) any proposed upgrades/changes to the road network including the timing of these works.

3.4 ROAD DESIGN

3.4.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO4.1 in the Transport, Servicing, Access and Parking Code. These standards represent the “acceptable outcome” which meets the performance outcome set out in the code.

3.4.1.1 General

(1) Roads are design in accordance with standard drawings in section 8 of the policy and the following standards unless otherwise specified by the requirements set out in this section:
- IPWEAQ Complete Streets
- Austroads: Guide to Road Design
- Austroads: Guide to Traffic Management
- Austroads: Guide to Pavement Technology
- DTMR Manual of Uniform Traffic Control Devices (MUTCD)

3.4.1.2 Road Hierarchy

(2) The purpose and function of the road hierarchy is detailed in Tables 2 and 3.

Table 2: Functional characteristics of road types - residential

	Access Laneway	Access Place	Access Street	Collector Street	Major Collector Street	Sub-Arterial Road	Arterial Road
Network	Local				Strategic		
Function	Rear access to lots fronting road with restricted property access Refuse collection	Local access to properties Shared traffic, pedestrian and recreational uses	Access to properties and local neighbourhoods with shared traffic, pedestrian and recreational uses	Access to properties and other roads. Access to local neighbourhoods	Transport of people and goods within suburbs District movement	Transport of people and goods between suburb Connects suburbs to activity centres, local education community and health facilities	Transport of people and goods through and around the local government area

Table 3: Functional characteristics of road types - industrial

	Industrial Access Street	Industrial Collector Street
Function	Vehicular access to industrial properties.	Vehicular access to industrial properties and other roads.

(3) Council's adopted road design standards are shown in Table 4 and Table 5.

Note: All measurements are taken from lip of kerb and channel unless otherwise specified.

(4) Any required landscaping buffers do not form part of the road reserve and as such are in addition to the minimum required road reserve width.

Table 4: Road design standards – residential

Street Type	Access Laneway	Access Place	Access Street	Collector Street	Major Collector Street	Sub-Arterial	Arterial
Maximum traffic volume (vpd)	150	150	1,000	3,000	10,000	2 lanes – 15,000 4 lanes – 20,000	20,000 - 30,000
Design traffic volume	10 vpd detached 6 vpd attached	10 vpd detached 6 vpd attached	10 vpd detached 6 vpd attached	10 vpd detached 6 vpd attached	10 vpd detached 6 vpd attached	10 vpd detached 6 vpd attached	10 vpd detached 6 vpd attached
Traffic catchment	25 dwellings	15 lots	100 lots	300 lots	1,000 lots	2,000 lots	N/A
Direct property access	Yes	Yes	Yes	Yes	No	No	No
Posted speed	30km/h	40km/h	40km/h	50km/h	60km/h	60-80km/h	60-80km/h
Reserve width	8m	15m	15m (18m required in MDR zoned areas of Kinross Road and South East Thornlands)	18m	23m (plus cycle lanes if required)	2 lanes – 29m (plus cycle lanes if required) 4 lanes – 36m (plus cycle lanes if required)	Refer to DTMR design standard
Number of traffic lanes	N/A – total carriageway width min. 5.5m	2	2	2	2	2 or 4	
Traffic lane width	N/A	3m	3m	3.5m	3.5m	3.5m	
Number of auxiliary lanes	Nil (parking not permitted)	Nil	Nil	2	2	2	
Auxiliary lane width	N/A	N/A	N/A (2m auxiliary lane required in MDR zoned areas of Kinross Road and South East Thornlands)	1m	2.5m	2.5m	
Number of dedicated on road cycle lanes	Informal	Informal	Informal	Informal	As required by the LGIP	As required by the LGIP	As required by the LGIP
Cycle lane width	N/A	N/A	N/A	N/A	As required by the LGIP	As required by the LGIP	As required by the LGIP
Min verge width	Minimum 1.2m (dependant on services within the verge)	4m	4m	4.5m	5.5m	5.5m	Refer to DTMR design standard
Median width	N/A	N/A	N/A	N/A	N/A	6m central median	
Intersection spacing	N/A	75m	60m same side 40m opposite side	60m same side 40m opposite side	100m same side 60m opposite side	500m	700m
Min Footpath	Full concrete 1.2m verge	No	1.5m (one side) (1.5m path on both sides required in MDR zoned areas of Kinross Road and South East Thornlands)	1.5m (one side)	2.0m (both sides)[20]	2.0m (both sides)20	2.0m (both sides)20

[20] Unless otherwise required by the Local Government Infrastructure Plan

Table 5: Road design standards - industrial roads

	Industrial Access Street	Industrial Collector Street
Design Speed	60km/h	60km/h
Reserve width	20m	22m
Carriageway width	11m	13m
Number of traffic lanes	2	2
Width of traffic lanes	3.5m	3.5m
Number of parking lanes	2	2
Width of parking lanes	2m	3m
Verge width	4.5m	4.5m
Footpath	Both side 1.5m	Both sides 1.5m
Grade	Maximum 10% Minimum 2.5%	Maximum 8% Minimum 0.4%

3.4.1.3 Geometric Design

(1) The geometric design of all roads is in accordance with *Austroads Guide to Road Design: Part 3 – Geometric Design*. The design is to be in accordance with the 'desirable' ranges of minimum and maximum design limits, except where varied below.

3.4.1.3.1 Cross Falls

(1) All intersections and cul-de-sac heads are to be contoured to prevent ponding of water. Where minimum cross fall cannot be achieved the longitudinal grades must be used to shed water.

(2) A cross fall of 2% is permissible when joining to existing road construction with a flatter cross fall.

3.4.1.3.2 Truncations

(1) A corner truncation of the real property boundary for roads, streets and accessways is provided at each intersection to maintain sight distance. The size of the truncation must be in accordance with Table 6.

Note: where streets of a different hierarchy intersect, the truncation required is that of the higher order road.

Table 6: Truncation According to Street Type

Street Type	Truncation
Rear Laneway, Access Street, Access Place, Collector Street, Major Collector Street	6m x 6m 3 chord
Sub Arterial	10m x 10m 3 chord
Arterial	25m x 25m 5 chord
Industrial	8m x 8m 3 chord

3.4.1.3.3 Turning Areas

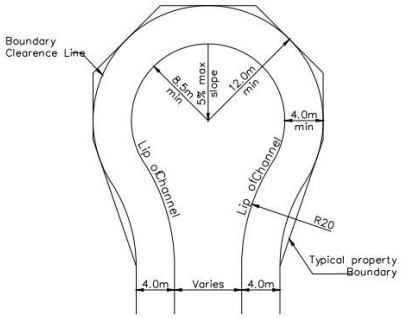
(1) Culs-de-sac are to be provided to facilitate turning movements at the end of a road.

(2) The road reserve width at cul-de-sac is to provide a minimum 4m verge from the lip of the channel to the property boundary.

(3) The provision of alternative cul-de-sac design to accommodate additional on street car parking (eg. using a centre island with parking spaces) must be considered where more than 4 properties adjoin the head of a cul-de-sac.

(4) The minimum radius at the head of a cul-de-sac in a residential area is 8.5m to the lip of the channel generally in accordance with the diagram below.

Diagram 1 – Residential Cul-de-sac Treatment



(5) For industrial areas, the cul-de-sac head must be designed to accommodate the design vehicle appropriate to the use.

(6) Where a temporary turning facility is required (generally for staged construction) the preference is for a cul-de-sac.

3.4.1.4 Kerb and Channel

(1) The types of kerb and channel to be used are listed in Table 7.

Table 7: Kerb and channel types

Road Type	Kerb and Channel Type (refer IPWEAQ standard drawing RS-080)
Access Place Access Street Collector Street	M1
Major Collector Street Sub-arterial Road Arterial Road	B1 (450mm channel)
Industrial Road	B1 (450mm channel)
Bridges and Culverts	B1 (450mm channel)

(2) In addition to the table above the following are to be applied:
- (a) type B1 barrier kerb and channel is to be used where a road adjoins open space;
- (b) type B1 barrier kerb and channel is to be used at bus stops;
- (c) edge restraints are to be used in residential areas where one way cross falls are used;
- (d) on medians and traffic islands, semi mountable type SM4 and SM5 are used with concrete median and landscaped median respectively;
- (e) semi mountable type SM5 is to be used for roundabout centre island (75mm high kerb may be adopted where the roundabout lies on a minor (local) road which is unlikely to be a bus route;
- (f) kerb ramps are provided adjacent to all kerb returns, at entrances to parks and where required to support pedestrian access.

3.4.1.5 Road edge guide posts

(1) Road edge guide posts are in accordance with DTMR standard drawings and are provided at all location where concrete kerb and channel is not constructed, such as half road construction, tapers and ends of roads.

3.4.1.6 Service conduits

(1) Service conduits for rear lots are extended along the full length of the accessway and a locator post provided.

3.4.1.7 Entry treatments, signage and barriers

(1) All entry treatments (where approved) are to be placed on private property and the land owner is to be responsible for their ownership and maintenance.

(2) For major traffic routes, safety barriers are to be identified and designed in accordance with the *DTMR Road Planning and Design Manual - Volume 3, Part 6: Roadside Design, Safety and Barriers*. Appropriate risk assessment is to be undertaken using the DTMR Road Side Impact Severity Calculator and a report provided to justify the design.

(3) Barriers and guardrails are to be in accordance with DTMR standard drawings. Covers must be provided to protect road users from sharp and protruding edges.

3.4.1.8 Threshold Treatments

(1) Threshold treatments are to be provided where major roads intersect local streets to highlight the change in the road environment. The typical treatment is coloured stamped AC and the depth of the AC in the location of the treatment must be increased by the depth of the stamp. Coloured pavement treatments are to be undertaken in accordance with Brisbane City Council – Reference Specifications for Civil Engineering Work – S155 Road Pavement Marking.

3.4.1.9 Pavement Design

(1) Pavements are designed in accordance with the following standards unless otherwise specified below:

- Austroads Guide to Pavement Technology
- DTMR Pavement Design Supplement
- BCC Reference Specifications for Civil Engineering Work

(2) The traffic design loadings are to be based on the ultimate traffic generation for the catchment area, originating from:

(a) ultimate development of current zoned land; and,
(b) staging of works and the resultant development and construction traffic.

3.4.1.9.1 Flexible pavements

(1) The minimum design traffic loadings in equivalent standard axles (ESA) for the various road classifications are defined in Table 8. Where appropriate, Council may nominate a higher ESA value based on a traffic impact assessment, predicted traffic or increased percentage of heavy vehicles.

Table 8: Design Equivalent Standard Axles

Road Type	Design ESA (20 years)
Access Street Access Place	1×10^5
Collector Street	5×10^5
Major Collector Street	1×10^6
Sub-Arterial Road	2×10^6
Arterial Road	Refer to DTMR design standards
Industrial Roads	2×10^6

(2) The assessment of the supporting subgrade strength is to be in accordance with *DTMR Pavement Design Supplement 'Supplement to Part 2: Pavement Structural Design' of the Austroads Guide to Pavement Technology* with the following considerations:

(a) in deep cuttings, fills or other instances where testing of the subgrade is not possible until the completion of bulk earthworks, the pavement design or re-evaluation of designs may be required upon achieving subgrade level;

(b) the subgrade must be tested at the following frequencies:

(i) road length $\leq$ 120m: 1 test for each subgrade type (minimum of 2 test locations)

(ii) road length $>$ 120m: 1 test for each subgrade type and/or 1 test for every 60m or part thereof, but not less than 3 tests for each subgrade type;

(iii) spacing of test sites must be selected to suit subgrade, topographic and drainage characteristics;

(c) a maximum subgrade CBR of 10 is to be used for design purposes;

(d) if the CBR determined for the subgrade is less than CBR 3 for flexible (granular and full depth asphalt) pavement or CBR 5 for concrete pavement, the minimum depth of subgrade replacement is to be increased by 100mm for each 0.5% reduction in the CBR value. After subgrade improvement, the pavement design should be based on subgrade CBR 3 for flexible pavement and CBR 5 for concrete pavement. Other techniques such as rock spalls on geotextile and geogrids together with correctly sized gravel blanket course will be considered for CBR values less than 1.

(e) design gravel depths for flexible pavements with thin bitumen surfacing for light-traffic roads with loading of up to and including 2×10^6 ESAs is to be assessed from subgrade strength and in accordance with Table 9. The minimum total pavement gravel depth is 250mm.

Table 9: Minimum flexible pavement gravel depth (mm) with thin AC surfacing

CBR	1×10^5	5×10^5	1×10^6	2×10^6
3	380	480	520	560
4	330	410	440	480
5	290	360	390	420
6	260	330	350	380
7	250	300	320	350
8	250	270	300	320
9	250	260	280	300
10	250	250	260	280

(f) The minimum total pavement thickness is shown in the Table 10 below, in addition:

(a) all granular pavements must be sealed with a prime coat (C170) or a primer seal (C170 with 7mm chip – assumed ALD 5mm) prior to surfacing with asphalt;

(b) continue pavement at least 150mm past the back of the concrete kerb and channel to ensure stability of the pavement edge;

(c) pavement depths are increased by an additional 100mm for 10m on either side of slow points, traffic calming devices, traffic islands adjacent to intersections, cul-de-sac heads and all intersections;
(d) roundabouts have a minimum 40mm AC surfacing with a 7mm chip seal where a flexible pavement is used;

Table 10: Total Pavement Thickness

	Up to 5.0 x 10^5 ESAs	**1.0 x 10^6 ESA and greater**
Composition	**Minimum course thickness (mm)**	
Asphalt	30mm	45mm
Primer coat/seal	Yes	Yes
Base (CBR 80)	125	125
Sub-base (CBR 45)	125	125
Sub-base (CBR 15)	As required to obtain the minimum pavement depth	
Minimum total pavement (including AC)	280	295

(g) subsoil drainage is to be constructed in accordance with the standard drawings in section 8 of this policy and located:
(a) under all kerb and channel, and median kerbs;
(b) in areas where landscaping could affect the road pavement;
(c) at the end of a road at the end of a stage boundary; and,
(d) where the pavement is affected from springs or the ingress of water. These areas may require the use of mitre drains for a satisfactory solution.

3.4.1.9.2 Rigid pavements

(1) Rigid pavements for lower order roads (rear laneways, access places, access streets) are designed in accordance with the following standard:

- Cement and Concrete Association of Australia Guide to Residential Streets and Paths

3.4.1.10 Bridges and major culverts

(1) Bridges and culverts and associated elements are designed in accordance with the following standards unless otherwise specified below:
- Austroads: Guide to Bridge Technology
- Austroads: Guide to Road Design
- AS5100 Bridge Design
- AS3845 Road Safety Barrier Systems
- AS1428 Design for Access and Mobility

(2) Road bridges and major culverts (RCP≥1800mm, RCBC span≥1800mm and height≥1500mm) must also be design in accordance with the standards set out in section 1.2.1 of this policy.

(3) To minimise Council's future maintenance responsibilities the following must be adhered to:
(a) timber must not be used for structural components;
(b) steel pipe or arch culverts are not used for stormwater management purposes; and,
(c) masonry block structures are not permitted.

(4) Minimum vertical clearances for bridges must be in accordance with *Austroads: A Guide to Bridge Technology* and *Austroads: A Guide to Road Design* and must consider the requirements for:
(a) road clearance;
(b) power lines and other service authorities;
(c) waterways clearance:
(i) flood immunity clearance;

(ii) waterway navigation freeboard.

(5) Design life for the main components of the bridge and culvert structures is to achieve a minimum of 100 years.

(6) The design of bridge and culvert structures must take into account accessibility for inspection, maintenance and replacement as follows:
- (a) structures are designed so that all corrosion protection systems including concrete covers can be easily inspected, maintained and replaced;
- (b) bridges are designed to enable items such as bearings, expansion joint seals, railings and drains to be readily accessible for inspection, maintenance and replacement;
- (c) culverts are designed to enable items such as tidal flaps debris grates, silt traps, railings and drainage connections to be readily accessible for inspection, maintenance and replacement.

(7) Bridge barriers designed in accordance with the *DTMR Road Planning and Design Manual* and must meet the regular performance level as in *AS5100 Bridge Design* as a minimum. Where a bridge structure is over permanent water deeper than 300mm or where the drop height exceeds 1.2 m, vertical balustrade pedestrian handrails with appropriate bicycle offset rail or equivalent must be provided on the structure's outer edge.

(8) Proposals must not include slip forming of concrete bridge barriers or use of timber bridge barriers.

(9) Bridges and culverts are designed to accommodate present and future requirements for services crossing the structure.

(10) If future widening of a bridge or culvert may be required, allowance must be made in the design for connection of the future widening.

(11) Applied loads are to be determined in accordance with *AS5100 Bridge Design*, unless otherwise specified below:
- (i) For pedestrian loads:
  - (a) isolated pedestrian and bikeway bridges protected by 'deflection rails' with maximum 1.5 m clearance against vehicle access are designed to accommodate a minimum 1,800kg GVM mini tractor, ride-on mower or equivalent, assuming a 1.2 m track width and 2 m wheel base are situated anywhere on the deck;
  - (b) where full width access greater than 1.8 m is possible, the structure accommodates either a 6,100kg GVM full size tractor, 2,500kg utility vehicle or a mini tractor as described above.

(12) For road bridges, the deck wearing surface must:
- (a) for asphaltic concrete, be constructed of dense graded asphalt with a minimum design life of 20 years;
- (b) achieve a minimum thickness of 60 mm in any traffic lane;
- (c) achieve a minimum thickness of 45mm in any other area.

(13) Notwithstanding the requirements set out by the standards listed above, Council requires the following in the design and construction of pedestrian bridges:
- (a) that the minimum clear width must be 2.5 m, unless Council requires the use of maintenance vehicles, in which case the minimum clear width requirement must be 3.5m;
- (b) designed for a 5.0kPa live load and a 20KN concentrated load;
- (c) to increase and prolong the structural integrity and durability of the structure, Council does not recommend the use of timber in the construction of bridge structures. This will prolong the life of the structure and also assist in reducing future maintenance costs:
  - (i) however if timber is the chosen material for pedestrian bridge construction, the timber elements must be designed in accordance with:
    - AS1720 – Timber Structures Design Code;

- AS3660 – Termite Management to incorporate Termite Management Systems and;
- must satisfy the durability requirements stated in the bridges and large culverts section of this document.

3.4.2 Guidance for applicants

3.4.2.1 Street naming

(1) Street names are to be submitted to Council for approval to comply with Council's Policy and Guidelines on street naming and numbering, in accordance with section 60 of the *Local Government Act 2009*. Sections of streets that have the same street name should not be isolated. Isolated sections should have different names to provide clarity to road users.

3.5 INTERNAL ACCESSWAYS FOR LARGE RESIDENTIAL DEVELOPMENTS

3.5.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO5.1 in the Transport, Servicing, Access and Parking Code. These standards represent the "acceptable outcome" which meets the performance outcome set out in the code.

(1) Internal accessways are designed in accordance with the following standard unless otherwise specified below:
- AS2890.1 – Off-street car parking

(2) Internal accessways are designed in accordance with Table 11 below.

