Scenic Rim Regional Council

Design and Construction Manual

Revision B, Issue June 2015

FOREWORD

The Design and Construction Manual has been produced by Scenic Rim Regional Council, for use in the design and construction of infrastructure within the Scenic Rim region.

Providing guidance through the process of Operational Works applications and associated design and construction of street, roads, drainage and other associated activity within the Scenic Rim region; this manual reaffirms Council's commitment to apply asset management, financial and environmental sustainability principles as fundamental components of infrastructure planning and management.

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1 APPLICATIONS AND APPROVALS

1.1 PURPOSE OF SECTION

The Design and Construction Manual has been prepared to provide guidance through the process of Operational Works applications and associated design and construction of streets, roads, drainage and other associated activity within the Scenic Rim Regional Council area.

This Section describes the application process in accordance with the requirements of the Sustainable Planning Act 2009, which has superseded the Integrated Planning Act 1997. It also provides an overview of the process through the approval, construction and completion phases of the development. Section 2 provides the technical reference information required in the preparation of design drawings for Operational Works. Section 3 includes the construction specifications and describes the required testing and level of supervision required in this phase of development. Section 4 describes the "As Constructed" requirements at the completion of the construction phase after the works have been accepted "On Maintenance". The Manual concludes with a number of Appendices which provide all the standard forms required for the application and construction phases.

Attached to this manual is a complete set of standard drawings referred to in Sections 2 and 3. These drawings are provided in a .pdf version on the Council's web page.

This Manual is derived from information gained from many sources including from within Local Government and from the private sector. It will be used as a basic standard against which all design applications and construction works within the Region will be assessed. The production of this Manual is however an evolutionary process and Council welcomes all constructive comments in relation to improving the standard of design and construction of works within the Region.

1.2 SUSTAINABLE PLANNING ACT

New planning and development laws came into effect on 18 December 2009. The Sustainable Planning Act 2009 (SPA) replaces the Integrated Planning Act 1997 (IPA). The purpose of SPA is to achieve ecological sustainability through managing the process by which development takes place.

1.3 INTEGRATED DEVELOPMENT ASSESSMENT SYSTEM (IDAS)

When a development application is lodged with Council the process that is followed during assessment is called the Integrated Development Assessment System (IDAS).

The IDAS process incorporates four stages. However, the four stages of the IDAS may not apply to all development applications. Simple development applications may trigger only two stages.

More complex and environmentally sensitive proposals may trigger all four stages. The Department of Infrastructure and Planning provides information regarding the IDAS process and IDAS flow charts. For more information regarding these flow charts, visit the following website:

http://dlgp.qld.gov.au/development-applications/flow-charts.html

SPA recognises that ecological sustainability can be achieved by planning for and managing the development process in the natural and built environments. SPA brings all development related activities into one coordinated assessment system.

For more information on SPA visit the Department of Infrastructure and Planning website:

http://dlgp.qld.gov.au/planning-development/

A copy of the Sustainable Planning Act 2009 is available on the Queensland State Government's legislation website:

http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/S/SustPlanA09.pdf

1.4 SPA APPLICATIONS

1.4.1 APPLYING TO COUNCIL

Under SPA, applications for various types of development are processed through the "Integrated Development Assessment System" (IDAS). Development includes:-

- Building Work
- Plumbing or Drainage Work
- Operational Work
- Reconfiguring a lot (subdivision), and
- Making a Material Change of Use of premises.

"Operational work" *means—*

- extracting gravel, rock, sand or soil from the place where it occurs naturally; or
- planting trees or managing, felling and removing standing timber for an on-going forestry business (whether in a native forest or a plantation); or
- excavating or filling that materially affects premises or their use; or
- placing an advertising device on premises; or
- undertaking work (other than destroying or removing vegetation) in, on, over or under premises that materially affects premises or their use; but does not include building, drainage or plumbing work.

Under SPA, all development is exempt from obtaining an approval unless it is identified as "assessable" development or "self-assessable" development. Exempt development does not require a development application. Lists of activities which are exempt development are found in the various Council Planning Schemes.

"Self-Assessable" development is an activity that may be carried out without a development application being made. Such activities must comply with any codes of development that apply to the development. These codes are explained below.

"Assessable" development is an activity that requires an approval before it can begin. For these activities, Development Applications are required. There are two forms of assessment for applications:-

- Code Assessment, where the proposal is assessed against codes that set the standard for development, and
- Impact Assessment, where the impacts and effects of the proposal are assessed and managed.

The IDAS allows for two kinds of approval:-

- Preliminary Approvals, and
- Development Permits.

A Preliminary Approval approves Assessable Development, but does not authorise it to occur. Development is subject to conditions and approved to the extent stated. A Preliminary Approval could be used to determine the important or controversial aspects of a proposal, without the need to prepare detailed engineering or building plans.

A Development Permit authorises Assessable Development to occur. It too is subject to conditions, and approved to the extent stated.

A Development Permit is necessary for Assessable Development, but is not required for Self-Assessable or exempt development. The IDAS allows for more than one form of development to be applied for simultaneously. Note: an application can be for a Preliminary Approval and for a Development Permit simultaneously.

1.4.2 FORMS

Refer to the Department of Infrastructure and Planning web site for relevant forms:

http://dlgp.qld.gov.au/forms-templates/idas-forms-guides-and-checklists-spa.html

It is recommended that checklist 4 also be completed and submitted.

The following general advice on the various Sections and questions is intended to provide assistance in completing the application form. If you have specific queries about a particular question or matter, it is recommended that you discuss the query with a Council Officer from the relevant Section or Department.

Applicant Details
The first Section is to ensure that Council can contact you correctly.

Property Description
This section assists Council in correctly identifying the land to which the application refers. The Site Address and Locality is the land's postal address, including the street numbers assigned by Council. The Real Property Description (RPD) is how the Land Titles Office in the Queensland Department of Natural Resources identifies land. It generally is Lot XXX RP YYYYYYY. "SP" has now replaced "RP", and all land recently titled will have this format. Other land may be designated as an S, W or WD, depending upon how and when it was first titled.

The Site Address, Locality and RPD are available from Council's Rates Department, and are also indicated on Council's Rates Notice for easy reference.

Landowner's Consent
This section also assists Council in correctly identifying the land the subject of the application. The Act requires the written consent of all landowners for the application to be assessed as being properly made. If there is more than one owner **all** owners must sign the application form.

Proposal Details
This section sets out the various types of development and whether the application is for a Development Permit or a Preliminary Approval. These are outlined above.

1.4.3 FEES

Fees associated with applications for Operational Works are listed in Council's Fees and Charges schedule located on Council's website:

http://www.scenicrim.qld.gov.au/busdev/forms.shtml

1.4.4 THE APPLICATION PROCESS

1.4.4.1 APPLICATION

Applications processed under the IDAS generally follow the process below.

The IDAS assessment process for code assessment incorporates three stages, being:-

1. Application Stage
2. Information Request Stage
3. Decision Stage.

The IDAS process places a number of responsibilities upon the Applicant and upon Council as the Assessment Manager. It is important for Applicants to note that applications may lapse should certain actions be not undertaken within a set time frame.

Applicants may make a change to their applications at any time prior to a decision being made. Such changes must be in writing to the Assessment Manager. The timeframes and processes of assessment are then modified in such situations.

Applicants may also withdraw their application at any time prior to a decision being made. Withdrawals must also be in writing to the Assessment Manager.