Table 11: Internal Accessways for Development with a Community Management Statement (CMS)

	Type 1[21]	**Type 2**[22]	**Type 3**[23]
Maximum design speed	35km/h	25km/h	15km/h
Minimum carriageway width	6 metres	5.5m	5m at entrance to public road, otherwise 4.5m
Minimum shoulder width	1.5m	1m	1m
Minimum total accessway reserve	10m	8m	8m
Verge width	1.5m	N/A	N/A
Design for service vehicle	3 point turn	3 point turn	3 point turn

[21] Minor loop road not exceeding 200 metres in length and serving not more than 100 car parking spaces.
[22] Road for vehicular and pedestrian use not exceeding 100 metres in length and serving not more than 50 car parking spaces.
[23] Road for vehicular and pedestrian use not exceeding 50 metres in length and serving not more than 25 car parking spaces.

3.6 PEDESTRIAN AND CYCLIST FACILITIES

3.6.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO7.1 in the Transport, Servicing, Access and Parking Code. These standards represent the “acceptable outcome” which meets the performance outcome set out in the code.

(1) Pedestrian and cyclist facilities are designed in accordance with the standard drawings in section 8 of the policy and the following standards unless otherwise specified below:
- IPWEA Complete Streets: Guide for Urban Street Design
- Austroads Guide to Road Design Part 6A: Pedestrian and Cyclist Paths
- DTMR Manual of Uniform Traffic Control Devices
- AS1428 – Design for Access and Mobility
- AS2890.3 - Parking facilities – Bicycle parking

(2) Footpaths, shared paths and cycle paths within the road reserve are required as set out in Table 4 and Table 5.

(3) Footpaths and shared paths in the verge are to be located 1.5m from the property boundary.

(4) Pathways are to be supported by kerb ramps and fencing to assist pedestrian movements and safety.

(5) Special cycleway design consideration should be applied at the following locations:
(i) pinch points;
(ii) traffic calming devices;
(iii) roundabouts; and,
(iv) high speed / high volume traffic interfaces.

3.6.2 Guidance for applicants

(1) Consideration must be given to the effect of cycleway surface treatments at change of directions under wet conditions.

3.7 ON-SITE PARKING

3.7.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO9.1, AO9.2 and AO9.3 of the Transport, Servicing, Access and Parking Code. These standards represent the “acceptable outcomes” which meet the performance outcomes set out in the code.

(1) Car parking and internal circulation is designed in accordance with the following standard:
- AS2890 – Parking Facilities

3.8 SITE ACCESS

3.8.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO18.1 of the Transport, Servicing, Access and Parking Code which meet the performance outcome set out in the code.

(1) Queuing area is designed in accordance with the following standards unless specified below:
- AS2890 – Parking Facilities

(2) Where food and drink outlets have a drive-through facility, queuing space for a minimum of 10 vehicles is provided measured from the order point.

3.9 SERVICING AND MANOEUVRING AREAS

3.9.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO19.1, AO20.1 and AO20.2 of the Transport, Servicing, Access and Parking Code. These standards represent the "acceptable outcomes" which meet the performance outcomes set out in the code.

(1) Manoeuvring area is designed in accordance with the following standards unless specified below:
- AS2890 – Parking Facilities

(2) Manoeuvring areas for non-residential uses are designed to accommodate the service vehicle appropriate to the use nominated in Table 12 below.

Table 12: Service vehicle for non-residential uses

Use	Service Vehicle
Animal keeping	SRV
Bar	WCV
Bulk landscape supplies	AV
Car wash	MRV
Child care centre	SRV
Educational establishment	HRV
Emergency services	HRV
Food and drink outlet	HRV
Function facility	WCV
Funeral parlour	WCV
Garden centre	HRV
Educational establishment	HRV
Hardware and trade supplies	HRV
Healthcare services	SRV
High impact industry	AV
Hospital	HRV
Hotel	HRV
Indoor sport and recreation	HRV
Low impact industry	HRV
Marine industry	AV
Market	SRV
Medium impact industry	AV
Nightclub entertainment facility	WCV
Office	SRV
Outdoor sales	AV
Outdoor sport and recreation	HRV
Place or worship	SRV
Service industry	HRV
Service station	AV
Shop/shopping centre	SRV for 200m^2 or less gross leasable area
	HRV for 201m^2 – 2,000m^2
	AV for 2,001m^2 – 20,000m^2

Use	Service Vehicle
	AV for 20,001m^2 or more gross leasable area
Showroom	HRV
Tourist park	HRV
Veterinary services	SRV
Warehouse	AV
Any other non-residential use	As determined by council

Note:
AV = Articulated vehicle[24]
HRV = Heavy rigid vehicle[24]
MRV = Medium rigid vehicle[24]
SRV = Small rigid vehicle[24]
WCV = Waste Collection Vehicle – refer to Table 4 in Section 2.4.1.4 of this policy for the dimensions of the appropriate WCV.

(3) Manoeuvring areas (where required) for residential uses are designed to accommodate the service vehicle appropriate to the use nominated in Table 13 below.

Table 13: Service vehicle for residential uses

Use	Service Vehicle
Multiple dwelling	WCV where on site waste servicing is required
	SRV where waste collection is from the kerbside
Relocatable home park	HRV
Resort complex	WCV
Retirement facility	WCV
Short-term accommodation	WCV

Note:
SRV = Small rigid vehicle[24]
WCV = Waste Collection Vehicle – refer to Table 4 in Section 2.4.1.4 of this policy for the dimensions of the appropriate WCV.

[24] Refer AS2890.2: Off-street commercial vehicle facilities for vehicle dimensions and manoeuvring requirements.

4.0 LANDSCAPING

4.1 RELATIONSHIP WITH THE PLANNING SCHEME

(1) This section sets out:

(i) particular standards called up as acceptable outcomes in 9.3.3 Landscape Code. These are contained within the following subsections:
4.2.1 Plant species
4.2.2 Street planting
4.2.3 Street furniture

(ii) information council may request to demonstrate compliance with the performance outcomes of the code. These are contained in the following subsections:
4.6.1.1 Arborist reports
4.6.1.2 Tree management plans

(iii) guidance for applicants contained in the following subsection:
4.3.2 Street tree planting

4.2 PLANT SPECIES

4.2.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO9.1 in the Landscaping Code. These standards represent the “acceptable outcome” which meets the performance outcome set out in the code.

(1) Plant species for conservation and rehabilitation areas are to be selected from the Regional Ecosystem Species Database as applicable to the regional ecosystem shown in Council’s red-e-map.

https://www.redland.qld.gov.au/info/20255/plants_and_trees_in_the_redlands/632/ecosystem_mapping

(2) Plant species for open space and other landscaped areas to be transferred into council ownership are to be selected from Appendix B.

4.3 STREET TREE PLANTING

4.3.1 Standards called up as acceptable solutions

This section sets out the standards called up in AO16.1 in the Landscape Code. These standards represent the “acceptable outcome” which meets the performance outcome set out in the code.

(1) Street trees are to be selected from the species listed in Appendix B.

(2) For narrow verges or verges with pathways with less than 2m between the edge of the footpath and the back of kerb, street tree species selected from Appendix B must be from the narrow verge column.

(3) Street trees listed in Appendix B as feature trees are suitable for entry statements or for limited use within parkland areas.

(4) A variety of street trees are to be selected to create a visually interesting streetscape.

(5) Planting is to be undertaken in accordance with the following:
  (a) street trees are planted a minimum of:
    - 4 metres from driveways, fire hydrants, water valves, other infrastructure pits and stormwater infrastructure;
    - 8 metres from power poles and street lights;
    - 10 metres from a departing corner; and
    - 15 metres from an approaching corner and bus stop;
  (b) root barriers are provided where the trunk diameter will be greater than 100mm at maturity; and,
  (c) root directors appropriate to the species are used to protect pavements and hard landscaped areas where the width or the planted area is less than 2m.

(6) Verge areas are turfed with a minimum depth of 100mm friable organic soil.

(7) Landscaped medians, traffic islands and round-a-bouts provide (subject to council approval):
  (a) type SM5 semi-mountable kerb keyed a minimum of 135mm into the pavement;
  (b) adequate site preparation and soil depths with a minimum soil depth of 400mm friable organic soil;
  (c) root barriers where the trunk diameter will be greater than 100mm at maturity; and,
  (d) sub-soil drainage.

(8) Planting on centre islands and adjacent to round-a-bouts must take into account the provision of adequate sight distance in accordance with *Austroads: Guide to Road Design Part 3: Geometric Design*.

4.3.2 Guidance for applicants

(1) Street trees are planted at the latest possible stage of development, after all other infrastructure has been completed to minimise damage to the trees.

4.4 RETAINED VEGETATION

4.4.1 Information that Council may request

This section sets out information that may be requested to demonstrate compliance with the performance outcomes in the Landscape Code.

4.4.1.1 Arborist's reports

(1) An arborist's report may be required to determine the condition of existing vegetation, recommend vegetation to be removed or retained and provide parameters to minimise the risk to, and long term viability of, retained vegetation.

(2) All arborist's reports must be undertaken by a qualified arborist (AQF level 5) with membership of a relevant association and relevant local experience.

(3) An arborist's report must include:
  (a) an assessment of tree characteristics, current health and defects of all significant trees and any other trees and shrubs which overhang from neighbouring properties. A proforma format is acceptable provided it is

accompanied by relevant discussion and photos and includes scientific reasoning to support statements;

(b) a contextual analysis which describes, in text and with photos, the tree as an element of an ecological unit, cultural landscape, or historic listing such as a vegetation protection ordinance;

(c) photographs of any disease, damage or defect with descriptions and annotated photos showing recommendations and actions for remediation and an estimate of the remaining lifespan of tree or major branch affected, and relative risk to human safety or property;

(d) photographs and a scale tree plot showing canopy height and root zone spread in relation to any existing or proposed building/driveway, calliper of trunk at chest height, spot height of trunk, botanical name and common name;

(e) the extent of any earthworks in the vicinity;

(f) any weed and invasive species as nominated in local government's pest management plan and proposed weed removal methods;

(g) protection measures during construction phase which should include tree protection zones and structural root zones and protective barriers for tree trunks and root zones;

(h) methods for trimming of tree roots and canopy in accordance with *AS4970-2009 - Trees on Development Sites*;

(i) disturbance to tree root zone for hard landscape works such as cultivation for new plant material;

(j) the impacts of proposed materials for hard landscape works, such as permeable paving and retaining edges;

(k) proposed irrigation and fertilizer/nutrient regime; and,

(l) recommendations for removal/retention, protection and/or pruning of trees including any required inspections and monitoring.

5.0 PARKS

5.1 RELATIONSHIP WITH THE PLANNING SCHEME

(1) Desired standards of service for Redland's trunk park network are established under the local government infrastructure plan (LGIP).

(2) This section sets out:

(i) particular standards called up as acceptable outcomes in 9.3.3 Landscape Code. These are contained within the following subsections:
5.2.1 Paths in parks and open spaces
5.4.1 Utilities in parks
5.5.1 Park furniture

(ii) information council may request to demonstrate compliance with the performance outcomes of the code. These are contained in the following subsections:
5.6.2.1 Open space management plans
5.6.2.2 Tree management plans

(iii) guidance for applicants contained in the following subsections:
5.2.2 Paths in parks and open spacesutilities
5.3.1 Signage in parks
5.6.1 Earthworks, topsoiling, turf and landscaping
5.7.1 Types of parks

5.2 PATHS IN PARKS AND OPEN SPACES

5.2.1 Standards called up as acceptable outcomes

(1) Paths in parks and open space areas are designed in accordance with the standard drawings in section 8 of this policy.

5.2.2 Guidance for applicants

(1) Paths in parks and open space areas are to be designed to avoid proximity to thick vegetation and large trees (existing and future) to avoid damage to the path, protect vegetation and maintain adequate sight distance for cyclists.

5.3 SIGNAGE IN PARKS

5.3.1 Guidance for applicants

(1) Signage is provided in a park to facilitate land identification, and to promote safe and appropriate use.

(2) Signage should be placed in front of vegetation or other background landscaping to reduce the landscape impact.

(3) All parks signs are designed to the standards specified in *Redland City Council Parks and Conservation & Corporate Style Manual* (March 2008) which will comply with Australian Standards.

(4) Signage should include:
(i) an approved park name sign, directional signs and information signs at the primary public access point/s to the park;

(ii) information and directional sign should also be provided at the primary access point/s to the park and any sites of special interest or key points of access within the park;
(iii) warning signs are to be installed at sites of potential public risk in the park such as at creeks liable to flooding.

(5) The content of proposed descriptive and interpretive signage should be submitted for approval with the landscape plan.

5.4 UTILITIES

5.4.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO9.1, AO11.1, AO11.2, AO13.1 and AO14.1 of the Infrastructure Works Code. These standards represent the "acceptable outcome" which meets the performance outcome set out in the code.

(1) Parks are to be provided with a water supply that is a minimum of:
(i) one 25mm diameter water service for each hectare (or part) of park areas;
(ii) one water meter in all park.

(2) Sewer connections are to be provided where public toilets are likely to be installed, in accordance with the embellishment standards set out in the LGIP.

(3) Underground power reticulation is to be provided and the power supply is to be metered.

(4) Lighting is to be provided within parks:
(a) at intervals along paths that transverse parkland;
(b) points of conflict; and,
(c) at park entrances.

5.5 PARK FURNITURE

5.5.1 Standards called up as acceptable outcomes

This section sets out the standards called up in AO17.1 in the Landscape Code. These standards represent the "acceptable outcome" which meets the performance outcome set out in the code.

(1) All park furniture is designed, constructed and located in accordance with relevant Australian standards and the following principles:
(a) complements and enhances other recreation opportunities in the park;
(b) is served by a continuous accessible pedestrian path;
(c) uses low maintenance materials; and,
(d) where possible, uses alternative technology such as durable recycled materials, solar energy and rainwater harvesting.

(2) Seats are:
(a) located in areas with interesting outlooks and where they can obtain maximum shade;
(b) provided in proximity to playgrounds or active recreation nodes, around sports fields, at viewpoints and at resting points along paths; and,
(c) constructed on a concrete pad.

(3) Seating and tables complement and enhance other recreational opportunities in the park, and:
(a) are to be provided in conjunction with a playground or other activity space;

(b) are located at attractive and accessible locations or at places of special interest;
(c) have vehicular access for cleaning and maintenance purposes; and,
(d) generally include electric barbeques.

(4) Waste bins are:
(a) provided in fire proof wheelie bin enclosures;
(b) where practical, bins are located near a road or the perimeter of the park where they can be serviced without the need to drive the refuse collection truck into the park;
(c) located near BBQ areas and seats and tables; and,
(d) include dog refuse bins in adjacent to walking trails and dog off leash areas.

(5) Drinking bubblers and fountains are provided near seats and tables, playgrounds, BBQ areas, active recreation pathways, sporting nodes and dog off leash areas where visitor use is high.

(6) Playground equipment conforms to:
- AS/NZS 4486.1 - Playground and playground equipment - Development, installation, inspection, maintenance and operation; and,
- AS/NZS 4422 - Playground surfacing - Specifications, requirements and test methods.

(7) Shade structures are provided using shade ports (not sails) and are:
(a) offset to the north and west of the play elements in order to maximise the shade benefits;
(b) vandal resistant, meaning not able to be climbed on, burnt, torn, ripped or stolen;
(c) designed so that the roof is not accessible by persons at any point, particularly when standing on the highest part of the playground equipment or furniture;
(d) certified as designed and constructed in accordance with the relevant Australian Standards and the *Building Code of Australia* by a Registered Professional Engineer Queensland (RPEQ).

(8) Approved tree species may be planted where appropriate to complement the shade port and ultimately, to replace the need for shade structures.

(9) Public toilets are located and designed to:
(i) be easily maintained;
(ii) to avoid nuisance to neighbours;
(iii) within reasonable proximity to a car park or other demand source;
(iv) on suitable terrain to facilitate an accessible path of travel;
(v) provide convenient access for the elderly and disabled to the toilet facility and into at least one cubical; and,
(vi) allow for casual surveillance from surrounding streets or other sites with frequent public use.

(10) Bollards:
(i) may be required in association with infrastructure such as playground equipment; and,
(ii) should be provided at park entry points in the form of a lockable fold-down metal bollard.

5.6 EARTHWORKS, TOPSOILING, TURF AND LANDSCAPING

5.6.1 Guidance for applicants

(1) Proposed park areas are to be levelled to provide a final landform suitable for ease of maintenance and practical use by the public.

(2) Where filling is required, sufficient topsoil is provided in order to:
   (i) support the growth of flora that is compatible with the proposed use of the parkland; and,
   (ii) minimise the effects of gases, minerals, and salts in the underlying layers of earth, whether these are naturally occurring or imported.

(3) Seventy-five (75) mm compacted thickness of approved topsoil is provided over all disturbed areas within parks. Soils to be used under turfed areas needs to meet *AS 4419 – Soils for landscaping and garden use*. Such areas are to be turfed, fertilised, watered regularly and maintained.

(4) Parks are to be provided with a turf grass cover over all areas not retained as native vegetation or provided with softfall in association with play equipment. Turf is to be:

   (i) Cynodon spp (green couch) or common species eg. Wintergreen; and,
   (ii) cut from a weed free environment and is not to include any viable weed seed.

(5) Species used in landscaping within public parks is to be undertaken in accordance with Appendix B of this planning scheme policy.

5.6.2 Information that Council may request

5.6.2.1 Open space management plan

(1) An open space management plan may be required for areas of open space to be transferred into Council ownership to provide information of the ongoing maintenance and management requirements and to assist Council in determining the maintenance program and associated costs.

(2) An open space management must address:
- identification of the purpose of the open space area;
- future management and maintenance regimes for the protection of significant vegetation area, ecological systems, waterways and fauna;
- future management of bush fire hazard (where appropriate);
- ongoing management and control of weeds and pests;
- tree management procedures (refer section 5.6.2.2 Tree management plans);
- maintenance of any structures and hard surfacing; and,
- management of rubbish.

5.6.2.2 Tree management plans

(1) A tree management plan may be required to provide direction for the management of the seasonal growth of mature/maturing trees including existing trees and new tree plantings. The tree management plan must address:
   (a) tree growth to achieve the intent of the landscape design and vegetation; management plan through correct and uniform practices;
   (b) reduction of hazard development, branch failure, fungal infection or premature tree death;
   (c) reduction of the likely impact of storm damage after the site has been occupied;
   (d) formative pruning of young and developing trees where deemed necessary in accordance with *AS4373 - Pruning of Amenity Trees*;
   (e) the minimisation of any potential risk to people and property;
   (f) change of any conditions around the site during the development stages, and how changes are to be managed; and

(g) a process for annual technical reports (generally initiated annually in May/June prior to the spring growth period) and is to include provision for the supervision of any annual pruning, crown modification in accordance with *AS4373 - Pruning of Amenity Trees.*

5.7 PARK TYPES AND FUNCTIONS

5.7.1 Guidance for applicants

(1) The park function and type referred to in this section relates to the components of the open space network described in part 4.4.5 of the local government infrastructure plan (LGIP). Park functions may include:

(i) sport;
(ii) recreation;
(iii) community;
(iv) recreation corridor;
(v) ecological;
(vi) amenity;
(vii) public utility; or
(viii) unallocated.

(2) Recreation parks have the hierarchy:

a. Type 1—destination parks
b. Type 2—community parks
c. Type 3—neighbourhood parks
d. Type 4—meeting place parks
e. Type 5—civic spaces

(3) These are described generally as follows:

a. Type 1 – Destination parks

Type 1 parks have very high levels of visitation. Some type 1 parks may experience very high levels of visitation for short periods of time such as for an event or over a holiday season while others tend to have a more consistent level of visitation over the year, though there may well be variations during the week.

Major parks are provided where the opportunity arises—they may not be distributed equitably across the city. They have unique values that differentiate them from other types of recreation park.

They are usually associated with attractive natural landscapes or historic, or unique man-made features that make them very popular with residents and visitors. They may also be developed to preserve Indigenous heritage.

The level of embellishment needs to be able to support the high loads so there is often a higher level of hard surfacing, signage, barrier controls and similar. Type 1 parks generally require good public transport access or be capable of supporting significant car parking.

Type 1 parks may well have commercial ventures within or adjacent to the park and have areas suited to licensing for events.

b. Type 2 – Community parks:

Type 2 parks are spread throughout the city with most urban residents being within a short drive. All type 2 parks are, or will eventually be, connected into the city's cycleway and pedestrian network so that they are easily accessed by these forms of transport.

These parks offer a variety of activities sufficient to keep visitors entertained for several hours. They may range between 2ha and 10ha in size.

Typically the park will offer higher order play experiences for toddlers through to teenagers. Picnic facilities such as barbecues and shelters, and clean, contemporary public amenities allow for extended family and group visits.

Community events that require a park-based setting such as car rallies, markets, musical events and film nights will usually be accommodated in a type 2 park.

c. Type 3 – Neighbourhood parks

In suburban areas type 3 parks are the most common park type. Type 3 parks are usually accessed by walking or cycling and appeal to the people living within that walk or cycle catchment. The park area is usually smaller than type 1 and 2 parks and the park is often located within a residential setting. They generally range between 5000m^2 and 2ha in size.

Embellishment will be focussed on a theme such as youth play, natural area play, community gardening, exotic trees or quiet contemplation to add variety across the park type. Some parks may have relatively little embellishment whereas others are highly embellished.

Any theme-based development of this park type will be driven by the demographics and the wants and needs of the catchment community.

d. Type 4 – Meeting place parks

Type 4 parks are small green spaces located within concentrated industrial estates and commercial areas. They serve as meeting points for workers and their families or attractive places for lunch or “smoko” for outdoor workers, sales people and similar occupations who work from their vehicle during the day.

Type 4 parks are usually quite small with shaded and sunny spaces to suit the seasons. Seats, tables, rubbish bins and water are the primary embellishments. An area for a food or coffee concession-van may be set aside if required.

e. Type 5 – Civic spaces

Civic spaces are relatively small areas that are used for organised community events, rallies, performances and similar that attracts a significant crowd. As the use is often very intense there are often high levels of hard surfacing and minimal use of grass.

6.0 DOCUMENTATION

(1) This part of the policy sets out the requirements for drawing standards, design calculations, inspections, quality assurance documentation and as constructed plans.

6.1 DESIGN DRAWING STANDARDS

This part sets out the required drawing standards for engineering and landscape design drawings.

6.1.1 General

(1) Scales used for all drawings are those recommended by the Standards Association of Australia which are 1:1, 1:2.5, and 1:5 and multiples of 10 of these scales. 1:2 or multiples thereof are not desirable.

The following scales are suggested but these may be varied, as appropriate to the works concerned:

(a) plan - 1:1000 or 1:500;
(b) longitudinal section:
    (i) horizontal - 1:1000 or 1:500;
    (ii) vertical - 1:100 or 1:50;
(c) cross sections - 1:100;
(d) intersection details - 1:250;
(e) engineering details - 1:25 or 1:10.

(2) Landscape plan scales are to match with site plans, architectural and/or engineering drawing scales as applicable.

(3) Linear dimensions on all drawings are in metres, with the exception of some detail drawings of small structures such as access chambers, which may be in millimetres.

(4) Sufficient survey information/levels are obtained to enable:
(a) long sections to be shown for the centreline of all roads, stormwater drainage lines and sewerage lines, with natural surface levels nominally shown at twenty (20) metre intervals and at significant changes of grade on the natural surface;
(b) cross sections are drawn for roads and open drains nominally at twenty (20) metre intervals and at significant changes of grade on the longitudinal section; and,
(c) contours of 0.5 metre maximum intervals are drawn representing the natural surface of the land.

6.1.2 Engineering Design Drawings

(1) All engineering drawings and calculations are signed as checked and approved by a Registered Professional Engineer of Queensland (RPEQ) (Civil).

(2) Street lighting and electricity reticulation is prepared and certified by a RPEQ (Electrical) and co-ordinated and lodged by the RPEQ (Civil) who will act as the principal consulting engineer.

(3) The design includes sufficient information outside the boundaries of the premises as determined by the local government to verify that future extension of the proposed works can proceed in accordance with local government standards and without any undue cost to future development.

(4) Where the local government has approved staged development, the local government may require engineering design and construction to include the whole of the land, or

such additional parts of the land as will enable the local government to maintain the works in a satisfactory condition if the balance of the development does not proceed to completion.

(5) Engineering drawings, in general include the following:
- (a) title block;
- (b) locality plan;
- (c) layout and stage plan;
- (d) plan of each new road;
- (e) detail plans of each intersection and cul-de-sac;
- (f) longitudinal section of each road;
- (g) type cross sections;
- (h) cross sections of each road;
- (i) signs and pavement marking plan;
- (j) longitudinal section of each drainline;
- (k) stream and open channel drainage plans;
- (l) stormwater drainage catchment plan;
- (m) stormwater drainage calculations;
- (n) earthworks plan;
- (o) sewerage reticulation plan;
- (p) longitudinal section of each sewer line;
- (q) water reticulation plan;
- (r) landscape plan;
- (s) erosion and sediment control plan;
- (t) water quality control provisions; and,
- (u) electrical reticulation, street lighting and conduit plan.

(6) The following information must be included on all plans:
- (a) the local government’s file reference number;
- (b) development name, if any;
- (c) real property description;
- (d) locality;
- (e) developer's name;
- (f) scales;
- (g) origin permanent survey mark for level datum and level;
- (h) drawing number and sheet number;
- (i) schedule and date of amendments;
- (j) signed design certification;
- (k) signed check certification; and,
- (l) signed approval certification, by the relevant qualified person.

6.1.2.1 Layout and stage plan

(1) For large developments, the layout plan shows the relationship of all new roads to each other, and to existing roads adjoining the development.

(2) Where development is planned in stages, the boundaries of proposed stages are shown on the plan, and the stages identified by numbering.

(3) Existing and proposed streets which are adjacent to or fronting the proposal are included on the layout plans.

(4) All services, natural features, significant trees and the like are shown on existing road reserves.

(5) Details of the permanent survey mark, including the AHD level from which the levels were transferred, are included.

6.1.2.2 Plan of each new road

(1) The plan of each road includes:
- (a) road boundaries;
- (b) lot boundaries, both existing and proposed;
- (c) centreline or other construction line;
- (d) chainages on centreline or construction line;
- (e) bearings of the centreline or construction line;
- (f) offsets if the construction line is not the centreline;
- (g) tangent point chainages of each curve;
- (h) radius and tangent length of each curve;
- (i) road boundaries, centreline, and bearing of each intersecting road;
- (j) chainage of the intersection point of road centrelines;
- (k) channel lip lines, kerb types, lip radii and chainage of all tangent points of lip lines;
- (l) edge of pavement, where no kerb and channel is proposed;
- (m) dimensioned road, verge, footpath and pavement widths, where these differ from the standard cross section;
- (n) location and details of signs and road markings proposed;
- (o) drain line locations and diameters of pipes;
- (p) access chamber locations;
- (q) gully location tabulated to include type, chainage, centre of grate lip level, pipe diameter and invert levels;
- (r) location of existing utilities or other existing works within the site;
- (s) limits and levels of lot filling or grading;
- (t) co-ordinates of all set out points;
- (u) origin permanent survey mark for AHD and level;
- (v) origin permanent survey marks for horizontal datum and coordinates;
- (w) location and levels of survey control stations reference marks on AHD; and,
- (x) north point.

6.1.2.3 Detail plans of intersections, culs-de-sac or the like

(1) Intersection detail plans include all relevant information required for plans together with additional details such as channel lip levels on all kerb and channel returns, pavement contours and channelisation works.

(2) Lip level longitudinal grading plots for kerb returns and culs-de-sac are shown on the drawing or alternatively, photocopies of plots may be submitted for examination.

6.1.2.4 Longitudinal sections of roads

(1) The longitudinal section of each road includes:
- (a) chainages;
- (b) peg levels;
- (c) design road centreline levels;
- (d) a plot of the existing surface on the construction centreline;
- (e) design grades;
- (f) chainage and level of tangent points of vertical curves;
- (g) sight distance diagram for each direction of travel (for collector or higher order roads only); and,

(h) line marking where applicable.

6.1.2.5 Type cross sections of roads

(1) A standard cross section is shown for each road, including:
- (a) road width;
- (b) pavement widths, lip to lip dimension;
- (c) road verge widths;
- (d) concrete footpath and cycle paths;
- (e) crossfalls of pavement and road verges;
- (f) pavement depth;
- (g) type of kerb and channel; and,
- (h) type of pavement surfacing.

6.1.2.6 Cross sections of roads

(1) A cross section is shown for each chainage on each road.

(2) Cross sections show:
- (a) road boundaries;
- (b) pavement centreline, or other construction lines;
- (c) natural surface;
- (d) design cross section; and,
- (e) crossfall of pavement and road verge, pavement and road verge widths, and pavement depths, wherever these differ from the standard cross section.

(3) When existing bitumen sealed roads are widened, cross sections include the full existing sealed pavement cross section at not more than 10 metre intervals.

(4) Each cross section shows the percentage crossfall on the existing bitumen surface and the design crossfall to the lip of the proposed kerb and channel.

(5) Notations on drawings also require the supervising engineer to check for any errors between the design and the set out of the kerb and channel before the kerb and channel is constructed.

6.1.2.7 Signs and road pavement marking plans

(1) These plans show all necessary traffic lights, warning signs, regulatory signs, direction signs and pavement marking details, adequately dimensioned for accurate setting out. The sign and line marking information is on a separate set of plans to other plans referred to above.

6.1.2.8 Longitudinal sections of stormwater drain lines

(1) A longitudinal section of each drain line is shown, including:
- (a) chainages;
- (b) existing surface levels;
- (c) design invert levels;
- (d) access chamber chainages, inlet and outlet invert levels, and finished surface levels of
- (e) structures;
- (f) distances between access chambers;
- (g) grade of each pipe in percent;
- (h) diameter of each pipe length;
- (i) class of each pipe, length and type of pipe;
- (j) design discharge;
- (k) design velocity; and,

(l) design hydraulic grade line.

(2) All piped drainage and constructed or natural channels used to convey runoff as part of the development are shown on drawings.

(3) Longitudinal sections and cross sections of all channels show the calculated hydraulic grade line for the design frequency.

(4) Piped drainage is included either on the road longitudinal sections where applicable or detailed separately.

6.1.2.9 Stormwater drainage catchment plan

(1) The catchment plan shows all catchments, including external areas contributing to the stormwater drainage design, and the following:
- (a) road boundaries;
- (b) lot boundaries;
- (c) peg lines and chainages;
- (d) finished surface contours at not more than 2 metres vertical interval or 30 metres horizontal interval with spot levels where 0.5 metre contours are more than 30 metres apart, all on AHD;
- (e) identification of drainlines;
- (f) access chambers, catchpits, location and type of stormwater improvement devices or associated infrastructure; and,
- (g) drainage easements where required over underground drainlines and outlets.

(2) Waterway longitudinal sections and cross sections are included in the drainage plans at intervals not exceeding 100 metres in order to determine flood levels.

6.1.2.10 Waterway and open channel plans

(1) Engineering drawings for waterways and open channels, whether natural or constructed, include the following information:
- (a) longitudinal and cross sections with invert levels, 50 percent AEP and 1 percent AEP flood levels, and where applicable, existing and proposed surface profiles;
- (b) plans showing existing and proposed surface contours, where applicable, and 1 percent and 50 percent AEP flood lines. Additionally, show 10 percent AEP flood lines in parkland; and,
- (c) details of all proposed construction, landscaping and maintenance.

6.1.3 Landscaping Design Plans

(1) The preferred scales of landscape drawings are as follows:
- (a) concept plans - minimum 1:500 preferred 1:100/1:250;
- (b) sketch plans and working drawings - minimum 1:250; and,
- (c) construction details - minimum 1:50;

(2) Landscape design plans must include (where relevant):
- (a) north point;
- (b) plan scales that are compatible with site plans, architectural and engineering drawings;
- (c) existing site information including, but not limited to, significant vegetation, boundaries;
- (d) contours, easements and drainage lines;

(e) the proposed site layout (including proposed building footprint/s, heights and finished floor levels);
(f) adjoining structures including trees that overshadow the site;
(g) existing vegetation that is to be retained and/or removed;
(h) location of identified areas of ecological value and/or ecological corridors;
(i) location of adjoining pedestrian, bikeway and vehicular linkages;
(j) proposed planting themes and entry treatments;
(k) proposed surface treatments including paths and driveways;
(l) proposed site contours and any retaining structures
(m) location of proposed recreation facilities and/or infrastructure;
(n) drainage and open space corridors;
(o) bushfire hazard zones and fire trails;
(p) entry statements and signage treatment;
(q) indicative positions of all street furniture;
(r) proposed lighting
(s) communal and private open space areas;
(t) external storage spaces and structures, including pergolas and sheds;
(u) utility areas, clothes drying, waste and recycling storage collection areas; and,
(v) fencing height and style;

6.2 DESIGN CALCULATIONS

(1) All engineering designs are to be fully documented and include all information necessary for interpretation of design. Proprietary computer software is supported by verification procedures and details of their theoretical basis. All software used is well documented and is an extensively used product.

(2) The consulting engineer must provide an electronic copy of the data and output files for the engineering design where appropriate.

(3) Tabulated calculations for urban drainage are required, including the same information and similar format as that shown in the Queensland Urban Drainage Manual (QUDM).

(4) Revised stormwater drainage calculations are resubmitted where the drainage is redesigned.

6.3 INSPECTIONS

(1) Prior to or during the construction phase inspections must be undertaken at the hold points nominated below and at any other time in accordance with the conditions of the development approval.

6.3.1 Prestart meeting

(1) Where required, a prestart meeting between the local government's representative/s and the consulting engineer, principal contractor and other relevant parties is to be undertaken prior to any works commencing on site.

(2) The consulting engineer is to allow a minimum of five business days from the date of the inspection request and that of the prestart meeting.

(3) At the time of or prior to requesting a prestart meeting, the consulting engineer must ensure all relevant documents have been submitted to Council including any permits and payment of any bonds in accordance with the conditions of the development approval.

6.3.2 Compliance inspection

(1) Upon completion of the development, a compliance inspection is to be undertaken with the consulting engineer and other relevant parties. The compliance inspection must be undertaken prior to sealing of the survey plan or the use of the development commencing, whichever is the soonest.

(2) All relevant documentation must be provided to council five business days prior to the inspection.

6.3.3 Works to be transferred into council ownership

(1) Where works involve the construction of assets to be transferred into council ownership the following inspections and/or submission of documentation may be required.

6.3.3.1 Roads

6.3.3.1.1 Pavement design

(1) Prior to commencing any pavement works, the consulting engineer must submit to council the subgrade test results including a plan showing the location of the tests and a proposed pavement design in accordance with section 3.4.1.9 of this policy for council approval.

6.3.3.1.2 Sub grade inspection

(1) A sub-grade inspection is required with council representatives after boxing out of the road for proof rolling of the subgrade and confirmation of the depth.

(2) The consulting engineer must contact council a minimum of 24hrs prior to the proposed inspection time to request a sub-grade inspection with council representatives.

(3) Pavement works may not proceed any further until a successful sub grade inspection has been undertaken.

6.3.3.1.3 Minus 250 inspection

(1) Where the proposed pavement is greater than 400mm in depth, a minus 250 inspection must be undertaken at 250mm below the final pavement level (280mm below the final AC surface level) for proof rolling, depth confirmation and inspection of the side drains.

Note: For pavements less than 400mm a minus 250 inspection is not required, the next hold point is the pre-seal inspection.

(2) The consulting engineer must contact council a minimum of 24hrs prior to the proposed inspection time to request an inspection with council representatives.

(3) Pavement works may not proceed any further until a successful minus 250 inspection has been undertaken.

6.3.3.1.4 Pre-seal inspection

(1) A pre-seal inspection is required with council representatives at the final pavement surface level for proof rolling of the pavement and checking of the shape.

(2) The consulting engineer must contact council a minimum of 24hrs prior to the proposed inspection time to request a pre-seal inspection with council representatives.

(3) AC surfacing works may not commence until a successful pre-seal inspection has been undertaken by council.

6.3.3.2 On-maintenance Inspection

(1) An on-maintenance inspection must be undertaken upon the completion of all civil and landscaping works that are to be transferred into council ownership. All required documentation and as-constructed drawings (in accordance with section 6.4 of this policy) must be submitted to the local government a minimum of five business days prior to requesting an inspection.

(2) Once the development is accepted on maintenance the defect liability period commences which is the period for which the applicant will be liable for any defects in materials, construction, maintenance (in the case of landscaping) and/or design intent of any works that are to be transferred into council ownership.

(3) As a result of council's review of the as-constructed information and an on-maintenance inspection of the completed works, the as-constructed information or documentation may require amendment. Where amended as constructed information is required, the applicant must either submit the amended drawings or lodge a bond for the security of the preparation and submission of as-constructed information prior to on-maintenance being formally accepted by council (refer to section 7.2.5 of this policy for information regarding bonding of as-constructed information).

6.3.3.3 Defect Liability Period

(1) The defect liability period for assets to be dedicated to Council is a minimum of twelve months from the date at which the works are accepted on maintenance by Council except for:

(a) sewage pumping stations where the on-maintenance period is a minimum of 12 months commencing after a minimum of 15 equivalent tenements have been completed;

(b) landscaping works where the period may vary from a minimum of six months to a maximum of 24 months depending on the scale of development and in order to ensure establishment and survival of planted species through varying seasonal conditions; and,

(c) stormwater treatment devices where the period may vary from a minimum of 12 months to a maximum of 24 months depending on the scale of development and in order to ensure establishment and effective operation of the asset due to seasonal variations.

6.3.3.4 Off-maintenance Inspection

(1) An off maintenance inspection must be undertaken after the defect liability period has been completed and prior to formal acceptance of the works off maintenance by council.

(2) All required documentation must be provided to council a minimum of 5 days prior to requesting an off maintenance inspection.

(3) Any outstanding amended as constructed information must be finalised prior to off maintenance being accepted.

6.4 QUALITY ASSURANCE DOCUMENTATION AND TESTING

6.4.1 Documentation

(1) The following documentation must be submitted to the local government prior to requesting an on maintenance inspection:
- (a) conformance certificates for products and materials;
- (b) operating manuals;
- (c) inspection and testing certification;
- (d) copies of relevant test results (refer to checklist in Appendix C);
- (e) copies of stormwater quality device testing and certification
- (f) certification that any playground equipment or other park embellishment/street furniture has been installed or constructed in accordance with the relevant standards; and,
- (g) any other site specific testing required by the local government.

(2) An electronic copy of all documentation is to be provided in one complete assembled PDF document including a table of contents.

(3) Should any of the above test results fail to meet the local government's requirements the consulting engineer must include details of re-testing/rectification.

6.4.2 Certified Design As-Constructed Drawings

(1) Design drawings associated with the operational works approval are to be amended to reflect the final constructed works and submitted to the local government in digital (PDF) format.