Applications and all supporting materials are open to public inspection until:-

- the Assessment Manager rejects the application as Not Properly Made, or
- the application is withdrawn or lapses, or
- the last period in which an appeal may be made against a decision as the case may be.

Public scrutiny does not apply to sensitive security information together with other material which Council considers is not required for a third party to access for the purposes of evaluating or considering the impacts of a proposal.

1.4.4.2 ACKNOWLEDGEMENT

Acknowledgement notices are only required to be issued under SPA when there are referral/concurrence agencies involved (Section 267) and applications other than those which are code assessable.

1.4.4.3 INFORMATION REQUESTS

Where the Assessment Manager or a Referral Agency considers that insufficient information has been provided, an Information Request will be made to the Applicant.

The Assessment Manager will request further information in an Information Request. The Information Request will be made within 10 business days of the submission of the application.

Extending Information Request period - The assessment manager of concurrence agency may, by written notice given to the applicant and without the applicants' agreement, extend the information request period by not more than 10 business days (giving 20 business days in total).

Refer to the relevant section of the Act for further detail on Information Requests.

Applicants must respond to an Information Request in writing. Responses may include:

(a) the full provision of information, or
(b) the part provision of information, with a notice asking the requesting authority to proceed in assessing the application, or
(c) the giving of a notice to the requesting authority stating that it is not intended to supply any of the information requested, and asking the requesting authority to proceed in assessing the application.

A response to an Information Request must be given within 6 months, after which point the application will lapse. An extension of this time is possible but **must** be requested prior to the expiry of the application.

The Assessment Manager may make a further request for additional information or design amendments during the assessment of the Operational Works application. The applicant may choose to respond to this and further requests by providing the information or may advise the Assessment manager in writing that no further information will be provided. The Assessment Manager will then consider the application based upon the information provided.

1.4.4.4 DECISIONS

Following the completion of all the preceding stages, the Assessment Manager's decision making period commences. This period runs for 20 business days after which the Assessment Manager must issue the Decision Notice within 5 business days after the day the decision is made.

All applications for Operational Works will be assessed and decided by Officers of Council's Infrastructure Services Department. All inquiries, regarding Operational Works, should be directed to this Department only.

Decisions are based on the assessment of the proposal, and may be for approved with conditions, or refused. Approvals may be for all or part of the application, and must include any conditions required by a Concurrence Agency (if applicable).

Decision Notices are issued to Applicants only, and include the decision, conditions and appeal rights.

1.4.4.5 NEGOTIATED DECISIONS AND APPEALS

Following the issue of a Decision Notice, all parties involved have appeal rights.

The Applicant may seek to renegotiate conditions with the Assessment Manager. The Applicant may appeal against the decision or conditions. Refer to:- http://www.dlgp.qld.gov.au/dispute-resolution for assistance on the negotiated decision and appeal procedures.

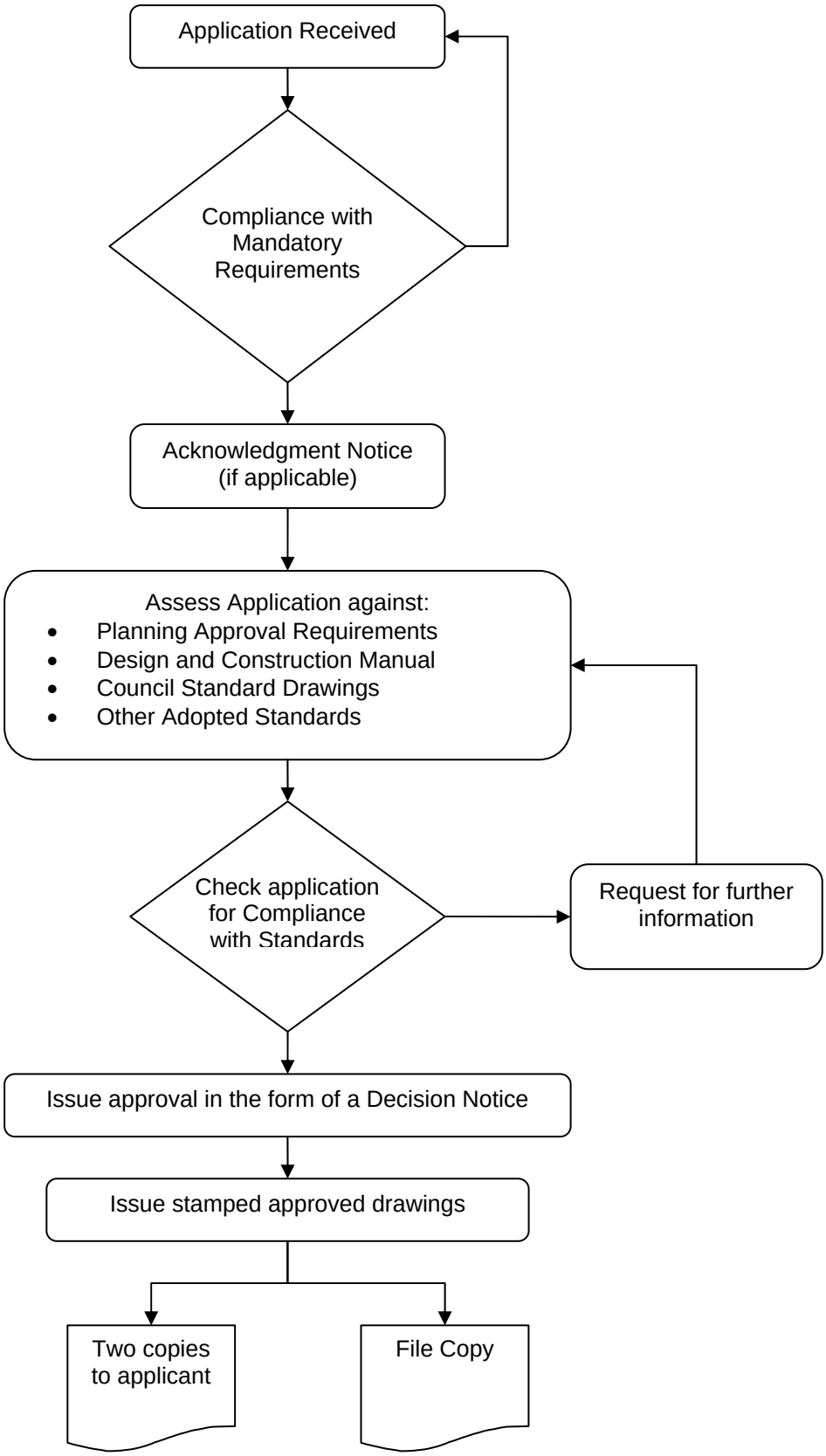
1.4.4.6 APPROVALS

Following the issue of the Decision Notice and the resolution of any appeals, an approval then becomes valid. Conditions however may also state when an approval may take effect. Approvals are valid for a "currency period" before they lapse. Unless the approval states or implies a time for the approval to lapse, the currency period starts the day the approval takes effect. For more information on currency periods and approval validity, refer to the Sustainable Planning Act 2009, or contact Council's Infrastructure Services Department.

Note: Comprehensive User Guide outlining all aspects of Operational Works can be found on Council's website (Operational Works tab): http://www.scenicrim.qld.gov.au/operational-works.

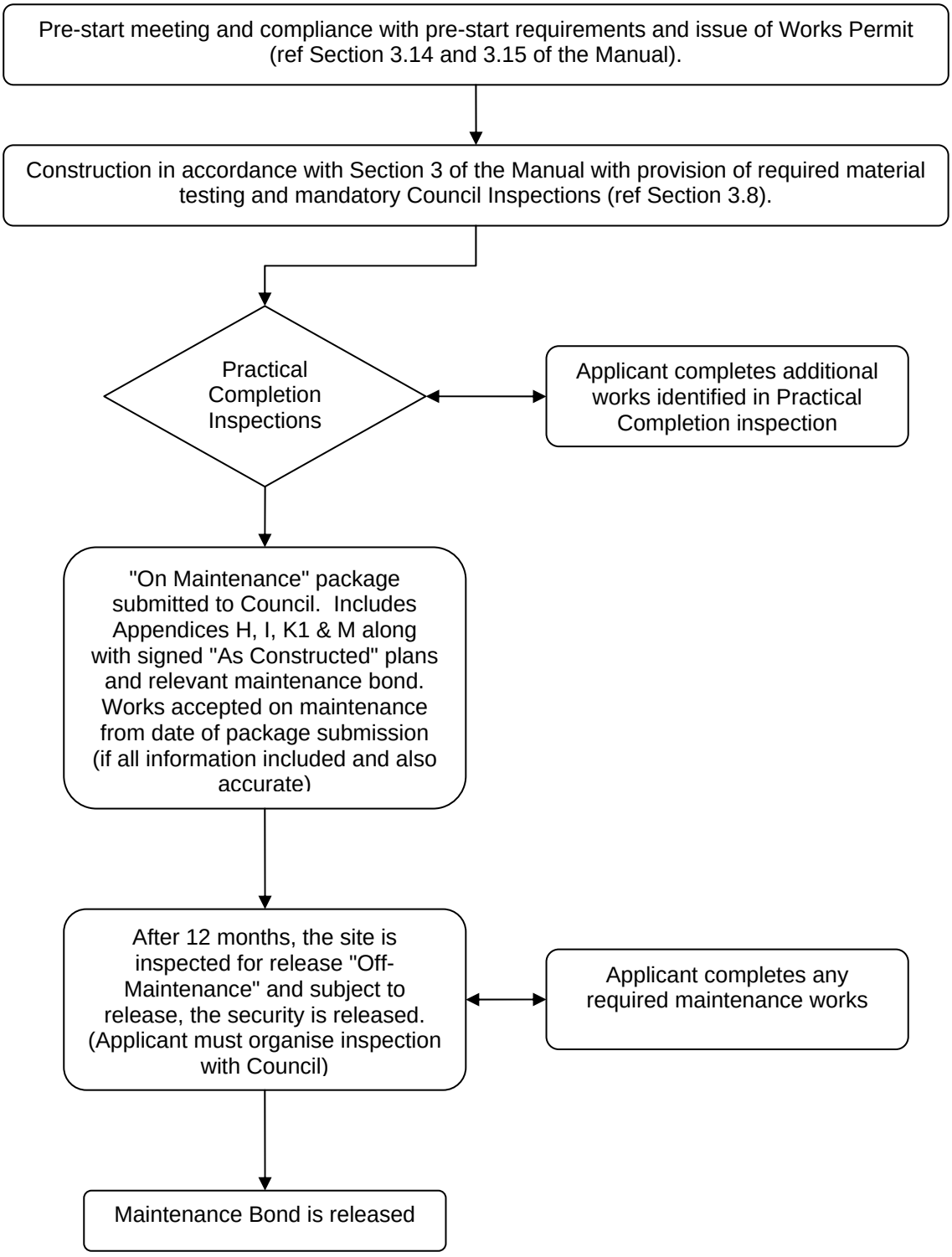
1.4.5 OPERATIONAL WORKS PROCESS

The following flowchart describes the above process of application – assessment approval:



1.4.6 OPERATIONAL WORKS (CONSTRUCTION PHASE)

Operational Works will not commence without the issue of a Development Permit and a Works Permit. The construction and completion of the Works will follow the following process.



1.4.7 PLANS OF SUBDIVISION

The plan of subdivision must be lodged with Council for signing and sealing within the currency period. (ref 1.3.4.6).

The Council must sign and seal the plan of survey when:

- all Appendices as required in the Design and Construction Manual have been submitted
- the conditions of the development permit about the reconfiguration have been complied with; and
- for a reconfiguration that required operational works, the conditions of the development permit for the operational works have been completed; and
- there are no outstanding rates or charges levied by the Council or expenses that are charged over the land under any Act; and
- the plan is prepared in accordance with the approved development permit.

Note: This action is the responsibility of Council's Planning Department

2 DESIGN REQUIREMENTS

The purpose of this Section is to provide a broad overview of the design phase associated with operational works within the Region and to document the various references used in the preparation of these **minimum** design standards.

2.1 INTRODUCTION TO DESIGN REQUIREMENTS

2.1.1 GENERAL

The design requirements outlined herein should save considerable time and effort on the part of both Designers and Council Officers by reducing the necessity for examination and amendment of submitted designs.

The adoption of this Manual does not imply limitation in any way of Council's rights to impose differing conditions for developmental proposals, or limitation of the discretion of the Director Infrastructure Services to vary the engineering requirements in respect of a particular development, having regard to good engineering practice.

It is strongly recommended that consultants have discussions with Scenic Rim Regional Council prior to and during the design, to agree on design concepts and ascertain specific requirements related to the design in hand.

A pre-design site inspection is expected to be undertaken prior to any detailed design work commencing unless otherwise agreed. For Designers undertaking works on behalf of Council or Developers it is recommended that a pre-design site inspection should be held with a representative from the Council's Infrastructure Services Department to discuss specific issues and requirements for the site and surrounds

This Manual shall be read in conjunction with Council's Planning Schemes, statutory requirements including the Local Government Act, Sustainable Planning Act and other references as detailed herein.

Any conflicts or departure from Council's Standard Drawings and the Design and Construction Manual shall be brought to the attention of the Director Infrastructure Services for final determination.

Where reference to Council's Standard Drawings, Department of Transport and Main Roads Manuals or other Guidelines and Standards as made in this Manual, the current issues at the design stage shall be adopted as these may be amended or upgraded from time to time. Council may also adopt additional Manuals, Guidelines and Standards from time to time, after advice of which the developer shall adopt.

Where staged development has been approved by Council, Council may require engineering design and construction to include the whole of the land, or such additional parts of the land as will enable the Council to maintain the works in a satisfactory condition if the balance of the development does not proceed to completion (e.g. temporary end of road turn around & drainage outlets).

All construction, i.e. pavement, footpaths, kerb and channel, drainage etc. shall be designed to join smoothly to existing construction to the satisfaction of the Director.

The design shall include sufficient information outside the boundaries of the proposed development to verify that any future extension of the proposed works can proceed in accordance with Council's standards and without any undue cost to future development.

In accordance with the main objects of the Professional Engineers Act 2002 being:
(a) to protect the public by ensuring professional engineering services are provided by a registered professional engineer in a professional and competent way; and
(b) to maintain public confidence in the standard of services provided by registered professional engineers; and
(c) to uphold the Code of Ethics of that of Registered Professional Engineers.

All design drawings and calculations shall be supervised and certified by a Registered Professional Engineer of Queensland (Civil) before being submitted to Council for examination. The name and RPEQ number of the Engineer must be printed below the signature.