(2) The following list includes specific drawings required in this format. Other drawings may be required as determined by the local government on an individual project basis:
- (a) cover sheet - locality plan, notes and details;
- (b) roadway and earthwork layout plans;
- (c) road longitudinal and cross sections;
- (d) road intersection details;
- (e) stormwater longitudinal sections;
- (f) stormwater details including access chambers, stormwater treatment devices and/or other associated infrastructure;
- (g) drainage catchment plans including plot of relevant flood lines of waterways;
- (h) drainage calculation sheets;
- (i) signing and line marking plans;
- (j) erosion and sediment control plans (final phase only);
- (k) earthworks;
- (l) landscaping plans;
- (m) level datum, permanent survey mark number and reduced level adopted from which the site datum was determined; and
- (n) the location, number and reduced level of all permanent survey marks located within the development.

(3) Each amended drawing is to show the following:
- (a) the development name and stage;
- (b) the name of the consulting engineer submitting the information;
- (c) the local government's development reference file number;
- (d) certification in accordance with the requirements above;
- (e) property and easement boundaries as shown on the approved calculated lot layout;
- (f) lot numbers as shown on the approved calculated lot layout; and

(g) approved road names.

6.4.3 Certified Digital As-Constructed Drawings

(1) Digital as-constructed information is to be submitted in accordance with the ADAC Data Capture Guidelines in Appendix D except for sewer and water assets which is in accordance with the SEQ Water Supply and Sewerage Design and Construction Code.

(2) All as-constructed engineering drawings must be certified as-constructed works by a registered professional engineer Queensland (RPEQ) in the form of a note on each drawing which confirms that it is a true and correct record of the works constructed. The required certificate is:

As-Constructed Works

It is certified that works herein have been constructed to relevant approved specifications and the operational works approval. The as-constructed drawings for these works constitutes a true and correct record of the works constructed and complies with the design intent.

Signature …… RPEQ No. ……
Date of Practical Completion……..
Company Title……

(3) All as-constructed drawings are certified as-constructed works by a registered surveyor (Queensland), in the form of a note on each drawing. This will indicate that the location, the levels and the dimensions shown thereon are a correct record of an as-constructed survey performed in accordance with the prescribed accuracy standards. The required certificate is:

As-Constructed Works

It is certified that the locations, levels and dimensions of the infrastructure shown herein are a true representation of the constructed works and that the as-constructed survey was performed to the prescribed accuracy standards.

Registered Surveyors Name…… Registration Number……

Registered Surveyors Signature…… Company Title……..

Date……..

Note: A registered surveyor is a person or a body corporate registered as a surveyor by the Surveyors Board of Queensland under the Surveyors Act 2003.

(4) The Cadastral Endorsed or Registered Surveyor Land's certification provided to the local government must confirm that:

(a) the road construction provides minimum verge widths and pavement widths in accordance with the approved engineering drawings;
(b) the stormwater drainage pipes and access chambers are within easements and/or drainage reserves provided in accordance with the development approval; and,
(c) the roof water and inter-lot drainage construction and sewerage construction are in correct relationship to property boundaries as required by the local government's standards.

6.4.4 Manuals for mechanical and electrical equipment

(1) Operation and maintenance manuals are provided covering the installation, commissioning, operation and maintenance of equipment supplied.

6.4.4.1 Standards

(1) Manuals comply with the current editions of all applicable Australian Standards, and in particular:
- (a) *AS1000: 1998 - The International System of Units, SI, and its Application;*
- (b) *AS1100: 1992 - Technical drawing - General principles;*
- (c) *AS1101: 1993 - Graphical Symbols for General Engineering;*
- (d) *AS1102: 1989 - Graphical Symbols for Electro-technology.*

6.4.4.2 Manual Detail

(1) Manuals are sufficiently comprehensive to enable local government staff to operate and maintain the equipment in an efficient and workmanlike manner.

(2) Manuals include descriptive information relating to individual items of equipment to assist personnel in becoming familiar with the equipment and its operation.

(3) Manuals include clear and concise instructions so as to allow proper and safe installation, commissioning, operation, correct maintenance, and compliance with the Manufacturer's Warranty.

(4) Such information relates specifically to the equipment as supplied. Any information which does not pertain to the equipment supplied is removed or deleted. Maintenance instructions are in sufficient detail to enable overhaul and replacement of all parts.

6.4.4.3 Submission

(1) One draft copy of the manual is submitted to the local government for review and approval. The local government will return a copy of this draft with appropriate comments. These comments are incorporated into a revised draft manual, one copy of which is re-submitted for a second review.

(2) This review by local government will not relieve the Developer of the responsibility to provide a useful and professionally prepared document.

(3) At such time when the local government's comments confirm that the manual is acceptable, the Contractor is to prepare the final manual.

(4) Provide an electronic (PDF) copy of the final manual to the local government before the works are accepted on-maintenance.

6.4.4.4 Addenda

(1) Should it become necessary to modify the final manual at some later stage, such as the inclusion of as-constructed information, the developer is to issue copies of the addenda to the local government for inclusion within the existing manuals.

(2) If, in the opinion of the local government, the addendum modifies the existing manuals extensively, the developer must re-issue the manuals completely.

6.4.4.5 Manual Construction

(1) All units are SI units.

(2) All information is in English.

(3) All data sheets for proprietary equipment plant are clearly reproduced and are to indicate the appropriate information pertinent to the installation.

(4) The title and drawing number, issued by the local government, is displayed on the front cover and spine of the document to enable the manual to be included in the drawing register.

6.4.4.6 Content

(1) As a minimum, the document contains:
- (a) equipment specification, including a complete system description and a full specification for each individual item of equipment;
- (b) a complete listing of the plant, equipment, valves, pipes and other items supplied and installed, including model and serial numbers;
- (c) functional description of its operation;
- (d) erection, assembly, installation, pre-commissioning and commissioning instructions and diagrams;
- (e) detailed operating instructions;
- (f) service and maintenance schedule and instructions including dismantling/assembly procedures and a table of maintenance tasks showing recommended time intervals between carrying out these tasks;
- (g) lubrication schedule, including details of lubricant types, grades and trade names, initial fill quantities, and re-lubrication quantities and intervals;
- (h) tabulation of all consumables excluding lubricants but including fuel type and quantity, electrical components, chemicals and other relevant data; and,
- (i) performance specification, including commissioning data.

6.5 SURVEY CONTROL

6.5.1 Horizontal Control

(1) The local government will supply without charge, the co-ordinates to be adopted for three or more survey control points, within the survey control network, adjacent to the development site.

(2) Where coordinated permanent survey marks are not available within 500 metres of the premises, the developer is responsible for:
- (a) establishing at least two permanent survey marks not less than 200 metres apart. Existing permanent survey marks, where available, may be adopted where ever they are secure;
- (b) coordination of these permanent survey marks on MGA coordinates to 3rd order, class C accuracy standards (< 0.03m positional uncertainty horizontally) as per the Inter-governmental committee on surveying and mapping standards and practices for control surveys (SP1); and,
- (c) informing the local government and Department of Natural Resources and Mines (DNRM) of the method used in coordination, accuracy of coordinates and the coordinates determined for each of these permanent survey marks.

(3) All digital as-constructed information is supplied MGA coordinates.

6.5.2 Level Datum

(1) All levels supplied with As-Constructed information are reduced to and presented on Australian Height Datum (AHD).

(2) The local government will provide the reduced level to adopt for a permanent survey mark. The value provided is obtained from the local government's listing of DNRM survey control database and may vary from the value shown on the permanent survey mark sketch plan.

(3) For the extension of an existing development, as in staging, the reduced level provided for the initial permanent survey mark is adopted for the extension unless directed otherwise by the local government.

6.5.3 Permanent Survey Marks

(1) Permanent survey marks are placed on each development. Permanent survey marks are placed such that their spacing is not greater than 500 metres and not less than 100 metres.

(2) All permanent survey marks are connected to the cadastral boundaries of the development site and such connections are shown on the relevant cadastral survey plan. This is to include those marks used as horizontal control for the development works.

(3) Permanent survey marks are levelled to 4th order, class D (< 0.02m positional uncertainty horizontally) as per the Inter-governmental committee on surveying and mapping standards and practices for control surveys (SP1).

(4) A permanent mark sketch plan is completed and lodged with DNRM for each permanent survey mark placed. A copy of the sketch plan is submitted to the local government before the development will be approved for off-defect.

(5) Any permanent survey marks that cannot be located or are lost due to any associated development works are reported to the local government and DNRM for update of their Survey Control Database.

6.5.4 Survey Plans

(1) Survey plans submitted for sealing and registration must show the approved road names.

7.0 BONDING

7.1 RELATIONSHIP WITH THE PLANNING SCHEME

(1) This part sets out:

(i) guidance for applicants on the requirements for submission and return of security bonds. This is contained in the following subsections:
7.2.1 Types of security bonds
7.2.2 Performance bonds
7.2.3 Significant vegetation protection bonds
7.2.4 Uncompleted works bonds
7.2.5 As-constructed information bonds
7.2.6 Defect liability bonds
7.2.7 Form of security bonds
7.2.8 Deeds of agreement

7.2 SECURITY BONDS

7.2.1 Types of Security Bonds

(1) The five broad categories of security bonds are:
(a) performance bonds;
(b) significant vegetation protection bonds;
(c) uncompleted works bonds;
(d) as-constructed information bonds; and,
(e) defect liability bonds.

7.2.2 Performance Bonds

(1) Performance bonds are security bonds submitted to the local government prior to development works commencing, to secure the completion and fulfilment of specific conditions/works.

(2) The bond amount is subject to the type and scale of works carried out.

(3) Performance bonds must be submitted with the relevant submission of security bonds form and any other required documentation as outlined in the condition prior to a pre-start meeting or prior to development works commencing in the case where a pre-start meeting is not required.

(4) Performance bonds are refundable once the development is formally accepted on maintenance and the relevant refund of security bonds form is submitted to council.

(5) Where the condition/works are not completed to the satisfaction of the local government and in accordance with any relevant standards, the bond may be forfeited to cover the cost of the works.

7.2.3 Significant Vegetation Protection Bonds

(1) Significant vegetation protection bonds are security bonds submitted to the local government prior to the commencement of development works to secure and protect significant vegetation which has the potential to be detrimentally affected by the works.

(2) The bond amount is calculated by Council using tree evaluation methods which includes the cost to cover removal of the vegetation and replacement with the same species and maturity of vegetation (where this is possible).

(3) Significant vegetation protection bonds must be submitted with the relevant submission of security bonds form and any other required documentation prior to a pre-start meeting or prior to development works commencing in the case where a pre-start meeting is not required.

(4) Significant vegetation protection bonds are refundable upon completion of a minimum 12 month post-construction monitoring period (unless otherwise determined by the arborist) from the date all construction works are completed.

(5) Prior to the return of the bond, a report from a suitably qualified arborist (AQF level 5) must be provided which states that the vegetation is in sound health and confirms that the construction works have not had an adverse impact on the viability of the protected significant vegetation.

(6) Where the tree is found to be in poor health, and where recommended by the arborist, a further monitoring period may be agreed to by Council.

(7) In the event of decline or death of the vegetation, the bond will be forfeited to cover the cost of removal of the vegetation and replacement (where possible).

7.2.4 Uncompleted Works Bonds

(1) Uncompleted works bonds are security bonds submitted to the local government prior to the completion of development works, to cover the costs of all uncompleted works to enable council approval of the survey plan.

(2) Council may accept an uncompleted works bonds subject to (but not limited to) completion of the following level of works as detailed in the table below.

Table 1 - Level of Completion of Works

Type of Works	Level of Completion of Works
Construction and Earthworks	(1) 100 percent of bulk earthworks are completed and stabilised to the local government's satisfaction including the completion of any retaining walls; (2) 100 percent of the kerb and channel is completed to the local government's satisfaction; (3) Roads are certified by a registered surveyor that the roads are within the correct alignment, where applicable; (4) 50 percent of the total value of construction works are completed to the local government's satisfaction; (5) All testing results (including RPEQ certification for retaining structures) and preliminary as-constructed information is provided to the local government.
Sewerage and Water Supply Works	(1) 100 percent of the total value of sewerage and water supply works, including external and internal reticulation, are completed to the local government's satisfaction; (2) All testing results and preliminary as-constructed information is provided to the local government.

(3) The bonding of uncompleted works relating to erosion and sediment control is generally not permitted.

(4) Prior to approval of the survey plans, council must be satisfied that all works and services will be completed and operational within three months of the date of approval of the plan of survey. A written undertaking from the supervising RPEQ to this effect will be required at the time of submission of the bond request.

(5) The uncompleted works bond is to the greater value of either -
(a) 150 percent of the estimated uncompleted works costs; or
(b) $5000.

(6) For all uncompleted works council requires a fully priced bill of quantities[25] certified by an RPEQ detailing the works completed and the works still outstanding.

(7) The applicant must lodge a formal request with council which must include the following (where applicable):
(a) the relevant bond submission form;
(b) all QA documentation for the completed works;
(c) as constructed plans for the completed works; and,
(d) a bill of quantities (signed by an RPEQ).

(8) After the bond submission is reviewed, council will confirm agreement of the proposed security bond amount with the applicant.

(9) Uncompleted works bonds are refundable once the development has been accepted on maintenance and all uncompleted works finalised and the relevant return of security bonds form is submitted to council.

(10) Where the works are not completed to the relevant standard within a reasonable timeframe, the bond may be forfeited to cover the cost of the works.

(11) Where agreed to by Council, bond reductions may be accepted. A request for a bond reduction must be accompanied by a fully price bill of quantities, updated as constructed plans and quality assurance documentation (where relevant) and the relevant return of security bond form.

7.2.5 As-Constructed Information Bonds

(1) As constructed information bonds are security bonds submitted to the local government prior to formal acceptance of the development works on maintenance, to secure the completion of the associated as constructed plans. Once the bond is received and reviewed, the development may be accepted on maintenance by council.

(2) The bond amount is calculated in accordance with Table 1 below.

[25] a bill of quantities is a fully priced itemised list, certified by an RPEQ, of the assets to be transferred to council ownership.

Table 1: As-constructed bond calculation

ROL or MCU	
Number of lots or units	**Charge per lot or unit**
Up to 5	$ 550
6 – 10	$ 500
11 – 40	$ 450
40 – 60	$ 440
Over 60	$27,000 flat rate
Non-residential MCU	$2,500 or 2.5% of the civil construction costs (whichever is greater)

(3) Amendments to as-constructed drawings or documentation required by council are to be completed and the information resubmitted to the satisfaction of council a maximum of 1 month after the date of on maintenance.

(4) As-constructed bonds must be submitted with the relevant submission of security bonds form.

(5) The bond will be returned upon acceptance of the final as-constructed plans and submission of the relevant return of security bonds form.

(6) Non-compliance with resubmission of amended as-constructed information within this period may result in:
- (a) the defect liability period being extended until the as-constructed data is submitted to council; or
- (b) the as-constructed information bond being forfeited to cover all costs incurred by council for the capture and presentation of the information.

7.2.6 Defect liability bonds

(1) Defect liability bonds are security bonds submitted to council prior to formal acceptance of the development on maintenance for all assets to be transferred into council ownership and cover the cost of repair/replacement of defective assets and landscaped areas, during the defect liability period.

(2) All assets and landscaped areas that are to be transferred into council ownership must undergo a defect liability period as specified by the conditions of the development approval/s.

(3) For landscaped areas, the areas must be maintained during the defect liability period in accordance with the approved maintenance program and any applicable condition of approval. Where there is a significant loss of plants (as determined by council), the plants must be replaced and a minimum 3 month establishment period undergone prior to the landscaping being accepted off maintenance.

(4) For civil works, all assets to be transferred into council ownership must be repaired/replaced where there is any defective work or where the assets do not meet the design intent prior to the development being accepted off maintenance.

(5) The defect liability period commences following formal acceptance of the works on maintenance by council.

(6) The defect liability bond is the greater value of either:
(a) 10% of the contributed assets; or
(b) $2500.

(7) A fully priced bill of quantities certified by a RPEQ must be submitted to council detailing the development works that are to be transferred into council ownership.

(8) Defect liability bonds are refundable upon council acceptance of the development off maintenance and submission of the relevant return of security bonds form.

(6) In the event that there are defective works that are not rectified the bond may be forfeited to cover the cost of the works.

7.2.7 Form of security bonds

(1) Security bonds submitted to the local government may be in the form of either:

(a) cash; or
(b) bank guarantees.

(2) Cash security bonds may be paid in the form of a cheque. However, in the case of the personal cheque, the security bond will not be processed and approved until the cheque amount is cleared.

(3) The local government will not accept any other form of security bonds other than those outlined above unless detailed in an infrastructure agreement or conditioned under a development approval.

(4) The local government requires security bonds to be submitted to the local government in the form of cash for the following development works:

(a) road cleaning;
(b) road opening;
(c) vegetation protection for amounts of $10 000 and less.

(5) The local government requires bank guarantees that:

(a) are irrevocable guarantees from a recognised trading bank;
(b) are open ended with no expiry date;
(c) are unconditional;
(d) detail the full and correct name of the customer/applicant;
(e) detail the full and correct real property description to identify the property for which the security bond is for;

(f) where applicable, detail the different types of bonds, the relevant amounts covered by the guarantee, and a statement describing the specific purpose(s) of the bond;
(g) give the council development approval number/s; and,
(h) are for the total secured sum.

7.2.8 Deeds of Agreement

(1) For security bond amounts:

(a) between $250 000 and $500 000 - the local government requires a standard deed of agreement to be signed by the applicant and a delegate of the council which specifies the required security bond amount/s; or

(b) greater than $500 000 - the local government requires a security bond agreement, prepared by the local government's solicitors, to be signed by the applicant, any party holding a mortgage over the property and a delegate of the council which specifies the required security bond amount/s. The cost of the preparation of the security bond agreement is to be borne by the applicant.

8.0 STANDARD DRAWINGS

8.1 GENERAL

Topic	Drawing No	Title
Fencing	IPWEA GS-042	Fencing – Log Barrier and Alternative Hardwood Timber Bollard
	IPWEA GS-043	Fencing – Locking Rail Types 1, 2 and 3
	IPWEA GS-044	Fencing – Tubular Steel Fence With & Without Chain Wire
	IPWEA GS-045	Fencing – Welded Mesh Fencing and Control Fence
	IPWEA GS-047	Fencing – Entrance Barrier – Single Swing Gate
	IPWEA GS-048	Fencing – Entrance Barrier – Double Swing Gate

8.2 STORMWATER DRAINAGE AND WATER QUALITY

Topic	Drawing No	Title
Access chamber	IPWEA DS-010	Access Chamber – Stormwater Access Chamber Details – 1050 to 2100 dia.
	IPWEA DS-015	Access Chamber – Manhole Frame – Roadway and Non-Roadway – 1050 to 2100 dia.
	IPWEA DS-018	Access Chamber – Manhole Riser Details (Roadway)
	IPWEA DS-019	Access – Chamber – Manhole Cover (Roadway) 1050 to 2100 dia
	IPWEA DS-020	Access Chamber – Manhole Cover (Non -Roadway) 1050 to 2100 dia
	IPWEA DS-021	Access Chamber – Manhole Cover Concrete Infill (Pedestrian Traffic) 1050 to 2100 dia
Bedding and backfilling	IPWEA DS-030	Excavation, Bedding and Backfilling Rigid & Flexible Drainage Pipes
	IPWEA DS-031	Excavation, Bedding and Backfilling Precast Box Culverts
Erosion and sediment control	IPWEA DS-040	Sediment Control – Sediment Control Devices – Sediment Fence – Entry/Exit Sediment Trap
	IPWEA DS-041	Sediment Control – Sediment Control Devices – Kerb and Field Inlets – Check Dams & Straw Bales
Drainage pits	IPWEA DS-050	Drainage Pits – Field Inlet – Type 1 and Type 2
	IPWEA DS-061	Drainage Pits – Kerb Inlet – Precast Lintel Details
	IPWEA DS-062	Drainage Pits – Kerb Inlet – Grate and Frame
	IPWEA DS-063	Drainage Pits – Kerb Inlet – Lip in Line – General Arrangement
	IPWEA DS-069	Drainage Pits – Field Inlet Pit – Dome Top Cover (900 x 600)
Bioretention	IPWEA DS-070	Bioretention Drainage Profile – Type 1 – Saturated Zone – Unconstrained
	IPWEA DS-071	Bioretention Drainage Profile – Type 1 – Saturated Zone – Constrained
	IPWEA DS-072	Bioretention Drainage Profile – Type 2 – Sealed
	IPWEA DS-073	Bioretention Drainage Profile – Type 3 – Conventional
	IPWEADS074IPW	Bioretention Drainage Profile – Type 4 – Pipeless
	IPWEA DS-075	Large Bioretention Sediment Forebay
	IPWEA DS-076	Bioretention Weir
	IPWEA DS-077	Bioretention Street Tree
	IPWEA DS-078	Bioretention Standard Notes
Inlet screen	IPWEA DS-082	Drainage Details – Culvert Inlet Screen

8.3 ROADS

Topic	Drawing No	Title
Driveways	R-RCC-1	Domestic Driveway Crossover
	R-RCC-2	Commercial/Industrial/Multiple Dwelling/Apartment Building Driveway Crossover (Type A)
	R-RCC-3	Commercial/Industrial Driveway Crossover (Type B)
	IPWEA RS-056	Driveways – Rural Driveway
Footpaths	R-RCC-4	Concrete Footpath and Shared Use Paths
	R-RCC-5	Footpath Profile
Utilities in road reserve	R-RCC-6	Public Utilities in Road Reserve – corridors and alignments
	R-RCC-7	Public Utilities in Road Reserve – conduit sections
Kerb and channel	IPWEA RS-080	Kerb and Channel – Profiles and Dimensions – Including Edge Restraints, median & Channel
	IPWEA RS-081	Kerb and Channel – Residential Drainage Connections
Kerb ramps	IPWEA RS-090	Kerb Ramps – Ramped Pedestrian Crossings
	IPWEA RS-091	Kerb Ramps – Ramped and Cut Through Treatments – For Pedestrian Crossings, Slip Lanes and Medians
	IPWEA RS-092	Kerb Ramps – Installation of TGSIs – on Ramped Kerb Crossings
	IPWEA RS-093	Kerb Ramps – Installation of TGSIs – on Ramped Kerb Crossings – Application Examples
	IPWEA RS-094	Kerb Ramps – Locations and Configurations
Signs	IPWEA RS-130	Road Furniture - Street Name Sign and Location (Fingerboard)
	IPWEA RS-131	Road Furniture – Traffic Sign Installation Details
Subsoil drains	IPWEA RS-140	Subsoil Drains – Details and Location
	IPWEA RS-142	Subsoil Drains – Access Points
Pavement trenching and widening	IPWEA RS-170	Pavement Extension – Trenching and Widening

8.4 CYCLEWAYS

Topic	Drawings No	Title
Entrance control	IPWEA PS-010	Bikeway Entrance Control – Type 1 – Low Volume
	IPWEA PS-011	Bikeway Entrance Control – Type 2 – High Volume
	IPWEA PS-013	Bikeway Slowdown Control – Reverse Curve
	IPWEA PS-015	Bikeway Entrance Control – Offset Chicane
Deflection rail	IPWEA PS-016	Bikeway Furniture Details – Deflection and Rest Rail Detail

8.5 LANDSCAPING

Topic	Drawings No	Title
Street tree planting	IPWEA GS-010	Landscaping – Street Tree Planting Details Including Root Barrier
	IPWEA GS-011	Landscaping – Street Tree Planting Details Wide Median
	IPWEA GS-012	Landscaping – Street Tree Planting Details Narrow

APPENDIX A

EROSION AND SEDIMENT CONTROL FORMS AND CERTIFICATION

REDLAND CITY COUNCIL

Erosion Hazard Assessment

Redland City Council (RCC), *Erosion Hazard Assessment* must be read in conjunction with the *Erosion Hazard Assessment-*

What is an Erosion Hazard Assessment (EHA)?
Soil erosion and sediment from urban development, particularly during construction activities, is a significant source of sediment pollution in Redland's waterways. The Erosion Hazard Assessment determines whether the risk of soil erosion and sediment pollution to the environment is 'low' , 'medium' or 'high'.

When is the EHA required?
An *Erosion Hazard Assessment* form must be completed and lodged with RCC for any Development Application (ie MCU or ROL) that will result in soil disturbance OR Operational Works or Compliance Assessment Application for 'Filling' or Excavation.

Failure to submit this form during lodgement of an application may result in assessment delays or refusal of the application.

Assessment Details

1 Please turn over and complete the erosion hazard assessment.

2 Based on the erosion hazard assessment overleaf, is the site:

☐ ***A 'low' risk site***

Best practice erosion and sediment control (ESC) must be implemented but no erosion and sediment control plans need to be submitted with the development application. Field guides for best practice ESC can be found at http://www.austieca.com.au/publications/book-5-field-guides

☐ ***A 'medium' risk site***

If the development is approved, the applicant will need to engage a Registered Professional Engineer (RPEQ) or Certified Professional in Erosion and Sediment Control (CPESC) to prepare an ESC Program and Plan and supporting documentation — in accordance with the requirements of the Infrastructure Works Planning Scheme Policy.

☐ ***A 'high' risk site***

If the development is approved, the applicant will need to engage a RPEQ and CPESC to prepare an ESC Program and Plan and supporting documentation — in accordance with the requirements of the Infrastructure Design Planning Scheme Policy. The plans and program will need to be certified by a CPESC.

Taken and modified from Brisbane City Councils EHA

3 Site Information and Certification

Application number (if known)

Site address

Postcode

I certify that:

☐ I have made all relevant enquiries and am satisfied no matters of significance have been withheld from the assessment manager.

☐ I am a person with suitable qualifications and/or experience in erosion and sediment control.

☐ The Erosion Hazard Assessment was completed in accordance with the RCC Infrastructure Design Planning Scheme Policy.

☐ The Erosion Hazard Assessment accurately reflects the site's overall risk of soil erosion and sediment pollution to the environment.

☐ I acknowledge and accept that the RCC, as assessment manager, relies, in good faith, on this certification as part of its development assessment process and the provision of false or misleading information to the RCC constitutes an offence for which RCC may take punitive steps/ action against me/ enforcement action against me.

Certified by *Print name*

Certifier's signature

Date

/ /

Assessment Table

Table 1: Low Risk Test

		Yes	*No*
1.1	Is the area of land disturbance > 1000 m^2		
1.2	Does any land disturbance occur in a RCC Waterways, Wetland and Moreton Bay overlay area.		
1.3	Does any land disturbance occur in a RCC Landslide Hazard overlay or is there any slope on site during or after construction that is steeper than 15%, and longer than 3 m in length.		
1.4	Does any land disturbance occur below 5 m AHD		
1.5	Does development involve endorsement of a staging plan		
1.6	Is there an upstream catchment passing through the site > 1 hectare		

Have you answered 'yes' to any of the questions in Table 1?	*Yes*	*No*	**If '*No*' then site is low risk with respect to erosion and sediment control**

If '*Yes*' then proceed to Table 2

Table 2: Medium Risk Test

		Yes	*No*	
2.1	Is the area of land disturbance > 1 hectare			**If '*No*' then site is <u>medium risk</u> with respect to erosion and sediment control**

If '*Yes*' then proceed to Table 3

Table 3: High Risk Test

3.1	Is there an upstream catchment passing through the site > 1 hectare		
3.2	Have you answered yes to 1.2 above (Water ways)		
3.3	Have you answered yes to 1.3 above (Steep Slope)		

Have you answered 'yes' to any of the questions in Table 3?	*Yes*	*No*	**If '*No*' then site is <u>medium risk</u> with respect to erosion and sediment control**

If '*Yes*' then site is <u>high risk</u> with respect to erosion and sediment control

REDLAND CITY COUNCIL

DESIGN CERTIFICATE

Erosion and Sediment Control

This form is to be completed and signed by the suitably qualified and experienced professional responsible for the preparation of the Erosion and Sediment Control Plan (ESCP).

Name of Development: _____

Location of Development: _____

Land Owner: _____

Supervising Engineer: _____

Related or Higher-Order Approval Number: _____

Operational Works Approval Number: _____

Drawing/Report Numbers for documents associated with this Certification: _____

MANDATORY INFORMATION: You are required to answer the following question. If the answer to the question is "NO", provide details of how compliance with the Conditions of the Development Permit will be achieved

	YES	NO
Is the ESCP and associated documentation in accordance with the requirements of the Conditions of the Development Permits which apply to the site	❑	❑

DETAILS IF THE QUESTION IS ANSWERED "NO": (Provide details of how compliance with the Conditions of the Development Permits and obligations of the *Environmental Protection Act 1994* will still be achieved). Use separate sheet if necessary.

_____

_____

_____

_____

CERTIFICATION

I certify that this information has been provided in accordance with Council's requirements and that, having made all relevant enquiries, I am satisfied that no matters of significance have been withheld from Council's Delegate. This form was completed by myself, or under my direct supervision, and I am suitably qualified and/or experienced to provide such certification. The information submitted is, to the best of my knowledge and belief, true, accurate and complete. I acknowledge and accept that the Council, as the administering authority relies, in good faith, on this certification as part of its

development approval process and that the provision of false or misleading information to the Council constitutes an offence against the *Sustainable Planning Act 2009.*

Certified By (print name in full): _____

RPEQ No or CPESC No: _____

P.I. Insurance No. & Company: _____

_____

Certifier's Signature: **Date:** _____

REDLAND CITY COUNCIL

INSPECTION CERTIFICATE

Erosion and Sediment Control

This form is to be completed and signed by a suitably qualified and experienced professional.

Name of Development: _____

Location of Development: ____

Land owner: _____

Inspected by (Name/Company): _____

Related or Higher-Order Approval Number: _____

Operational Works Approval Number: _____

Construction Stage/Hold Point: ____

Time and Date of inspection: _____

MANDATORY INFORMATION: You are required to answer the following question:

	YES	NO
(a) In regard to erosion and sediment control, at the time of inspection, was the development site in compliance with the development permits applicable to the works.	❑	❑

If answered "NO" to Question a) then complete Question b)

(b) Has specific advice been given to the applicant, which if implemented, will achieve compliance with the development consent and the obligations and duties of the *Environmental Protection Act 1994*	❑	❑

DETAILS IF QUESTION a) ANSWERED "NO": Provide a summary of the advice issued to the Land owner to ensure compliance with the Conditions of the Development Permit and obligations under the *Environmental Protection Act 1994* will be achieved. Use separate sheet if necessary _____

_____

_____

CERTIFICATION

I certify that this information has been provided in accordance with Council requirements and that, having made all relevant enquiries, I am satisfied that no matters of significance have been withheld from Council's Delegate. This form was completed by myself, or under my direct supervision, and I am suitably qualified and/or experienced to provide such certification. The information submitted is, to the best of my knowledge and belief, true, accurate and complete. I acknowledge and accept that the Council, as the administering authority relies, in good faith, on this certification as part of its development process and that the provision of false or misleading information to the Council constitutes an offence against the *Sustainable Planning Act 2009.*

Certified By (print name in full): _____

RPEQ No or CPESC No: _____

P.I. Insurance No. & Company: _____

_____

Certifier's Signature: **Date:** _____

APPENDIX B

Tree Species List

Botanical Name	Common Name	Height	Canopy Width	Canopy Type				E/green	Endemic	Planting Location			Soil Type			Plant under P/lines	Flower Characteristics	
				S	M	L	U			Street	Narrow Verge (<2m)	Park	Coastal	Alluvial	Hilly Terrain of Hinterland		Colour	Months
Acmena hemilampra	Broad Leaved Lilly Pilly	6-12m	5m		●			●		●			●				White	O,N
Acmena smithii	Lilly Pilly	5-8m	3m		●			●		●			●	●			White	S,O,N,D,J,F
Agathis robusta	Kauri Pine	20m	8m				●	●		F		●		●	●			
Alectryon connatus	Grey Bird's Eye	18m	6-8m		●			●		●			●				Yellow	F,M
Alectyron coriaceus	Beach Bird's Eye	4-5m	2-3m	●				●	●	●	●		●				Yellow	D,J,F
Allocaasuarina littoralis	Coastal Sheoak	10m	3-5m		●			●				●	●				Red	M,A,M
Allocasuarina torulosa	Forest Oak	10-15m	5-8m		●			●				●		●			Red	S,O,N,D,J,F
Araucaria cunninghamii	Hoop Pine	50m	6-8m				●	●		F		●	●	●	●			
Araucaria hetrophylla	Norfolk Island Pine	60m	8-10m				●	●		F		●	●					
Backhousia citriodora	Lemon Scented Myrtle	3-6m	2-4m	●				●		●	●		●	●	●		White	D,J,F,M
Banksia aemula	Wallum Banksia	5m	2-3m	●				●		●	●			●			Yellow	M,A,M,J
Banksia integrifolia	Coastal Banksia	5m	2-3m	●				●		●	●	●	●				Yellow	J,F,M,A,M,J
Banksia oblongifolia	Fern Leaved Banksia	2m	1-2m		●			●				●	●				Yellow	M,A,M,J,J
Brachychiton acerifloius	Illawarra Flame Tree	10m	4-6m		●							●		●	●		Red	D,J,F
Brachychiton bidwillii	Little Kurrajong	6-8m	2-3m		●							●		●	●		Red/Pink	D,J,F
Buckinghamia celsissima	Ivory Curl	5-8m	2-4m	●	●			●		●	●			●	●	●	Cream/Yellow	J,F,M
*Callistemon viminalis**	Weeping Bottlebrush	2m	3m					●		●			●	●			Red	O,N,D,J,F
*Callistemon viminalis**	Dawson River'	5m	2-3m	●				●		●	●		●	●	●	●	Red	S,O,N,D,J,F
*Callistemon viminalis**	Hannah Ray'	5m	2-3m	●				●		●	●		●	●	●	●	Red	S,O,N,D,J,F
Callitris columellaris	Bribie Island Pine	10m	4-6m			●		●				●	●					
Casuarina equisetifolia	Horse tail Sheoak	10-15m	4-6m		●			●				●	●				Red	S,O
Casuarina glauca	Swamp Oak	10-20m	4-8m		●			●				●	●	●			Red	S,O
Corymbia cirtriodora	Lemon Scented Gum	30m	10-15m			●		●				●		●	●		Cream/White	D,J,F,M
Corymbia intermedia	Pink Bloodwood	30m	10-12m			●		●	●			●		●	●		Cream/White	D,J,F
Cryptocarya laevigata	Glossy Laurel	6m	2-3m		●			●				●		●			Cream/White	O,N
Cryptocarya triplinervis	Three Veined Laurel	12m	4m		●			●	●			●		●			Green	S,O,N
Cupaniopsis anacardioides	Tuckeroo Tree	8-12m	4-5m		●			●		●		●	●			●	Yellow	D,J,F
Delonix regia	Poinciana Tree	8-15m	8-10m			●		●		F		●	●	●	●		Red/Orange	N,D,J
Elaeocarpus eumundii	Eumundii Quandong	8-12m	4m				●	●		●				●	●		Cream	N,D
Elaeocarpus grandis	Blue Quandong	15-25m	8m			●		●				F		●	●		White	M,A,M
Elaeocarpus obovatus	Hard Quandong	10-15m	4-5m		●			●		●			●	●			White	D,J,F,M
Elaeocarpus reticulatus	Blueberry Ash	5-6m	3-4m	●	●			●		●	●			●	●		White/Pink	D,J,F
Eucalyptus microcorys	Tallow wood	30m	5-10m			●		●		A		●		●	●		White	J,A,S,O,N
Eucalyptus pilularis	Blackbutt	25m	10m			●		●				●		●	●		White	S,O,N,D,J,F,M
Eucalyptus resinifera	Red Mahogany	15-20m	5-10m			●		●				●		●	●		White	O,N,D.J.F
Eucalyptus tereticornis	QLD Blue Gum	20m	5-10m			●		●				●		●	●		White	J,J,A,S,O,N
Corymbia tessellaris	Moreton Bay Ash	35m	10-15m			●		●				●		●	●		White	J,A,S,O,N
Ficus macrophylla	Moreton Bay Fig	30m	20m			●		●	●			F	●	●	●			
Ficus obliqua	Green Leafed MB Fig	10m	5-8m		●			●	●			F		●	●			

Flindersia australis	Crows Ash	10m	5-8m		●			●		●							Cream/White	S,O,N
Flindersia brayleana	Queensland Maple	10m	4-8m		●			●		●				●	●		Cream/White	S,O,N,D,J,F
Flindersia xanthoxyla	Yellow wood	10m	4-8m		●			●	●	●				●	●		Cream/White	D,J,F
Gmelina leichardtii	White Beech	6m	3-4m		●			●				●		●	●		Cream	S,O,N
Grevillea baileyana	White Oak	6m	2-4m	●	●			●		●	●			●	●		White	M,J,J
Guoia semiglauca	Guoia / White Quince	5-6m	2-3m	●	●			●	●	●	●		●	●		●	White	S,O,N
Harpullia pendula	Tulipwood	5-6m	2-3m	●	●			●		●	●			●	●		Yellow/Green	S,O,N,D
Hibiscus tiliaceus	Cottonwood	10m	5-10m		●			●				●	●				Yellow	D,J,F
Lepiderma pulchella	Fine Leaf Tuckeroo	5m	2-3m	●	●			●		●	●		●	●			Yellow	D,J,F
Leptosernum petersonii	Lemon Scented Tea Tree	5m	2-3m	●				●		●	●		●	●		●	White/Pink	D
Lophostemon confertus	Brushbox	8m	4-5m		●			●		A		●		●	●		White	O,N,D
Lophostemon suaveolens	Swamp Mahogany	15m	5-8m		●			●		A		●		●	●		White	D,J,F
Magnolia grandiflora 'Little Gem'	Magnolia 'Little Gem'	6m	2-4m	●	●			●		●	●			●	●	●	White	S,O,N
Melaleuca linarifolia	Snow in Summer	12m	5m	●	●			●		●	●	●		●		●	Cream/White	S,O,N
Melaleuca quinquenervia	Broad leafed paperbark	10-15m	5-10m			●		●	●			●	●	●			Cream	S,O,N,D,J,F,M,A
Melia azederach	White Cedar	10m	2-4m		●							●		●			Mauve	S,O,N
Pandanus pendunculatus	Screw Pine	7m	4-6m		●			●				F	●					
Peltophorum pterocarpum	Yellow Flame Tree	15-20m	10-15m			●						F		●	●		Yellow	O,N,D,J,F
Podocarpus ellatus	Brown Pine	10m	2-3m		●			●		F		F		●	●			
Syzygium australae	Shrub Cherry	8m	2-3m		●			●		●		●	●	●	●		White	S,O,N
Syzygium jambos	Rose Apple	8m	4-6m			●		●		●		●		●	●		White	O,N,D
Syzygium leuhmanii	Riberry	8m	2-4m		●			●	●	●		●	●	●	●		White	O,N,D
Syzygium oleosum	Blue Lilly Pilly	8m	2-4m		●			●	●	●		●		●			White	N,D,J,F,M,A,M
Tabebuia chrysanthus	Yellow Tabebuia	8m	3-5m	●	●					●	●		●	●			Yellow	S,O,N
Tabebuia palmeri	Pink Trumpet Tree	8m	3-5m	●	●					●	●		●	●			Pink	S,O,N
Tabebuia rosea	Pink Trumpet Tree	8m	3-5m		●					F			●	●			Pink	S,O,N
Tristaniopsis laurina	Water Gum	8m	4-6m		●			●		●			●	●			Yellow	D,J,F
Waterhosia floribunda	Weeping lilly Pilly	10m	5-6m		●			●		●				●			White	S,O,N,D,J,F
Xanthostemon chrysanthus	Golden Penda	5-6m	2-3m	●	●			●		●	●		●	●		●	Yellow	S,O,N,D,J,F

Legend

Canopy Width

S - up to 6m

M - 6 to 15m

L - Larger than 15m

U - Upright tree habit

Only on North Stradbroke Island

Only for Main Road Wellington Point, Colburn Ave Vic Point, Wellington St Ormiston, Bloomfield St Cleveland

Planting Location

F - Feature tree

A - Subject to Council approval

Appendix C

On-Maintenance Checklist and Certification

Development Application Number: .....