Scenic Rim Regional Council periodically reviews its design standards and accordingly, comment or constructive criticism is invited. Any comments should be made in writing to the Director Infrastructure Services.

2.1.2 OBJECTIVES

This Manual is designed to reflect the provisions of subsidiary codes, such as Queensland Streets, Complete Streets, Queensland Urban Drainage Manual (QUDM), Austroads publications, Queensland Department of Transport and Main Roads Design Manuals and Water Sensitive Urban Design guidelines, to reflect the specific requirements of Council.

It is Council's expectation that Quality Assurance principles will be implemented by each developer in the development of land to minimise the time and resources taken in examining each element for compliance and hence to produce a fully serviced development at the lowest cost.

2.1.3 CONCEPT CONSIDERATIONS

At the concept stage of the development, the developer is advised to make preliminary enquiries to determine whether, in Council's view, there are technical and/or Town Planning impediments, to the development.

Important technical considerations include:

(a) the availability of overland drainage paths, including whether such paths are necessary downstream and can be obtained by negotiation with downstream owners. For example council will not approve a downhill cul-de-sac unless there is public land downstream of the cul-de-sac which can accommodate the Q100 overland flow path;
(b) the proposed road layout particularly in relation to design standards, topography of the site and recognisable road hierarchy;
(c) the proposed developmental finished surface levels in relation to flood levels in existing streams, open channels and drainage pipes;
(d) the effects on existing developmental infrastructure;
(e) the effects on the natural environment, particularly with regard to statutory requirements; and
(f) the relationship of the development to Park, Recreational and Community facilities.

2.1.4 DEFINITIONS

Definitions of terms used within this document shall be as given in Beaudesert Planning Scheme, Boonah Planning Scheme and Ipswich Planning Scheme and Subdivision of Land By-laws. Further definitions applicable to this Manual are given below. However, in the event that a definition is disputed by any party, the decision of the Director Infrastructure Services in the matter shall be final and binding upon all parties.

"Applicant" means the person or corporation making application to Council for approval for a proposed development.

“Council” means Scenic Rim Regional Council

“Council’s Planning Schemes” means the planning schemes adopted by the former Beaudesert Shire Council, Boonah Shire Council and Ipswich City Council.

"Council's Works Inspector" means the officer nominated by the Director to carry out the duties of inspecting the construction of the development on behalf of Scenic Rim Regional Council.

"Consultant” means a Registered Professional Engineer of Queensland who has been appointed by the developer to provide professional engineering advice for the proposed development.

"Contractor" means the person or corporation bound to execute construction and related work on behalf of the developer.

“Director” means Director Infrastructure Services as appointed by Council, or other person/s authorised by the Director to act on his/her behalf in particular circumstances.

"Developer" means the person or corporation, who has been granted development approval by Council, which required a design submission, prepared by a Consultant, for examination by Council.

"Licensed Surveyor" means a Registered Surveyor whose registration by the Surveyors Board of Queensland is endorsed to the effect that the person may perform cadastral surveys.

“Manual” means the Scenic Rim Regional Council Design and Construction Manual

"May" is used to indicate an option, whether for Council or for the developer, as the context makes clear.

"Principal Consultant" means a Consultant who has been appointed as a Consultant by the developer to co-ordinate and supervise the work of other Consultants.

“Region” means the area of land under Scenic Rim Regional Council jurisdiction.

"RPEQ" means a Registered Professional Engineer Queensland currently registered by the Board of Professional Engineers in Queensland and competent to practice in the relevant field.

"Registered Surveyor" means a person who is registered by the Surveyors Board of Queensland as a surveyor.

"Shall" is used to indicate a requirement of Council, which must be complied with under any conditions specified.

"Should" is used to indicate a guideline of Council, which must be complied with unless the Director decides that it can be relaxed or deleted, having regard to good engineering practice.

"Supervising Engineer" means a Consultant who has been appointed by the developer to supervise the construction works for the development.

2.1.5 BILL OF QUANTITIES AND ASSET REPORT

The consultant shall provide Council with a Bill of Quantities at the time of submission of the engineering documentation. The Bill of Quantities need not include the contract prices. At the completion of the construction, the consultant shall provide Council with a completed Asset report (ref Appendix M) which reflects the actual construction costs, constructed volumes, areas and length of items constructed. This information enables Council to update its Asset Register.

2.2 STANDARD ENGINEERING CONDITIONS

2.2.1 ENGINEERING DOCUMENTS TO COUNCIL FOR APPROVAL

The documents shall include a copy of Council's Decision Notice with condition/s and variations thereof, if applicable.

One set of documents shall be submitted to the Director.

Documents to be submitted shall include, but not be limited to:-

(a) completed "IDAS Development Application Form**"** as described in Section 1 of this manual.
(b) completed "Operational Works - Engineering Documentation" form; - **Refer Appendix A**
(c) completed "Engineering Documentation - Application Check List" form; - **Refer Appendix B**
(d) a complete set of engineering drawings, covering the works to be constructed;
(e) Project Specification and Bill of Quantities;
(f) full design calculations, including catchment plan for all stormwater drainage included in the proposed works;
(g) electrical, street lighting and communication conduit layout/pole location drawings;
(h) Council's review/supervision fee, with calculations attached, based on Council's Schedule of Fees, Charges and Licenses current at the time of lodging of the documentation; and
(i) completed Annexure A and B to General Conditions of Contract AS2124-1992, or subsequent revisions, if required on Council Contract Works.

All drawings and calculations shall be certified as checked, and approved, by the Developer's Consultant before submission. After review by Council, documents shall be amended to conform with Council's requirements, if any, and **one set of amended construction documents** shall be lodged with Council for review.

Following approval by Council of the documents additional extra sets - as set out in Appendix A - are to be submitted for stamping.

Where the roads, frontage treatment or services of a development abut a declared main road, the engineering documentation submission must reflect any conditions set by the Queensland Department of Transport and Main Roads.

Where drainage outlets require permission from downstream owners and/or statutory bodies to discharge, a letter of approval from the appropriate persons, or Authorities, is required indicating that an easement will be granted to Council by the downstream owner prior to the completion of inspection of engineering drawings. - Refer 2.10

2.2.2 BASIS OF OPERATIONAL WORKS REVIEW

Council's review of the design and documentation is in effect like an audit where any issues and deficiencies may be pointed out but not necessarily a solution given, it should not be taken to mean that the documents have been checked in detail, and Council accepts no responsibility for their accuracy. If during construction inadequacies of the design are discovered, it is the responsibility of the Principal Consulting Engineer to resubmit amended plans to Council for approval and have the works rectified accordingly. Notwithstanding this the RPEQ engineer assumes full responsibility for all designs and will be required to certify all designs and final As Constructed drawings.

Notwithstanding any review given to engineering documents, where a discrepancy occurs between these documents and Council's standards, then the Director will make the determination. If in fact, there are errors, omissions or insufficient detail on the drawings for the purpose of construction, such deficiencies are to be made good during construction and Council reserves the right to withhold approval of construction until such remedies are complete.

2.2.3 MATTERS TO BE ADDESSED IN THE PROJECT SPECIFICATION

Notwithstanding Council's examination of construction plans, it is the responsibility of the Developer to ensure that all connection to contiguous constructions are constructed correctly as to level, alignment and grade and where necessary, subject to the requirements of Council's Works Inspector, existing construction shall be altered to achieve this.