Address:……..

	N/A	Attached
Certified As-Constructed Drawings		
Digital (ADAC) as-constructed drawings	☐	☐
Design as-constructed drawings	☐	☐
Inspection and Testing Documentation		
General		
RPEQ certification	☐	☐
Earthworks		
Compaction of fill	☐	☐
Level 1 report (certified by an RREQ)	☐	☐
Retaining wall certification	☐	☐
Roadworks		
Sub grade compaction	☐	☐
CBR 15 material quality	☐	☐
CBR 15 compaction-100 percent standard	☐	☐
Subgrade course material quality	☐	☐
Subgrade course compaction-100 percent standard	☐	☐
Base course material quality	☐	☐
Base course compaction-98 percent modified	☐	☐
Bituminous (chip) seal application rates	☐	☐
AC core compactions-92 percent	☐	☐
AC core depth-25mm/40mm	☐	☐
Water (in accordance with SEQ Code)		
Grading to water main bedding/surround material	☐	☐
Water main pressure tests	☐	☐
Water main bacteria test	☐	☐
Water meter installation details	☐	☐
Water main trench compaction	☐	☐

	N/A	Attached
Sewer (in accordance with SEQ Code)		
Grading to sewer bedding/surround material	☐	☐
Sewer pressure tests	☐	☐
Sewer main trench compaction	☐	☐
Sewer main closed circuit television report	☐	☐
Drainage		
Grading to stormwater drainage bedding material	☐	☐
Stormwater main trench compaction	☐	☐
Stormwater main closed circuit television report	☐	☐
Stormwater Treatment Device		
Subsoil drain filter media grading	☐	☐
Filter media certification (refer section 4 of Water by Design – Bioretention Technical Design Guidelines)	☐	☐
Maintenance plan	☐	☐
Other		
Concrete testing	☐	☐
Acoustic fence certification (form 15 and 16)	☐	☐
Operating manuals	☐	☐
Dust complaint resolved	☐	☐
Lots effectively stabilised	☐	☐
Other complaints resolved	☐	☐
Payments		
Defect liability bond	☐	☐
Sewer connection	☐	☐
Water connection	☐	☐
Other bonds/payments-	☐	☐

Other Items:……

……

……

……

……

……

Note – This is not a comprehensive list and the applicant is requested to include additional items when applicable.

Verification by Consultant…….Date……

RPEQ Certification

It is hereby certified that all inspections and supervision were carried out at the appropriate stages of construction. The supervision and testing associated with the works are in accordance with the specifications, documentation and requirements of the relevant local government codes and policies. The Supervisor possesses appropriate recognised qualifications and experience.

Name:…… Company ……..

Signature…….. Date……RPEQ No……..

AILA Landscape Certification

It is hereby certified that all inspections and supervision were carried out at the appropriate stages of construction. The supervision and testing associated with the works are in accordance with the specifications, documentation and requirements of the relevant local government codes and policies. The Supervisor possesses appropriate recognised qualifications and experience.

Name:…… Company ……..

Signature…….. Date……AILA No…….

APPENDIX D

ADAC Data Capture Guidelines

1. Purpose

The purpose of this document is to provide practical guidelines and general assistance with respect to the creation and provision of compliant ADAC XML files. ADAC XML files are to accompany any associated bundle of "As-Constructed" plans, drawings, schedules and associated information reflecting newly constructed civil infrastructure and associated assets handed over to Redland City Council.

On completion of physical works and prior to asset handover, "As-Constructed" (also known as "As-Built") information is used to indicate the locations of infrastructure installed as a part of the physical works. The final "As-Constructed" data should accurately reflect material types, specifications and other asset-specific information. The digital ADAC XML file is a complete and detailed digital record of "As-Constructed" Plan information and is used by Council to populate its asset system.

Specific details regarding the preparation and presentation of any required "As-Constructed" drawings and plans accompanying the ADAC XML can be accessed via the *Redlands Planning Scheme Policy 2 – Infrastructure Works*.

2. Introduction to ADAC XML

ADAC XML files are an accompaniment to the "As-Constructed" bundle of information required by Council as part of the final approval and handover of associated civil infrastructure and associated assets constructed.

Compliant ADAC XML files contain a structured and precise digital record of the assets described in the "As-Constructed" plans and other associated engineering documentation. Details include survey-accurate cadastral and boundary references, geometries and relative levels as well as detailed records of the new assets including accompanying attribute information.

ADAC XML files may also be used as a cross-check on accuracy and completeness of the "As-Constructed" information provided. The digital files afford a further confirmation of compliance with development approval conditions as well as helping to verify engineering specifications and other design-related requirements.

Depending on the tools (XML generator) being used to generate the ADAC XML, compliant files may be initially created during survey capture and then finalised in conjunction with the creation of the "As-Constructed" drawings. Alternatively the XML files may be generated after the electronic "As-Constructed" drawings have been finalised. It is essential that the "As-Constructed" drawings are created using complete and accurate information to correctly identify the assets and the locations being represented in the ADAC XML file.

On receipt of the "As-Constructed" bundle of information, Council will undertake data format and conformance checks on the ADAC XML file to confirm the completeness and validity of the details. Should significant anomalies, errors or missing information be identified during these checks, the ADAC XML file(s) may be returned to the provider for correction and resubmission in accordance with applicable conditions, potentially delaying the progress of the asset handover process.

Once the ADAC XML file(s) are accepted by Council, they are then uploaded to various internal systems and used to assist in the long-term management of the infrastructure. The detailed asset and location data is also available to external agencies in the future via various digital formats.

3. General Requirements

The ADAC XML file shall be produced using the most recent ADAC XML schema release (e.g. Version 4.1) and should be “validated” for compliance before being submitted to Council. Details on the data schema (attributes and mandatory status) describing the asset classes and sub-classes to be addressed by the ADAC capture process can be found throughout this document.

4. Datum Information

Data contained in the ADAC XML file(s) must reflect the survey details of the assets exactly as found in the real world and as accurately reflected in the “As-Constructed” drawings. Unless otherwise specified, survey details must be derived from permanent survey marks (PSMs), with Map Grid of Australia (MGA Zone 56 – GDA 94) co-ordinates and AHD levels to be to fourth order standard as defined by ICSM Standard for the Australian Survey Control Network Special Publication 1 (SP1) Version 2.0 October 2013.

5.0 Asset Capture Guidelines

The following section is intended to provide guidance on the capture of assets within the ADAC XML in a manner which is acceptable to Redland City Council.

The physical nature of assets will determine where/if assets are captured separately within the ADAC XML file. For example, a pathway would be captured as individual and separate features to reflect any changes in physical properties, such as width or material type. Where possible, diagrams and images have been supplied in this document to assist in asset capture.

5.1 Global Asset Attribution

Mandatory Attribution: The following attribution covered under the Global Types section of ADAC is mandatory for all assets:

Element Name	Mandatory (Y/N)
InfrastructureCode	N
Owner	N
Status	Y
Notes	N
SupportingFiles	N

The **Notes** element should be used to record any additional information regarding the asset, or to record attribute information which isn't available within the defined enumerations in the schema.

The **Status** is a critical element within the XML, as it is what Council uses to load new and dispose existing assets into the asset register. Please note the descriptions for each status below:

Status	Description
As-Constructed	New asset described as constructed
Existing	Existing asset described as encountered
Design	Future asset described as a design
Removed	Previously existing asset described as it was prior to removal
Retired	Pre-existing asset no longer in use, but left in-situ.
Rehabilitated	Existing asset repaired, refitted or refurbished as part of works project.

5.2 Cadastre assets

5.2.1 Cadastral Connection

Asset Capture: Simple linear feature capturing the cadastral connections as deduced from observations and the survey reference mark(s).

Spatial Relationship: Must be coincident to the vertices that define the Cadastre Lot boundary features and relevant PSMs.

Mandatory Attribution: The following attribution is mandatory for *Cadastral Connections*:

Element Name	Mandatory (Y/N)
Bearing	N
Distance_m	N

5.2.2 Easement

Asset Capture: Multi-patched area feature representing a new or existing Easement.

Spatial Relationship: May share boundaries with WaterCourseReserve, LotParcels or RoadReserve. Node points between shared boundaries must be coincident i.e. no overlaps or "slivers".

Mandatory Attribution: The following attribution is mandatory for *Easements*:

Element Name	Mandatory (Y/N)
LotNo	N
PlanNo	N

5.2.3 Lot Parcels

Asset Capture: Multi-patched area feature representing the boundary of a titled or proposed Cadastral Lot.

Spatial Relationship: May share boundaries with RoadReserves, WaterCourses or Easements. Node points between shared boundaries must be coincident i.e. no overlaps or "slivers".

Mandatory Attribution: The following attribution is mandatory for *Lot Parcels*:

Element Name	Mandatory (Y/N)
LotNo	N
PlanNo	N
CancelledLotPlan	N
TitledArea_sqm	N

5.2.4 Road Reserve

Asset Capture: Multi-patched area feature representing a gazetted or soon to be gazetted Road reserve boundary.

Spatial Relationship: May share boundaries with WaterCourseReserve, LotParcels, other RoadReserve or Easements. Node points between shared boundaries must be coincident i.e. no overlaps or "slivers".

Mandatory Attribution: The following attribution is mandatory for *Road Reserves*:

Element Name	Mandatory (Y/N)
Name	Y

5.2.5 Survey Mark

Asset Capture: Simple point feature representing a Permanent Survey Mark.

Spatial Relationship: May be used in a Cadastral Connection (as in lot parcels, noted above).

Mandatory Attribution: The following attribution is mandatory for *Survey Marks*:

Element Name	Mandatory (Y/N)
MarkName	Y

5.2.6 Water Course Reserve

Asset Capture: Multi-patched area feature representing the boundary of a Water Course reserve.

Spatial Relationship: May share boundaries with RoadReserves, LotParcels or Easements. Node points between shared boundaries must be coincident i.e. no overlaps or “slivers”.

Mandatory Attribution: The following attribution is mandatory for *Water Course Reserves*:

Element Name	Mandatory (Y/N)
Name	Y

5.3 Open Space Assets

5.3.1 Activity Area

General Information: Examples include: Sports Fields, Courts, Playgrounds and Animal Agility Areas.

Asset Capture: Multi-patched area feature representing different activity areas. For playgrounds, this will often align with the soft fall boundaries. For animal agility areas, this will often align with the fencing surrounding the area. For sports fields and courts, this will often align with the marked boundaries of the area, or the edge of the material. Please refer to the dashed yellow line in the example shown below in **Figure 1** representing activity areas for dedicated purposes.

Figure 1

Spatial Relationship: Feature must be totally within the Parent Open Space Activity Area feature.

Mandatory Attribution: The following attribution is mandatory for *Activity Areas*:

Element Name	Mandatory (Y/N)
Use	Y
Type	N
UnderSurfaceMaterial	Y
EdgeType	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Activity Areas* is **± 5m.**

5.3.2 Activity Point

General Information: Includes individual pieces of playground, fitness, animal agility or sports equipment.

Asset Capture: Simple point feature representing individual activity assets that typically fall within an Activity Area. Playground modules should be represented as a single feature, located by its approximate centre point. Please refer to the yellow dots in the example shown in **Figure 1**.

Spatial Relationship: Should typically fall within a defined Activity Area feature.

Mandatory Attribution: The following attribution is mandatory for *Activity Points*:

Element Name	Mandatory (Y/N)
Use	Y
Type	Y
Material	Y
Theme	N
Units	N
Manufacturer	N
ModelNumber	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Activity Points* is **± 5m.**

5.3.3 Artwork

General Information: Includes Entry Statements, Memorials, Monuments, Plaques, Sculptures & Statues.

Asset Capture: Simple point feature representing the centre of an asset.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Artwork*:

Element Name	Mandatory (Y/N)
Type	Y
Material	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Artwork* is **± 5m.**

5.3.4 Barbeque

General Information: Not applicable.

Asset Capture: Simple point feature representing the centre of the barbeque. Any hot water units, taps, lighting or shelters associated with the barbeque should be captured as separate features. The slab the barbeque is installed on is **not** considered part of the asset and needs to be separately captured.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Barbeques*:

Element Name	Mandatory (Y/N)
EnergySource	Y
Plates	Y
SurroundingMaterial	Y
TopMaterial	Y
Manufacturer	N
ModelNumber	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Barbeques* is **± 5m.**

5.3.5 Barrier Continuous

Asset Capture: Complex linear feature (polylines including curves but not bézier curves) representing a barrier type asset (e.g. fences, bollards, guardrails, pedestrian fall protection). Please refer to the dashed yellow line in the example shown below in **Figure 2**.

Guardrails should be captured under *Barrier Continuous*. When capturing guardrails, the attribution should be populated as follows:

- **Type:** ”Vehicle Barrier”
- **UprightMaterial:** Material of the posts
- **LinkMaterial:** Material of the rail
- **TopMaterial**: None
- **Length:** Length of the railing, including end treatments
- **Height:** Height of the railing
- **Notes:** Include the following:
    - Armour Rail / Steel Wire Rope / Wall
    - Leading & trailing end treatments

Spatial Relationship: None.

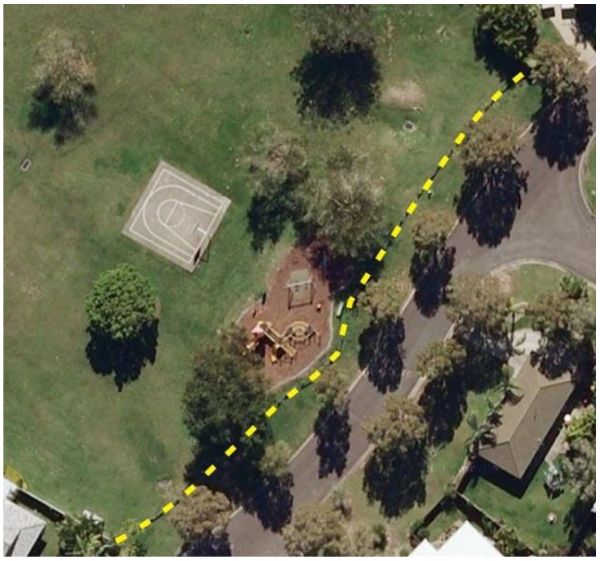


Figure 2

Mandatory Attribution: The following attribution is mandatory for *Barrier Continuous*:

Element Name	Mandatory (Y/N)
Type	Y
UprightMaterial	Y
LinkMaterial	Y
TopMaterial	N
Length_m	Y
Height_m	Y
UprightNumber	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Barrier Continuous* is **± 5m.**

5.3.6 Barrier Point

General Information: Includes bollards and locking posts.

Asset Capture: Simple point feature representing the centre of an asset. Road guide posts are not to be captured as Barrier Points (not captured by Redland City Council).

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Barrier Points*:

Element Name	Mandatory (Y/N)
Type	Y
UprightMaterial	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *Barrier Points* is **± 5m**.

5.3.7 Bicycle Fitting

General Information: Not applicable.

Asset Capture: Simple point feature representing the centre of a bicycle fitting. Any slab the bicycle fitting is installed on is **not** considered part of the asset and needs to be captured separately.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Bicycle Fittings*:

Element Name	Mandatory (Y/N)
Type	Y
Material	Y
Manufacturer	N
ModelNumber	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Bicycle Fitting* is **± 5m**.

5.3.8 Boating Facility

General Information: Not applicable.

Asset Capture: Area feature representing an individual boating facility such as a pontoon, ramp or jetty.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Boating Facilities*:

Element Name	Mandatory (Y/N)
Type	Y
Material	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *Boating Facilities* is **± 5m**.

5.3.9 Building

General Information:

Asset Capture: Area feature (closed polygon) representing the vertical Building footprint for a structure other than a shelter.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Buildings*:

Element Name	Mandatory (Y/N)
Type	Y
Material	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Buildings* is **± 5m**.

5.3.10 Electrical Conduit

General Information: Not applicable.

Asset Capture: Complex linear feature (polylines including curves but not bézier curves) representing a conduit run.

Spatial Relationship: Conduit shown as a polyline starting and finishing at coincident points with each associated fitting.

Mandatory Attribution: The following attribution is mandatory for *Electrical Conduits*:

Element Name	Mandatory (Y/N)
Type	Y
Material	Y
Diameter_mm	Y
Length_m	Y
Protection	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Electrical Conduits* is **± 5m**.

5.3.11 Electrical Fitting

General Information: Includes Lights, Pits, Poles, Power Outlets and Switchboards.

Asset Capture: Simple point feature representing the centre point of the asset. Council requires all Rate 3 lighting installed to be included in the XML. For lights affixed to a pole, a separate Pole feature does not need to be captured. Bollard lighting does not require a separate Pole feature to be captured.

Spatial Relationship: Must be coincident to Electrical Conduit polylines. Lights with poles will have coincidence geometry.

Mandatory Attribution: The following attribution is mandatory for *Electrical Fittings*:

Element Name	Mandatory (Y/N)
Type	Y
Base	N
Material	Y
EnergySource	N
Manufacturer	N
ModelNumber	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Electrical Fittings* is **± 5m**.

5.3.12 Fixture

General Information: Includes Dog Bag Dispensers, Fish Cleaning Stations, Goal Posts, Planter Boxes, Flag Poles, Scoreboards and Dog Bowls fixed to taps or drink fountains.

Asset Capture: Simple point feature representing the centre of an asset. Dog bag dispensers including a pole do not require the pole to be separately captured. The slab the fixture is installed on is **not** considered part of the asset and needs to be separately captured.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Fixtures*:

Element Name	Mandatory (Y/N)
Type	Y
Material	Y
Manufacturer	N
ModelNumber	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Fixtures* is **± 5m**.

5.3.13 Landscape Area

General Information: Not applicable.

Asset Capture: Multi-patched area feature representing the "footprint" of a landscaped area. Individual areas are required where the type of Landscaping changes (e.g. garden beds, grass). Only Gardens, Grass and Synthetic Grass are required to be included in the XML.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Landscape Areas*:

Element Name	Mandatory (Y/N)
Type	Y
EdgeMaterial	N
RootBarrier	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Landscape Areas* is **± 5m**.

5.3.14 Open Space Area

General Information: Examples include areas such as Parks or Bushlands.