All Standard Specifications, as set out in the appropriate sections of Part 3, to be used for the project are to be clearly identified in a separate Clause of the Project Specification.

Any other Standard Specifications (not incorporated in Part 3) which are required for the construction of the project shall also be clearly identified in a separate Clause of the Project Specification. A full copy of each of these Standard Specifications shall be included in the documentation submitted to Council for review, and in the Tender Document.

A copy of the fully itemised Bill of Quantities, including work descriptions, for each section of the proposed works shall be incorporated in the documentation submitted to Council for review. Refer 2.1.6.

Supplementary specifications may be included at the Consultants discretion for those work elements so listed in Appendix H.

All erosion/sediment control devices, required under Sections 2.6, 2.8 and 3.13 of this Manual, either during and/or after construction are to be clearly defined in the Project Specification, Bill of Quantities and on the Drawings.

2.2.4 REFERRALS

Approval of documentation for and construction of works on Queensland Department of Transport and Main Roads, roads shall comply with the requirements of that Department.

One set of documents, as approved by the Department, shall be forwarded to Council for review of connections with the design of internal works before Council's Approval of Documentation will be given.

When the subject land is bounded or traversed by a watercourse as defined in the Water Resources Act 1989 and prior to commencement of works on site, the applicant shall forward evidence to Council of clearance from the Department of Environment and Resource Management (DERM) stating that the Department has no requirements. Should the Department have requirements then all approvals, permits, licenses etc. required must be submitted to Council for review before Council's Approval of Documentation will be given.

If work has been undertaken which required DERM approval, the developer shall provide evidence to the Director Infrastructure Services that those works have been completed to the satisfaction of the Department at the time of lodging documents for sealing of plans of survey.

2.2.5 CLIMATE CHANGE

Scenic Rim Regional Council has developed a Climate Change Strategy for 2010-2015. The aim of the Strategy is to address the significant global issue of climate change in the Scenic Rim Region. The strategy addresses the following components:

- Climate Change – cause and effects.
- International and national response.
- Local Effects and Response.
- Action Plan towards low carbon community and corporate carbon neutrality.
- Highlight supporting documentation.

In accordance with the aim, the key objectives of this document are:

1. To provide information in relation to the background science of global climate change; cause and effects, current policy positions and local predictions.
2. To provide a framework for the implementation of a range of strategic and operational functions that contributes to achieving a low carbon community and corporate carbon neutrality.
3. To detail funding principles and priorities towards the allocation of revenue towards the relevant programs.

Given the expected impacts of climate change, this global phenomenon poses a threat to the Region with resulting rise in temperatures, increased storm strength and frequency, changed rainfall patterns, frequency of droughts, biodiversity loss, heat waves and bushfires. This means that market-driven forces such as insurance risk assessments and consumer demand may require planners, and engineers to adopt design outcomes that exceed current industry standards.

Architects, developers, planners and engineering consultants are encouraged to consider climate change projections that reflect the anticipated design life of their development and/or future local government assets. This will ensure a favourable whole of life cost benefit for all future assets.

Council promotes the use of water sensitive urban design principles on all major infrastructure projects.

Responding to climate change is the responsibility of every level of government, as well as the broader community. Council has the potential to respond to climate change through its policy, land-use, infrastructure and transport planning, natural resource management, integrated water management, economic development, social, disaster management, and community development services and functions.

Innovation and partnerships will play a major role with the success of the Strategy dependent on involving community and government and tapping into local and global knowledge.
As part of Council's Corporate Plan initiatives for environmental management Council will:-

- mitigate and offset the effects of climate change on the region by developing and implementing a range of initiatives,
- reduce the use of non-renewable resources by identifying, promoting and implementing environmentally sustainable principles and practices.

As noted in the Australian Government's Climate Change Adaptation Actions for Local Government, local government's response to climate change requires a dual approach:

- management and reduction of greenhouse gas emissions (mitigation)
- making adjustments to existing activities and practices so that vulnerability to potential impacts associated with climate change can be reduced or opportunities realized (adaptation)

The potential impact of Climate Change on Council's Assets relating to roads, stormwater and recreational facilities are as noted below:

Road/pavement construction and maintenance	• Changes in rates of deterioration – faster deterioration in wetter areas but potentially slower deterioration in areas where rainfall decrease. • Deterioration may also result from higher temperatures and increased solar radiation. • Changes in frequency of interruption of road traffic from extreme weather events and emergency transport routes disrupted.
Stormwater/drainage	• Exceedance of existing flood defences. • Exceedance in drainage capacity. • Changes in mean and peak stream and river flows. • Lower levels of rainfall, reducing pressure on stormwater systems.
Provision and use of recreational facilities	• Increased costs associated with operation and maintenance costs of public amenities/recreational sites due to storm damage.
Maintenance of recreational facilities	• Reduced water quality and quantity resulting in less watering/irrigation of open space and sports grounds and closure of ovals.

2.3 DRAWING AND DOCUMENTATION PRESENTATION

The purpose of this Section is to ensure as far as possible that engineering drawings and other documents are uniformly prepared to a common standard and that the level of detail is sufficient for accurate construction and that Council and other users of the documentation are able to consistently locate and readily compare information, and are able to rely on its accuracy.

2.3.1 DRAWING BASIS AND DESIGN SURVEY REQUIRED

2.3.1.1 SHEET SIZES AND PLAN STANDARD

All final engineering drawings shall be on standard A3 size sheets unless otherwise approved by the Director. Drawings shall be produced to a standard acceptable to Council for scanning.

2.3.1.2 *SCALES*

Scales used for all drawings shall be those recommended by the Standards Association of Australia:

1:1, 1:2.5, and 1:5 and multiples of 10 of these scales

The following scales are suggested for particular uses but these may be varied as appropriate to the works concerned.

Plan	1:1000 or 1:500
Longitudinal Section	
Horizontal	1:1000 or 1:500 (Preferable matched to the plan)
Vertical	5 or 10 times the horizontal scale
Cross Sections	1:100 (Natural Scale only will be accepted) or 1:200 on A3
Intersection Details	1:250
Access chamber details etc.	1:25 or 1:10

Landscaping Drawings – Minimum Scales	
Concept sketches (Subdivisions)	1:1000
Concept sketches (Building)	1:200
Landscaped Working Drawings	
Schematic layout details (Subdivisions)	1:500
Schematic layout details (Buildings)	1:200
Complex planting details	1:100
Specification and Construction details	1:50

2.3.1.3 DIMENSIONING ON DRAWINGS

Linear dimensions on all drawings shall be in metres, with the exception of some detail drawings of small structures (e.g. access chambers), which may be in millimetres. Architectural and building drawings are to be in millimetres.

2.3.1.4 SURVEY INFORMATION FOR DESIGN OF WORKS

A copy of the Surveyor's lot calculations (in plan form) used for the engineering design shall be supplied to Council with the documentation for review. Where necessary, allotment calculations and surveys shall be varied to provide approved road verge widths, following review of the Engineering Documentation.

Sufficient levels shall be obtained for the extent of the development to enable:

- Long sections to be shown, for the centreline of all roads, stormwater drainage lines (including outlets), trunk water mains and sewerage lines, with natural surface levels shown accurately.
- Cross Sections to be drawn for roads and open drains nominally at twenty (20) metre intervals on straights and ten (10) metre intervals on curves, and at significant changes of grade on the longitudinal section.
- Contours to be drawn to accurately represent the natural surface of the land.

The vertical and horizontal datum to be used for survey and design shall be the Australian Height Datum (AHD) and Geocentric Datum of Australia, 1994 (GDA94) respectively. (Unless application is made to Council to vary this and written approval is given by Council.)

2.3.2 DRAWINGS - GENERAL

Consultants must have systems in place to adequately assure the quality of their own Engineering drawings, documents and reports. Council will only carry out checks to ensure that the design presented broadly conforms to Council's Standards. Council's review does not constitute a full design check of all calculations and drawings. This is the responsibility of the RPEQ for the Project.

In keeping with the above, the Consultant shall complete the Engineering Documentation Application Checklist (refer Appendix B) and take full responsibility for errors and omissions in the Design Drawings submitted.

2.3.2.1 INFORMATION REQUIRED

Full engineering drawings, prepared by a RPEQ (Civil), - experienced in this field shall be submitted for all roadworks and associated stormwater drainage, sewerage, water supply, allotment improvement works and all other aspects of the development.

Electricity reticulation and street lighting shall be prepared and certified by a RPEQ (Electrical) - experienced in this field - and coordinated and lodged by the RPEQ (Civil) who will act as the Principal Consultant.

The Consultant shall, before commencing detailed engineering drawings, prepare overall layout plan/s for water and sewerage reticulation and submit to Council for preliminary review and comment.

Landscaping plans shall be coordinated and lodged by the RPEQ (Civil) acting as the Principal Consultant and a representative of the Developer.

All engineering design shall be fully documented and include all information necessary for interpretation of design decisions. Proprietary computer software shall be supported by verification procedures and details of their theoretical basis. Software should be well documented and extensively used products.

The Consultant shall provide computer software data and output files covering engineering design where appropriate, and particularly in relation to drainage design.

Tabulated calculations for urban drainage are required and should include the same information and be in similar format to that shown in QUDM.

Revised stormwater drainage calculations shall be submitted if the drainage has been redesigned.

Drawings shall include the following:-

- Title Block
- Locality Plan
- Layout and Stage Plan
- Approved Street Names for individual plan layout/s and detail/s on each drawing.
- Plan layout/s, sections and details as required under the specific phases detailed in Section 3

2.3.2.2 TITLE BLOCK

- Council's file reference number
- Development name (if any)
- Locality
- Real Property Description
- Developer's Name
- Approved Street Name/s and specific details included in each drawing
- Drawing Number and Sheet Number
- Signed design certification
- Signed check certification
- Signed approval certification, by a RPEQ (Civil), with name and number printed below his signature.
- Bar Scales used on each drawing
- Schedule and Date of Amendments, all of which are to be initialled by the certifying Registered Professional Engineer (Queensland)

2.3.2.3 LOCALITY PLAN

Location of the development in relation to adjacent town, main road, major streets etc.

2.3.2.4 LAYOUT AND STAGE PLAN

The layout plan shall be in the form of a "Master Plan Layout" showing the relationship of all new roads to each other, and to existing roads adjoining the development.

Where development is to be constructed in stages, the boundaries of proposed Stages shall be shown on this plan, and the stages identified by numbering.

For small developments, where all new road/s can be shown on one detail plan, the layout plan may be omitted.

Existing and proposed streets (including approved street names obtained at the time of Subdivision Approval) adjacent to and fronting the proposal and abutting frontage roads shall be included on layout plans.

All services, natural features, significant trees etc., shall be shown on existing road reserves.

Details of the Permanent Survey marks, including the A.H.D. level, from which the levels were transferred, shall be included.

2.3.3 DESIGN DRAWINGS - EARTHWORKS AND ROADWORKS

In addition to the requirements under 2.4.1 and 2.4.2 these drawings shall include the following fully detailed information.

2.3.3.1 PLAN

Plan of each road shall include:-

- Road reserve boundaries, including adjoining existing roads, and approved names on each street
- Allotment boundaries, both existing and proposed
- Design centreline, and control lines if not on centreline
- Chainages, on centreline or control lines
- Bearings of the centreline
- Offsets, if the construction line is not the centreline
- Tangent point chainages of each curve
- Data for each curve including Radius (R), Tangent Length (T), Arc Length (A), Spiral Length (S) and included Angle (<)
- Road reserve boundaries, centreline, and bearing of each intersecting road
- Chainage of the Intersection Point of road centrelines
- Kerb lines, kerb types, kerb radii and chainage of all tangent points of the kerb line, where kerb and channel is to be constructed
- Edge of pavement, where no kerb or kerb and channel is to be constructed
- Dimensioned road reserve, verge, footpath and pavement widths, where these differ from the standard cross section/s
- Location and details of signs, and road markings, to be provided for small development only. Separate sign and marking plans are required for larger developments
- If no kerb and channel, cross-road culvert/s location/s including diameter/s of pipe/s - refer 2.7 for further required data
- Separate drawings are required for drainage where kerb and channel is to be constructed
- Location of existing utilities or other existing works within the site
- Limits and levels of cuts and fills. A separate plan shall be submitted for large developments
- Sight distance lines are to be shown at all intersections and property accesses for all possible traffic movements.
- A Schedule of all Standard Drawing Numbers and Titles to be used
- Location of Bus Bays, where applicable
- Location of delineator posts or a noted reference to the MUTCD
- Location and levels of Bench Marks and Reference Pegs on Australian Height Datum
- North Point
- Easements - refer 2.10

2.3.3.2 LONGITUDINAL SECTIONS

Longitudinal Sections of each road shall include:-

- Chainages
- Design and existing surface levels
- A plot of the design and existing surface on the construction centreline
- Design grades

- Chainage/s and level/s of tangent point/s of vertical curves
- K-values of vertical curves with the related design speed and if absolute (Abs) or desirable (Des)
- Extent of curve widening, including tapers where applicable for horizontal curves
- Extent of superelevation, including transitions, and cross-falls where applicable for horizontal curves
- Design table drain invert/s showing localised deepening at invert/s and outlet/s of piped access crossovers, and other cases where the road grading is not followed.
- Line marking in accordance with the MUTCD
- Position of delineator posts
- Sight distance lines are to be shown at all intersections and property accesses for all possible traffic movements.

2.3.3.3 TYPE CROSS SECTION/S

A Type Cross Section, based on road classifications set out in Table 2.6A & 2.6C of this Manual, shall be shown for each road, including where applicable:-

- Road reserve width
- Kerb to kerb widths and type of kerb and channel, and/or kerb
- Pavement and formation widths if no kerb and channel is constructed
- Table drain details, as determined under 2.7
- Verge widths in rural residential developments must include a three metre wide services allocation (with a maximum cross-fall of 1 in 6) against the road reserve boundary on one side only.
- This allocation can vary from side to side of the road, dependent on cross-falls within the proposed road reserve. General cross-sections will detail these changes
- Cross-falls and widths of pavement and road verges - variations from Type Section/s to be detailed on affected general Cross-Sections
- Pavement depths shown in a Schedule under the Type Section, if the depth varies throughout the length of the road
- Median extent
- Pavement Surfacing details
- Turf behind kerb and channel, or other concrete or paved areas desirably to the property boundary but for a minimum width of 600mm and placed level with the verge to allow stormwater flows to top of kerb. Full turfing (as minimum scour protection) of table drains to the level of the outer edge of shoulder
- Concrete footpaths/cycleways

2.3.3.4 INDIVIDUAL CROSS SECTIONS

An Individual Cross Section shall be shown for each pegged chainage on each new road, including:-

- Road reserve boundaries
- Services locations
- Natural surface
- Pavement centreline and/or other construction line - with design surface level shown
- Design cross section, indicating overall pavement depth, as determined under Section 2.6
- Variation to cross-falls (including super-elevation) and widths (including curve widening) from Type Section/s are to be detailed and dimensioned on all affected cross-sections

When existing bitumen sealed roads are widened, cross-sections shall include the full existing sealed pavement cross-section at not less than 10m intervals. Each cross-section shall show the percentage crossfall on the existing bitumen surface and the design crossfall to the proposed kerb and channel or pavement edge. Notations on drawings shall also require the Consulting 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.