Asset Capture: Multi-patched area feature representing the complete "footprint" of the Open Space area and enclosing relevant Open Space assets. For example, parks will often align with the cadastral *Lot Parcels*, in which case the lot boundaries can be used

to represent the Open Space feature. Please refer to the dashed red line in the example shown in **Figure 1**.

Spatial Relationship: Not applicable

Mandatory Attribution: The following attribution is mandatory for *Open Space Areas*:

Element Name	Mandatory (Y/N)
Name	Y
Type	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *Open Space Areas* is **± 5m.**

5.3.15 Retaining Wall

General Information: Not applicable.

Asset Capture: Complex linear feature (polylines including curves but not bézier curves) representing a retaining wall. While recognised as a three dimensional object, the retaining wall is typically captured as a linear course where the wall intersects the ground. Figure 3 shows the capture location of a new retaining wall (red hatched). Where the retaining wall gradually changes height over its length, the height is to be taken from the highest point of the wall.

Figure 3

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Retaining Walls*:

Element Name	Mandatory (Y/N)
Use	Y
Material	Y
Construction	N
Length_m	Y
Height_m	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *Retaining Walls* is **± 5m.**

5.3.16 Seat

General Information: Not applicable.

Asset Capture: Simple point feature representing the centre of a seat. Seating associated with a table are not to be captured separately. The slab the seat is installed on is **not** considered part of the asset and needs to be separately captured.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Seats*:

Element Name	Mandatory (Y/N)
SeatType	Y
Places	N
Material	Y
Manufacturer	N
ModelNumber	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Seats* is **± 5m**.

5.3.17 Shelter

General Information: Not applicable.

Asset Capture: Simple point feature representing the centre of a shelter. Any lighting, tables, seats or barbeques located underneath the shelter are to be captured as separate assets. Shade sails which share a common pole should be treated as the one feature. Poles associated with shade sails / shelters do not need to be captured separately. The slab the shelter is installed on is **not** considered part of the asset and needs to be separately captured.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Shelters*:

Element Name	Mandatory (Y/N)
Type	Y
ConstructionType	N
FloorMaterial	Y
WallMaterial	Y
RoofMaterial	Y
Manufacturer	N
ModelNumber	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Shelters* is **± 5m**.

5.3.18 Sign

General Information: Not applicable.

Asset Capture: Simple point feature representing the centre of a sign. Poles associated with the sign do not need to be separately captured.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Signs*:

Element Name	Mandatory (Y/N)
Type	Y
Material	Y
Structure	N
SignText	Y
Rotation	N
Manufacturer	N
ModelNumber	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Signs* is **± 5m**.

5.3.19 Table

General Information: Not applicable.

Asset Capture: Simple point feature representing the centre of a table.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Tables*:

Element Name	Mandatory (Y/N)
Type	Y
SeatType	N
Places	N
Material	Y
Manufacturer	N
ModelNumber	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Tables* is **± 5m**.

5.3.20 Waste Collection Point

General Information: Includes any poles, stands or enclosures associated with a bin.

Asset Capture: Simple point feature representing the centre of the asset.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Waste Collection Points*:

Element Name	Mandatory (Y/N)
Type	Y
Material	Y
Manufacturer	N

Element Name	Mandatory (Y/N)
ModelNumber	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Waste Collection Points* is **± 5m**.

5.5 Stormwater

5.5.1 End Structure

General Information: Represents a stormwater headwall / end wall.

Asset Capture: Simple point feature representing the top of the headwall (refer **Figure 4**). Fences surrounding the end structure should be captured separately as *Barrier Continuous*.

Spatial Relationship: Should be coincident to a stormwater pipe.

Figure 4

Mandatory Attribution: The following attribution is mandatory for *End Structures*:

Element Name	Mandatory (Y/N)
StructureID	N
StructureLevel_m	Y
EndWallType	N
EndWallConstruction	N
WingWallType	N
WingWallConstruction	N
ApronType	N
ApronConstruction	N
GrateType	N
TideGate	N
PredominantMaterial	Y
OutletProtectionType	N
Rotation	N

Positional Accuracy: The minimum accepted horizontal accuracy for *End Structures* is **± 0.1m**.

5.5.2 Fitting

General Information: Represents a stormwater end cap.

Asset Capture: Single point feature representing the centre point of the fitting.

Spatial Relationship: Must be coincident to the end point a Stormwater pipe feature.

Mandatory Attribution: The following attribution is mandatory for *Fittings*:

Element Name	Mandatory (Y/N)
FittingType	Y
Rotation	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Fittings* is **± 0.1m**.

5.5.3 GPT Complex

General Information: Not applicable.

Asset Capture: Single point feature located at the centre of chamber on the top surface. Capturing centre of lid is appropriate only when the lid is centred over the chamber.

Gross Pollutant Trap (GPT) Complex assets are Commercial or Custom built devices (e.g. Humes Interceptor).

Spatial Relationship: GPT Complex assets must be coincident to pipe features as per Pits/Manhole features.

Mandatory Attribution: The following attribution is mandatory for *GPT Complexes*:

Element Name	Mandatory (Y/N)
Sqid_Id	Y
Manufacturer	Y
ModelNumber	Y
Length_mm	Y *(if rectangular)*
Width_mm	Y *(if rectangular)*
Diameter_mm	Y *(if circular)*
Function1	Y
Function2	Y
Function3	Y
US_PipeDiameter_mm	Y
DS_PipeDiameter_mm	Y
SurfaceLevel_m	Y
CleanoutLevel_m	Y
Depth_m	Y
SumpDepth_m	Y
HasFilterMedia	Y
HasBasket	Y
HasBoards	Y
DesignFlow_m3s	Y

Element Name	Mandatory (Y/N)
MaxContaminantVolume_m3	Y
MaxInternalVolume_m3	Y
MaintenanceCycle_mnths	Y
Rotation	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *GPT Complexes* is **± 0.1m**.

5.5.4 GPT Simple

General Information: Not applicable.

Asset Capture: Single point feature located at the centre of chamber on the top surface. Capturing centre of lid is appropriate only when the lid is centred over the chamber.

Gross Pollutant Trap (GPT) Simple assets are “in pit” basket or “end of line” devices.

Spatial Relationship: A GPT Simple asset’s spatial location must correlate with a Pit/Manhole asset as they are housed within those structures and can be removed for maintenance or relocation.

Mandatory Attribution: The following attribution is mandatory for *GPT Simple*:

Element Name	Mandatory (Y/N)
Sqid_Id	Y
Construction	Y
Manufacturer	Y
ModelNumber	Y
TreatmentMeasure	Y
Function1	Y
Length_mm	Y
Width_mm	Y
MaintenanceCycle_mnths	Y
Rotation	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *GPT Simple* is **± 0.1m**.

5.5.5 Non GPT Simple

General Information: Not applicable.

Asset Capture: Single point feature located at the centre of chamber on the top surface. Capturing centre of lid is appropriate only when the lid is centred over the chamber.

Non GPT Simple assets represent basic and minor sand filtration storage.

Spatial Relationship: Non GPT Simple assets must be coincident to pipe features as per Pits/Manhole features.

Mandatory Attribution: The following attribution is mandatory for *Non GPT Simple*:

Element Name	Mandatory (Y/N)
Sqid_Id	Y
Construction	Y
Manufacturer	Y
ModelNumber	Y
TreatmentMeasure	Y
Function1	Y
Function2	Y
Function3	Y
Length_mm	Y
Width_mm	Y
MaintenanceCycle_mnths	Y
Rotation	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *Non GPT Simple* is **± 0.1m**.

5.5.6 Pipe

General Information: Not applicable.

Asset Capture: A simple linear feature representing the invert of the pipe or midpoint of a box asset. Multiple-celled culverts & pipes should always be represented individually; therefore the number of cells attribute should always be "1". Line direction should be enforced from Gravity Upstream (higher AHD level) to Gravity Downstream (lower AHD level) due to gravitation flow. Pipe features are captured from the intersection of pipe material and chamber wall. Refer to **Figure 5** and **Figure 6**.

Figure 5 represents a single-celled pipe asset where vertices one and four represent the maintenance hole capture and vertices two and three are the intersection of the Pipe material and the chamber wall.

Figure 6 represents an irregular shaped pit with multiple multi-celled pipes entering the pit asset and a large single-celled asset exiting the pit with an outlet through an End Structure.

Pipes are to be captured based on their physical and spatial properties and attributes. For example, if a pipe changes size, material, class, embedment or direction etc. then it must be broken and captured separately.

Spatial Relationship: May be coincident to Stormwater point features.

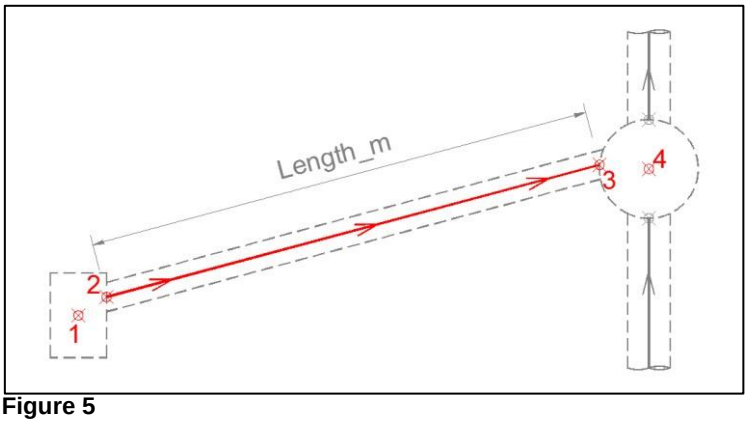


Figure 5

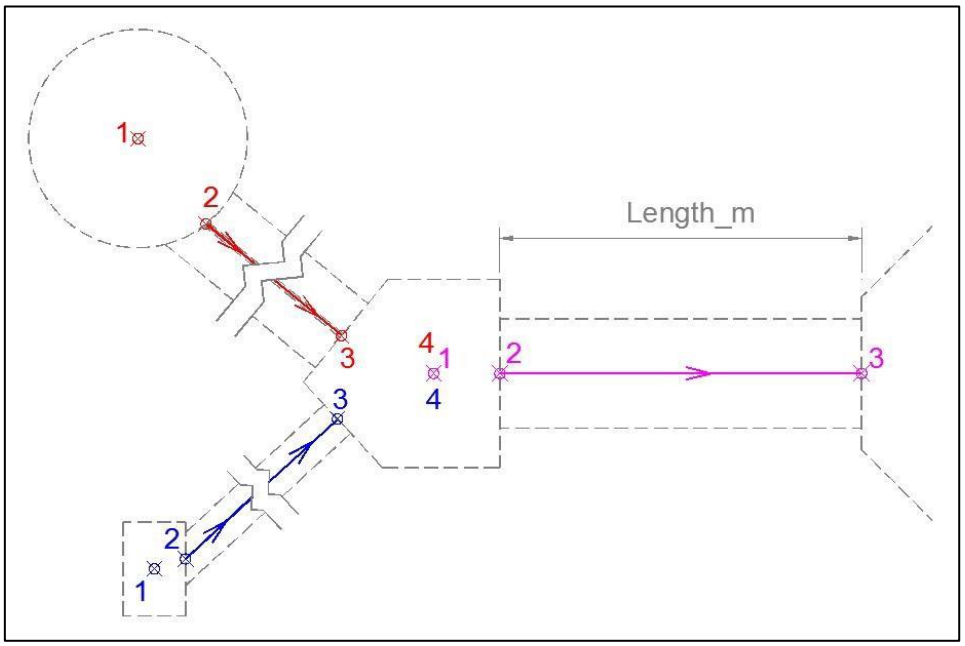


Figure 6

Mandatory Attribution: The following attribution is mandatory for *Pipes*:

Element Name	Mandatory (Y/N)
US_InvertLevel_m	Y
DS_InvertLevel_m	Y
US_SurfaceLevel_m	Y
DS_SurfaceLevel_m	Y
Diameter_mm	Y *(if circular)*
Height_mm	Y *(if box)*
Width_mm	Y *(if box)*
Material	Y
Class	Y *(if circular)*
JointType	Y *(if circular)*
Cells	N
ConcreteCoverType	N
Grade	Y

Element Name	Mandatory (Y/N)
Length_mm	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *Pipes* is **± 0.1m**.

5.5.7 Pit

General Information: Not applicable.

Asset Capture: Simple point feature representing the centre of chamber of a pit or manhole. If the asset's Use = "Pit" then the InletType element must be populated. If the Lintel element is not nil, then the InletConfig element must be populated. The InletConfig's Left/Centre/Right is referenced from the road crown looking at the lintel.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Pits*:

Element Name	Mandatory (Y/N)
PitNumber	N
Use	Y
ChamberConstruction	N
Length_mm	Y *(if rectangular)*
Width_mm	Y *(if rectangular)*
Diameter_mm	Y *(if circular)*
Radius_mm	Y *(if extended)*
Extension_mm	Y *(if extended)*
LidType	Y
SurfaceLevel_m	Y
InvertLevel_m	Y
Depth_m	Y
InletConfig	N
InletType	Y *(if inlet exists)*
LintelConstruction	Y *(if lintel exists)*
LintelLength_m	Y *(if lintel exists)*
OutletType	N
FireRetardant	N
Rotatation	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Pits* is **± 0.1m**.

5.5.8 Surface Drain

General Information: Not applicable.

Asset Capture: Simple linear feature representing the invert of the channel. Surface Drains are to be captured based on their physical and spatial properties and attributes. For example, if a surface changes size, material, shape etc. then it must be broken and captured separately. Figure 9 indicates the capture of a major surface drain as well as a smaller surface drain feeding into it. The main surface drain has been

broken into separate features where the main change of width occurs. The smaller surface drain ends at the intersection of the main surface drain's outer edge.

Figure 7

Spatial Relationship: May be coincident to End Structures and WSUD regions/polygons.

Mandatory Attribution: The following attribution is mandatory for *Surface Drains*:

Element Name	Mandatory (Y/N)
Type	Y
Shape	Y
LiningMaterial	Y
LinedWidth_m	Y
BatterMaterial	Y
BatterWidth_m	Y
US_InvertLevel_m	Y
DS_InvertLevel_m	Y
AverageGrade	Y
Length_m	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *Surface Drains* is **± 1m**.

5.5.9 WSUD Complex Area

General Information: Not applicable.

Asset Capture: Water Sensitive Urban Design (WSUD) areas such as kerbside bio-filtration beds or purpose built drainage swales should be captured individually as a region/polygon. Individual areas are to be recorded within the ADAC data capture

fields defining class type (e.g swale, buffer strip, bio-retention basin). Any associated infrastructure with the WSUD (e.g. vehicle accesses, fences, gates, etc.) should be captured separately. **Figure 8** demonstrates the capture of a WSUD and associated infrastructure, including a Vehicle Access (red polygon) and a gate (blue hatched line).

Figure 8

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *WSUD Complex Areas*:

Element Name	Mandatory (Y/N)
Sqid_Id	Y
TreatmentMeasure	Y
Function1	Y
Function2	Y
Function3	Y
PondingArea_m2	Y
PondingDepth_m	Y
FilterArea_m2	Y
FilterDepth_m	Y
TransitionDepth_m	Y
DrainageDepth_m	Y
MacrophyteZoneArea_m2	Y
MacrophyteZoneDepth_m	Y
CoarseSedimentArea_m2	Y
SedimentVolume_m3	Y

Element Name	Mandatory (Y/N)
MinSurfaceLevel_m	Y
PermanentPondLevel_m	Y
OutletLevel_m	Y
DesignFlow_m3s	Y
HasSpillway	Y
MaintenanceCycle_mnths	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *WSUD Complex Areas* is **± 5m**.

5.6 Supplementary

Supplementary features are used to record additional asset types or points of reference which isn't otherwise covered under the ADAC schema. Redland City Council has specified additional asset types required to be supplied in the XML under its *As-Constructed Data Standard.* The details for these asset types have been supplied below:

5.6.1 Point Feature / Polyline Feature / Polygon Feature (Additional Information)

Asset Capture: Simple Point, Complex Polyline or Multipatch Area feature (depending on the feature type) representing additional reference information that add clarity or context to the strict ADAC features.

Spatial Relationship: Not applicable

5.6.2 Artificial Fauna Habitat (Polygon Feature)

General Information: Represents artificial fauna habitats such as glider poles, nesting platforms and ground hollows.

Asset Capture: Multi-patched area feature representing the footprint of the artificial fauna habitat. These are to be recorded with a **Class** element of "Artificial Fauna Habitat".

Spatial Relationship: Not applicable.

Attribution: The following attribution is to be recorded against features identified as *Artificial Fauna Habitats*:

Attribute	Description	Type	Mandatory?	Allowable Values
Type	The type of Habitat eg: glider pole and ground hollow	TextValue	Y	Glider Pole
				Glider Rope
				Ground Hollow
				Log
				Nesting Platform
				Rock
Material	The predominant material	TextValue	Y	Concrete
				Fibreglass
				Masonry
				Plastic
				Rock
				Steel Galvanised
				Steel Powder Coated
				Timber
				Combination
Height	The height of the habitat in metres (2 decimal places).	DecimalValue	Y	
Pole Mounted	Is the feature mounted to a pole?	TextValue	N	Yes
				No

Positional Accuracy: The minimum accepted horizontal accuracy for *Artificial Fauna Habitats* is **± 5m**.

5.6.3 Bridge (Polygon Feature)

General Information: Not applicable.

Asset Capture: Multi-patched area feature representing the footprint of the bridge, from abutment to abutment (refer **Error! Reference source not found.**). These are to be recorded with a **Class** element of "Bridge". For road bridges which include a separated footbridge, the footbridge is considered part of the road bridge if it shares the same load bearing structure.

Figure 9

Spatial Relationship: Not applicable.

Attribution: The following attribution is to be recorded against features identified as *Bridges*:

Attribute	Description	Type	Mandatory?	Allowable Values
Bridge Name	Bridge descriptor name.	TextValue	N	
Deck Width	Deck width measured from outside to outside.	DecimalValue	Y	
Deck Length	Deck length measured from abutment to abutment.	DecimalValue	Y	
Deck Area	Deck area in square metres.	DecimalValue	Y	
Vertical Clearance	Vertical clearance under the bridge, measured from the highest astronomical tide or the crown of the road.	DecimalValue	Y	
Design Load	Maximum design load limit of the	DecimalValue	N	

Attribute	Description	Type	Mandatory?	Allowable Values
	bridge, in tonnes			
Actual Load Allowance	Maximum actual load limit of the bridge in tonnes, where differs from the design load.	DecimalValue	N	
Bridge Crossing Type	What is the bridge crossing?	TextValue	Y	Over Road Under Road Over Water Over Rail Under Rail Other
Footpath	Are there footpaths fixed to the bridge?	TextValue	Y	Nil One Side Both Sides
Span Type	The type of span used on the bridge.	TextValue	Y	Arch Beam girder Box girder Composite slab Concrete portal Truss
Span Length	Maximum length of each span, in metres.	DecimalValue	Y	
Span Quantity	Number of spans.	IntegerValue	Y	
Primary Bridge Use	The primary purpose of the bridge.	TextValue	Y	Pedestrian Vehicular Cycleway Rail
Lanes	Number of trafficable lanes on the bridge.	IntegerValue	N	

Positional Accuracy: The minimum accepted horizontal accuracy for *Bridges* is **± 5m**.

5.6.4 Fire Management (Polyline Feature)

General Information: Represents Fire Control Lines and Fire Trails.