Because As Constructed cross sections are not required, the following standard note shall appear on each page of cross-sections. "For as constructed pavement centre line levels refer long section." Refer also Section 4.1.

2.3.3.5 INTERSECTIONS, CUL-DE-SAC HEADS, ROUNDABOUTS AND TRAFFIC CALMING ISLANDS

Detail plans shall be provided for all Intersections, Cul-De-Sac Heads, Roundabouts and Traffic Calming Islands and shall include, without limitation, all the relevant information required for plans together with additional details such as lip levels and longitudinal gradient plots on all kerb returns, kerb set-outs, pavement contours and channelisation works.

2.3.3.6 SIGNS AND PAVEMENT MARKING

Signs and Pavement Markings shall show all warning signs, regulatory signs, direction signs and pavement marking details adequately dimensioned for accurate setting out. The sign and line marking information shall generally be on a separate drawing to the other drawings referred to above.

2.3.4 DESIGN DRAWINGS - STORMWATER DRAINAGE

In addition to the requirements under 3.1 and 3.2 these drawings shall include the following fully detailed information.

2.3.4.1 LAYOUT PLAN/S

Layout plan/s of full system (including property drain lines where applicable) to be constructed, for kerb and channel and/or table drain systems shall include:-

- Line locations and numbers.
- Manhole, Inlet Pit and Outlet Structure Numbers and road chainages.
- Drain line/s offset/s from design centreline.
- North Point.
- A Schedule of all Standard Drawing Numbers and Titles to be used from 2.3.
- Any details, not covered by 2.3 are to be provided in the submitted documentation on a Project Specific basis.
- Easements - refer 2.10

2.3.4.2 LONGITUDINAL SECTION/S

Longitudinal Section/s shall be provided for all main lines, and inter-allotment lines, and shall include but not be limited to:-

- Chainages on an individual section basis.
- Existing and design surface profile, along line with levels at each structure.
- Pipe diameter, class, grade and invert levels.
- Manhole/Pit number and size.

- Hydraulic Grade Line and frequency (no levels to be shown).
- Location and invert level of other services crossing the drainage line.
- Limits of property/road reserve (with approved street names) in which the lines are located.

2.3.4.3 PIT SCHEDULE/S

Pit Schedule/s for all inlet pits and outlet pipes shall be provided on the same drawings as the Longitudinal Section in the following format (indicative sample included for information):-

INLET PIT SCHEDULE

CATCHMENT No	LINE No	PIT DETAILS			DRAIN SECTION	LIP LEVEL *	OUTLET PIPE		LENGTH (m)	GRADE %	OUTLET I.L	MANHOLE INLET I.L.
		No	Type	G or S			DIA. (mm)	CL.				
A	1	1A	M	G	1A-1	26.42	375	2	1.8	1.00	25.44	25.42

* means Lip Level of kerb and channel on centre line of outlet pipe.
G means “On Grade”
S means “Sag”

2.3.4.4 MANHOLE DETAIL DRAWINGS

Fully dimensioned Manhole Detail Drawings shall be provided showing inlet and outlet pipe configuration relative to the centre of the manhole, and any reinforcing details.

2.3.4.5 FULL DESIGN DRAWINGS - DRAINAGE STRUCTURES (NON STANDARD)

Full Design Drawings, including certified structural design (where applicable) for inlets, manholes, headwalls and inlet drop structures shall be provided.

2.3.4.6 DETAILS - INLET/OUTLET CHANNEL/S

Separate detail drawings shall be provided for all man-made inlet/outlet channels (including cross road culverts on road drawings) to prove channel adequacy and free outfall.

2.3.4.7 CATCHMENT PLAN

The catchment plan shall show all catchments including external areas contributing to the stormwater drainage design and the following:-

- Road reserve boundaries.
- Allotment boundaries.
- Control lines and chainages.
- Contours accurately representing the design surface on AHD.
- Catchment areas external to the total estate development. (Shall be determined by using available topographic information, Aerial Laser Surveys (ALS) or Council’s records.)
- Identification of drain lines.
- Identification of access chambers, catchpits and pipe outlets.
- Easements - refer 2.10

2.3.4.8 ENGINEERING DRAWINGS - STREAM AND OPEN CHANNELS

Engineering Drawings for stream and open channels (whether constructed or natural) shall include the following information:-

- Longitudinal and cross sections with invert levels, 10 year ARI and 100 year ARI flood levels, and existing and proposed surface profiles;

- Plans with existing and proposed surface contours and 10 year and 100 year ARI flood line; and
- Details of all proposed construction, including erosion control measurements etc.

2.3.5 LANDSCAPING DESIGN DOCUMENTATION

2.3.5.1 GENERAL

Landscape drawings may be submitted to Council in the form of concept sketches, and working drawings.

Concept Plans are typically a Council requirement at the material change of use stage of Planning Approval. These plans shall normally be accompanied by a brief report outlining design intent. Working drawings are to be submitted:

(a) in conjunction with the subdivision engineering design where landscaping is required as part of a Park or Open Space contribution or
(b) in conjunction with the building application for the proposed development or
(c) where no building work is involved, then before the use of the land for the proposed purpose.

Council may also ask the Consultant to provide:

- A vegetation or tree survey
- Referenced photographs or significant or typical environmental considerations on the subject site.
- An overlay of engineering drawings detailing road reserves, property boundaries and/or buildings existing/final contours and sewer, stormwater drainage and power alignment.

2.3.5.2 WORKING DRAWINGS

Landscape working drawings shall be adequately detailed to enable accurate construction of the proposed works.

Such plans shall conform to the criteria specified in the Landscape Design, Section 2.8 and Landscape Construction, Section 3.13 of this Manual.

In addition Working Drawings shall also incorporate:

- All existing or proposed landscape and associated treatments including edges, paving, fences, walls, signage, retaining structures, lighting, pillar boxes, street lights/poles, bollards, drainage systems, overland flow paths, culverts, pits, playground equipment, park amenity equipment, landscape furniture, gazebos, swimming pools, mail boxes, clothes hoists, waste disposal bins, taps, etc.
- Planting plans, with plants canopies are clearly grouped, coded and referenced to the plant schedule.
- Irrigation plans showing mains connection metres/valves, backflow prevention, power connection point, irrigation controller, valves, filters, pumps, chemical injectors, sprinklers, emission devices, sensing devices, layout of all pipework and wiring including conduits/crossings.
- Areas where access is limited or restricted due to environmental considerations or vegetation preservation requirements including notations to define and protect these areas.
- Earthwork cut/fill profile with levels noted.
- Any specific vegetation or areas of vegetation that are proposed to be removed; include relevant notations describing the removal process.

- Schematic location of all existing and proposed services in the vicinity of the landscape works. (E.g. water, sewer, stormwater, telecom and power).