Asset Capture: Complex linear feature (polylines including curves but not Bezier curves) representing the centre longitudinal axis of a fire trail or fire control line. These are to be recorded with a **Class** element of "Fire Management".

Spatial Relationship: Not applicable.

Attribution: The following attribution is to be recorded against features identified as *Fire Management*:

Attribute	Description	Type	Mandatory?	Allowable Values
Type	The type of Fire Management feature (e.g. fire trail, fire control line).	TextValue	Y	Fire Control Line Fire Trail

Attribute	Description	Type	Mandatory?	Allowable Values
Trail Category	The type of fire trail. Only applicable when the Type is "Fire Trail" *Refer below for a description of each category.*	TextValue	N	1 2 3a 3b 4 5
Surface Material	The surface material of the fire trail or control line	TextValue	Y	Bitumen Concrete Exposed Aggregate Grass Gravel Pavers Natural Sand Timber
Length	Length in metres (2 decimal places).	DecimalValue	Y	
Width	Width in metres (2 decimal places).	DecimalValue	N	

Trail Categories:

1: strategically important fire control line (sealed or well-formed road)
2: major control line (well formed, 10% gradient)
3a: permanent medium fire control line (4x4 vehicle on 10% - 17% gradient)
3b: permanent minor fire control line (4x4 vehicle 17% - 38% gradient)
4: temporary fire control line (4x4 vehicle 17% - 38% gradient)
5: dormant fire control line (4x4 vehicle 20% - 45% gradient)

Positional Accuracy: The minimum accepted horizontal accuracy for *Fire Management* is **± 5m**.

5.6.5 Foreshore Protection (Polygon Feature)

General Information: Represents seawalls, groynes & artificial reefs.

Asset Capture: Multi-patched area feature representing the footprint of the foreshore protection asset. These are to be recorded with a **Class** element of "Foreshore Protection".

Spatial Relationship: Not applicable.

Attribution: The following attribution is to be recorded against features identified as *Foreshore Protection*:

Attribute	Description	Type	Mandatory?	Allowable Values
Type	The type of foreshore protection (e.g. seawall, groyne, artificial reef).	TextValue	Y	Seawall Groyne Artificial Reef
Material	The predominant material of the foreshore protection asset.	TextValue	Y	Geotextile Clay Shale

Attribute	Description	Type	Mandatory?	Allowable Values
				Mass Concrete Block
				Clay Shale / Geotextile
				Armour Rock/Boulder
				Boulder
Length	Length in metres (2 Decimal Places)	DecimalValue	N	
Width	Width in metres (2 Decimal Places)	DecimalValue	N	
Height	Height in metres (2 Decimal Places)	DecimalValue	Y	
Top Reduced Level	Level of the top of the asset in metres AHD.	DecimalValue	N	
Base Reduced Level	Level of the base of the asset in metres AHD.	DecimalValue	N	
Surface Material	Only required when there is pedestrian access over the asset.	TextValue	N	Bitumen
				Concrete
				Gravel
				Sand

Positional Accuracy: The minimum accepted horizontal accuracy for *Foreshore Protection* is **± 5m**.

5.6.6 Platform (Polygon Feature)

General Information: Not applicable.

Asset Capture: Multi-patched area feature representing the footprint of the platform. These are to be recorded with a **Class** element of "Platform".

Spatial Relationship: Not applicable.

Attribution: The following attribution is to be recorded against features identified as *Platforms*:

Attribute	Description	Type	Mandatory?	Allowable Values
Function	Primary purpose of the platform.	TextValue	Y	Viewing
				Fishing
				Other
Deck Material	Predominant material of the platform deck.	TextValue	Y	Timber
				Paved
				Concrete
Substructure Material	Predominant material of the platform substructure.	TextValue	N	Timber
				Concrete
				Steel
External Handrail	Predominant material of the	TextValue	N	Timber

Attribute	Description	Type	Mandatory?	Allowable Values
Material	platform handrails.			Metal
				None
Maximum Height	The maximum distance between the deck and the ground in metres (2 decimal places).	DecimalValue	N	
Length	Length in metres (2 decimal places)	DecimalValue	N	
Width	Width in metres (2 decimal places)	DecimalValue	N	
Area	Area in square metres (2 decimal places)	DecimalValue	N	

Positional Accuracy: The minimum accepted horizontal accuracy for *Platforms* is **± 5m**.

5.6.7 Prepared Surface (Polygon Feature)

General Information: Represents a slab, pad or prepared surface other than an activity area.

Asset Capture: Multi-patched area feature representing the footprint of the prepared surface. These are to be recorded with a **Class** element of "Prepared Surface".

Spatial Relationship: Not applicable.

Attribution: The following attribution is to be recorded against features identified as *Prepared Surfaces*:

Attribute	Description	Type	Mandatory?	Allowable Values
Function	The purpose of the prepared surface.	TextValue	Y	Annex Slab
				Hose Down Pad
				Recreational
				Storage
				Various/Other
Material	The material of the prepared surface.	TextValue	Y	Bitumen
				Concrete
				Exposed Aggregate
				Gravel
				Other
				Synthetic Grass
				Pavers
Length	Length in metres (2 decimal places)	DecimalValue	N	
Width	Width in metres (2 decimal places)	DecimalValue	N	
Area	Area in square metres (2 decimal places)	DecimalValue	N	

Positional Accuracy: The minimum accepted horizontal accuracy for *Prepared Surfaces* is **± 5m**.

5.6.8 Swimming Pool (Polygon Feature)

General Information: Not applicable.

Asset Capture: Multi-patched area feature representing the footprint of the pool shell. These are to be recorded with a **Class** element of "Swimming Pool".

Spatial Relationship: Not applicable.

Attribution: The following attribution is to be recorded against features identified as *Swimming Pools*:

Attribute	Description	Type	Mandatory?	Allowable Values
Type	The type of swimming pool.	TextValue	Y	Wading
				Lap
				Hydrotherapy
				Recreational
				Diving
				Learn to Swim
Indoor or Outdoor	Is the swimming pool located indoors or outdoors?	TextValue	Y	Indoor
				Outdoor
Material	Material of pool shell.	TextValue	N	Fibreglass
				Concrete
Finish	Finish applied to the pool shell material.	TextValue	Y	Fibreglass
				Paint
				Pebble Crete
				Tile
Lanes	The number of lanes.	IntegerValue	N	
Length	Length of the pool in metres.	DecimalValue	Y	
Width	Width of the pool in metres.	DecimalValue	Y	
Volume	Volume of the pool in cubic metres.	DecimalValue	Y	
Minimum Depth	The minimum depth of the pool, in metres.	DecimalValue	Y	

Positional Accuracy: The minimum accepted horizontal accuracy for *Swimming Pools* is **± 5m**.

5.6.9 Swimming Pool Heating Equipment (Point Feature)

General Information: Not applicable.

Asset Capture: Point feature representing the centre of the pool heating equipment. These are to be recorded with a **Class** element of "Pool Heating Equipment".

Spatial Relationship: Not applicable.

Attribution: The following attribution is to be recorded against features identified as *Pool Heating Equipment*:

Attribute	Description	Type	Mandatory?	Allowable Values
Type	The power source of the equipment.	TextValue	Y	Gas Electric Solar
Component	The type of pool heating equipment.	TextValue	Y	Exchanger Pump Valve Controller Solar Collector

Positional Accuracy: The minimum accepted horizontal accuracy for *Pool Heating Equipment* is **± 5m**.

5.6.10 Swimming Pool Fixture (Point Feature)

General Information: Not applicable.

Asset Capture: Point feature representing the centre of the pool fixture. These are to be recorded with a **Class** element of "Pool Fixture".

Spatial Relationship: Not applicable.

Attribution: The following attribution is to be recorded against features identified as *Pool Fixture*:

Attribute	Description	Type	Mandatory?	Allowable Values
Type	The type of pool fixture.	TextValue	Y	Tower Springboard Lifeguard Tower/Chair Access Ladder Starting Podium
Material	The material type of the pool fixture.	TextValue	Y	Aluminium Concrete Plastic Stainless Steel Steel Timber Masonry Fibreglass Combination
Finish	The finish applied to the pool fixture material.			Painted Polished Powdercoated Galvanised Stained PVC/Rubberised Coating

Positional Accuracy: The minimum accepted horizontal accuracy for *Pool Fixtures* is **± 5m**.

5.6.11 Water Body (Polygon Feature)

General Information: Represents man-made water bodies. Not to be used to represent WSUD areas.

Asset Capture: Multi-patched area feature representing the footprint of the water body. These are to be recorded with a **Class** element of "Water Body".

Spatial Relationship: Not applicable.

Attribution: The following attribution is to be recorded against features identified as *Water Body*:

Attribute	Description	Type	Mandatory?	Allowable Values
Maximum Depth	Maximum depth of the water body, in metres.	DecimalValue	N	

Positional Accuracy: The minimum accepted horizontal accuracy for *Water Bodies* is **± 5m**.

5.6.12 Weighbridge (Polygon Feature)

General Information: Not applicable.

Asset Capture: Multi-patched area feature representing the footprint of the weighbridge. These are to be recorded with a **Class** element of "Weighbridge".

Spatial Relationship: Not applicable.

Attribution: The following attribution is to be recorded against features identified as *Weighbridge*:

Attribute	Description	Type	Mandatory?	Allowable Values
Total Length	Total length of weighbridge in metres (2 decimal places).	DecimalValue	N	
Width	Width of weighbridge in metres (2 decimal places).	DecimalValue	N	
Number of Lanes	Number of lanes on the weighbridge.	IntegerValue	N	
Number of Decks	Number of separate weighing decks.	IntegerValue	N	
Maximum Weight	Maximum weight limit, in tonnes.	DecimalValue	N	
Deck Material	Material type of the weighbridge deck(s).	TextValue	Y	Concrete
				Concrete / Steel

Positional Accuracy: The minimum accepted horizontal accuracy for *Weighbridge* is **± 5m**.

5.7 Surface

5.7.1 Contour

Asset Capture: Linear feature capturing a single contour feature.

Spatial Relationship: Not applicable.

5.7.2 Spot Heights

Asset Capture: Simple point feature representing a single elevation point.

Spatial Relationship: Not applicable.

5.8 Transport

5.8.1 Flush Point

Asset Capture: Simple point feature representing the outlet of sub-soil drains into drainage pits/maintenance holes.

Spatial Relationship: Must be coincident to Sub Soil Drain assets.

Mandatory Attribution: The following attribution is mandatory for *Flush Points*:

Element Name	Mandatory (Y/N)
Function	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Flush Points* is **± 1m**.

5.8.2 Parking

Asset Capture: Multi-patch region/polygon feature representing the area of Parking. Asset capture is based on physicality therefore separate regions/polygons are required if any part of the pavement profile changes i.e. Surface, Base, Sub-Base, Lower Sub-Base and/or Subgrade.

Spatial Relationship: Must be coincident to other regions representing pavement / parking where there is a common boundary (e.g. no slivers/overlaps).

Mandatory Attribution: The following attribution is mandatory for *Parking*:

Element Name	Mandatory (Y/N)
Name	Y
NoOfCarparks	N
OnOffStreet	Y
SurfaceType	Y
SurfaceThickness_mm	Y
SurfaceArea_sqm	Y
PavementType	N
BaseLayerType	Y
BaseLayerDepth_mm	Y
BaseStabilisation	Y *(if Base stabilised)*
SubBaseLayerType	Y (*if SubBase exists)*
SubBaseLayerDepth_mm	Y (*if SubBase exists)*
SubBaseStabilisation	Y (*if SubBase stabilised)*
LowerSubBaseLayerType	Y (*if Lower SubBase exists)*
LowerSubBaseLayerDepth_mm	Y (*if Lower SubBase exists)*
LowerSubBaseStabilisation	Y (*if Lower SubBase stabilised)*
PavementGeoTextile	N
SubgradeCBR	Y
SubgradeStabilisation	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Parking* is **± 5m**.

5.8.3 Path Structure

Asset Capture: Complex linear feature (polylines including curves but not Bezier curves) representing the centre longitudinal axis of a path structure.

Spatial Relationship: Changes in surface types or widths must be represented as separate features.

Mandatory Attribution: The following attribution is mandatory for *Path Structures*:

Element Name	Mandatory (Y/N)
Use	Y
Structure	Y
SurfaceMaterial	Y
SubStructureMaterial	Y
Width_m	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *Path Structures* is **± 5m**.

5.8.4 Pathway

Asset Capture: Complex linear feature (polylines including curves but not Bezier curves) representing the centre longitudinal axis of a pathway. Changes in surface types or widths must be represented as separate features.

Figure 10

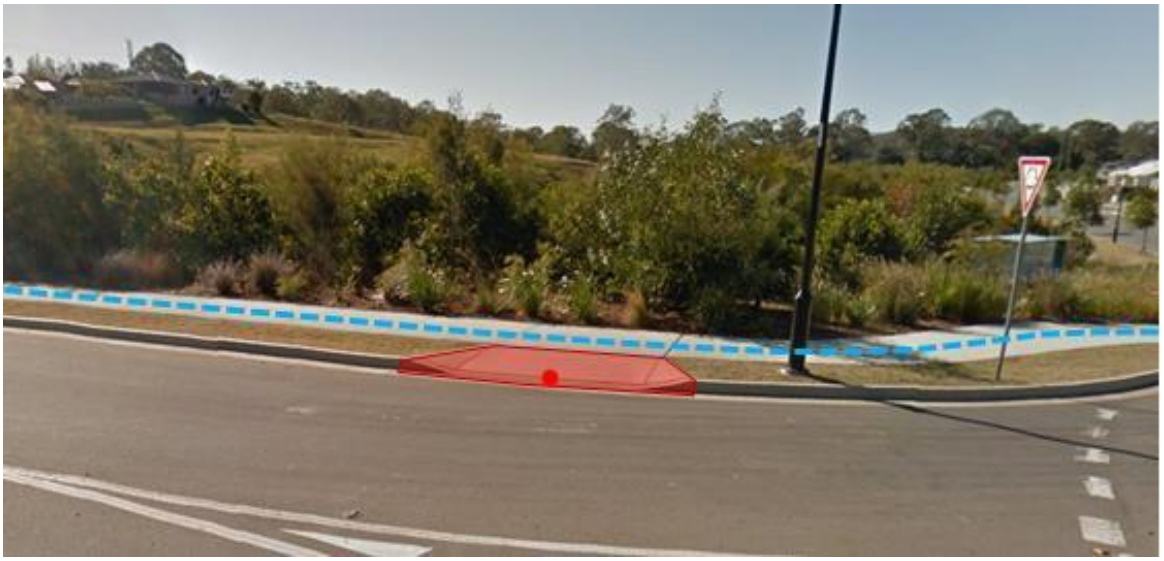


Figure 11

Spatial Relationship: **Figure 10** and **Figure 11** are examples of the capture of a pathway (blue hatched line) and its relationship with pram ramps (red point).

Mandatory Attribution: The following attribution is mandatory for *Pathways*:

Element Name	Mandatory (Y/N)
Use	Y
Structure	N
SurfaceMaterial	Y
Width_m	Y
Depth_mm	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Pathways* is **± 5m**.

5.8.5 Pavement

Asset Capture: Multi-patch region/polygon feature representing the area of Pavement. Asset capture is based on physicality therefore separate regions/polygons are required if any part of the pavement profile changes i.e. Surface, Base, Sub-Base, Lower Sub-Base and/or Subgrade. **Figure 12** demonstrates the capture locations of a Pavement. The blue line represents the capture location where kerb exists (back of kerb), the yellow line represents where no kerb exists (edge of seal) and the red line represents where separate pavement areas are recorded for each road.

Spatial Relationship: Must be coincident to other regions representing pavement / parking where there is a common boundary- no slivers/overlaps.

Mandatory Attribution: The following attribution is mandatory for *Pavements*:

Element Name	Mandatory (Y/N)
Name	Y
SurfaceType	Y
SurfaceThickness_mm	Y
SurfaceNomWidth_m	Y

Element Name	Mandatory (Y/N)
PavementType	N
BaseLayerType	Y
BaseLayerDepth_mm	Y
BaseStabilisation	Y *(if Base stabilised)*
SubBaseLayerType	Y (*if SubBase exists)*
SubBaseLayerDepth_mm	Y (*if SubBase exists)*
SubBaseStabilisation	Y (*if SubBase stabilised)*
LowerSubBaseLayerType	Y (*if Lower SubBase exists)*
LowerSubBaseLayerDepth_mm	Y (*if Lower SubBase exists)*
LowerSubBaseStabilisation	Y (*if Lower SubBase stabilised)*
PavementGeoTextile	N
SubgradeCBR	Y
SubgradeStabilisation	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Pavements* is **± 5m**.

Figure 12

5.8.6 Pram Ramp

Asset Capture: Simple point feature representing a pram ramp. Typically captured in the centre of Pram Ramp where it transitions to a Kerb/Road. Refer to **Figure 10** and **Figure 11** for the capture of Pram Ramps. The pram ramp (which is highlighted by the red polygon) is captured based on the red point.

Spatial Relationship: May be coincident with a Road Edge feature.

Mandatory Attribution: The following attribution is mandatory for *Pram Ramps*:

Element Name	Mandatory (Y/N)
Rotation	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Pram Ramps* is **± 5m**.

5.8.7 Road Edge

Asset Capture: Complex linear feature (polylines including curves but not bézier curves) representing the top (back) of kerb. In case of inverts, edge of concrete furthest from road centreline. Refer to the blue line in **Figure 12** for capture location.

Spatial Relationship: Must be coincident to other polylines representing road edge where there is a common boundary between kerb types / material change i.e. no slivers and/or overlaps.

Mandatory Attribution: The following attribution is mandatory for *Road Edges*:

Element Name	Mandatory (Y/N)
Type	Y
Length_m	Y
PavementExtension_mm	N

Positional Accuracy: The minimum accepted horizontal accuracy for *Road Edge* is **± 5m**.

5.8.8 Road Island

Asset Capture: Multi-patch region/polygon feature representing the area of Island/LATM bounded by the back of Kerb features. Asset capture is based on physicality therefore separate regions/polygons are required if the Type of Island or Infill changes. Refer to **Figure 13** for an example of asset capture.

Spatial Relationship: Must be coincident to other regions representing road islands where there is a common boundary i.e. no slivers and/or overlaps.

Mandatory Attribution: The following attribution is mandatory for *Road Islands*:

Element Name	Mandatory (Y/N)
Type	Y
Area_sqm	Y
InfillType	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *Road Islands* is **± 5m**.

Figure 13

5.8.9 Road Pathway

Asset Capture: Complex linear feature (polylines including curves but not Bezier curves) representing the centre longitudinal axis of a road pathway (on-road cycleway).

Spatial Relationship: Not applicable

Mandatory Attribution: The following attribution is mandatory for *Road Pathways*:

Element Name	Mandatory (Y/N)
Use	Y
Structure	N
SurfaceMaterial	Y
Width_m	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *Road Pathways* is **± 5m**.

5.8.10 Sub Soil Drain

Asset Capture: Simple Linear feature (i.e. straight lines) representing the Invert of a circular sub-soil drain pipe asset. Pipes are typically broken where the Use and/or Type of drain changes.

Spatial Relationship: Must be coincident to Flush Points.

Mandatory Attribution: The following attribution is mandatory for *Sub Soil Drains*:

Element Name	Mandatory (Y/N)

Element Name	Mandatory (Y/N)
Use	Y
Type	Y
Length_m	Y

Positional Accuracy: The minimum accepted horizontal accuracy for *Sub Soil Drains* is **± 1m**.