As applicable notes shall be provided to describe:

- Construction details
- Installation procedures
- Product type and quality descriptions

Any amendments to design plans shall be clearly identified on the drawing and in the revision block of the drawing.

Council does not specify minimum standards for infrastructure materials for landscaping works within private property (i.e. not parks and open space). Council's Planning Scheme's requires that development landscaping carparks etc. are maintained at all times. The failure or poor maintenance of any infrastructure within the development site will be considered as a breach of the planning scheme and may result in disruption to business to site. It is therefore recommended that Council's minimum standards are observed and due consideration be given to the long term maintenance costs associated with the infrastructure.

2.3.6 SOIL EROSION AND SEDIMENT CONTROL

A Soil Erosion and Sediment Control Plan shall show but not be limited to the following information:-

- an accurate Real Property Description;
- a North Point;
- drawn to a scale which is suitable to the site, normally 1:1000;
- accurate contours at an interval suitable to the site (normally 1m);
- property boundaries;
- construction site/disturbed area boundary, outside of which no works, vehicle movements or stockpiling of materials shall occur;
- details of access points to construction site, and methods to be adopted for the removal of mud/dirt from vehicle tyres;
- location, details and dimensions of all permanent and temporary sediment control structures;
- location of existing vegetation to be retained and methods proposed to protect vegetation from machinery;
- location of vegetation to be removed and method of disposal;
- all existing watercourses and/or drainage structures on the subject and adjacent sites;
- a plan, at an appropriate scale, showing the relationship of the site with the catchment within which it lies as well as the site's relationship to any nearby permanent and intermittent waterways;
- temporary and permanent stormwater management;
- material stockpile areas;
- staging of the erosion and sediment control works in note form that schedules the implementation stages of the various techniques;
- finished levels (AHD) where appropriate;
- revegetation techniques;
- be in accordance with Best Practice Erosion and Sediment Control. International Erosion Control Association, (IECA) Australasia Chapter, 2008
- signed and dated by the person, who designed the plan/s and certified by the Registered Professional Engineer, Queensland.

2.4 COUNCIL STANDARD DRAWINGS

2.4.1 ROADWORKS STANDARD DRAWINGS

SRRC No./ DTMR No.	Superseded Drawings			Drawing Title
	Boonah No.	Beaudesert No.	Ipswich No.	
R-01				Drawing Index – Roads & General
R-02	STD.R-0008	50400	SR.22	Public Utilities – Typical Service Corridors and Alignments
R-03	STD.R-0009	50401	SR.23	Public Utilities – Typical Service Conduit Sections
DTMR 1045				Revegetation – Treatment of Cut Batters
DTMR 1178				Diversion of Water – Diversion of Water from Roadway & Table Drain
R-04	STD.R-0013	50410	SR.11	Kerb and Channel Profiles and Dimensions
R-05	STD.R-0002	50413	SR.12	Residential Driveways
R-06	STD.R-0003/04	50429/30	SR.13/14	Non-Residential Driveway
R-07	STD.R-0005	50416	SR.16	Rural/Rural Residential Access (Single & Double) – Piped
R-08	STD.R-0005	50417/18	SR.15	Rural/Rural Residential Access (Single & Double) – Invert
R-09	STD.R-0015/16	50401/02	SR.02-05	Typical Cross Sections – Residential Street
R-10	STD.R-0011	50403	SR.09	Typical Cross Sections – Rural Roads – Class 4
R-11	STD.R-0012	50403	SR.09	Typical Cross Sections – Rural Roads – Class 5
R-12		50404		Pavement Extension – Trenching and Widening
R-13	STD.R-0006	50419	SR.19	Concrete Path
R-14	STD.R-0017	50415	SR.17	Residential Drainage Connections
R-15	STD.R-0014	50421	SR.26	Street Name Sign
R-16	STD.R-0007	50414	SR.18	Kerb Ramp for Paths – Typical Detail Sheet 1
R-17	STD.R-0007	50414	SR.18	Kerb Ramp for Paths – Typical Detail Sheet 2
R-18	STD.R-0018	50411	SR.20	Subsoil Drains – Access Point
R-19	STD.R-0018	50411	SR.20	Subsoil Drains – Detail
R-20	STD.R-0019	50412	SR.20	Subsoil Drains – Typical Median Locations
DTMR 1474				Steel Beam Guardrail – Installation and Set out
DTMR 1475				Steel Beam Guardrail – Installation on Bridge and Barrier Approaches
DTMR 1476				Steel Beam Guardrail – Terminal Components
DTMR 1477				Steel Beam Guardrail – Posts and Blockouts, Soil and Bearing Plates, Slip Base Plate
DTMR 1478				Steel Beam Guardrail – W Beam Anchor Bracket Delineation Unit Post on Base Plate Abraham Blockout
DTMR 1479				Steel Beam Guardrail – Bolts, Nuts, Screws and Washers Cable Assembly with Fasteners
DTMR 1480				Steel Beam Guardrail – Fabrication Details for W Beam Rails and rail Components
DTMR 1481				Steel Beam Guardrail – Fabrication Details for Thrie Beam Rails and Rail Components

SRRC No./ DTMR No.	Superseded Drawings			Drawing Title
	Boonah No.	Beaudesert No.	Ipswich No.	
DTMR 1482				Steel Beam Guardrail – W Beam and Thrie Beam Assemblies
DTMR 1483				Steel Beam Guardrail – Thrie Beam Layouts
DTMR 1484				Steel Beam Guardrail – Batter Slope Terminals (1 on 1 or steeper)
DTMR 1485				Steel Beam Guardrail – Reinforcing Details for Concrete Terminal Block
DTMR 1488				Steel Beam Guardrail – Thrie Beam Bullnose Installation and Set out
DTMR 1489				Steel Beam Guardrail – Thrie Beam Bullnose Components
DTMR 1490				Steel Beam Guardrail – Installation and Set out Footing Details
DTMR 1491				Steel Beam Guardrail – Standard Guardrail Attachments to Culvert, Fabrication and Assembly Details
DTMR 1493				Steel Beam Guardrail – W Beam Connections for Concrete End Posts
DTMR 1494				Steel Beam Guardrail – Thrie Beam Connections for Concrete End Posts
DTMR 1508				Bridge Barriers – Steel Bridge Connections for Concrete End Posts
DTMR 1509				Bridge Barriers – Steel Bridge Traffic Rail End Post w Beam Connection
DTMR 1510				Bridge Barriers – Steel Bridge Traffic Rail End Post Thrie Beam Connection
DTMR 1511				Bridge Barriers – Bridge Safety Rail
DTMR 1512				Bridge Barriers – Bridge Balustrade
DTMR 1351				Road Furniture – Motor Grid
DTMR 1352				Road Furniture – Motor Grid with Vermin & Dog Fencing
DTMR 1353				Road Furniture – Vermin & Dog Fencing at Motor Grid
DTMR 1354				Road Furniture – Standard Bicycle Safe Fitting to Existing Motor Grid
DTMR 1355				Road Furniture – Alternative Bicycle Safe Fitting to Existing Motor Grid
DTMR 1448				Road Furniture – Motor Grid (RHS Rails)
DTMR 1449				Road Furniture – Motor Grid (RHS Rails) with Vermin & Dog Fencing
DTMR 1600				Fencing - Rural Fence and Gates (Timber Posts and Stays)
DTMR 1601				Fencing - Rural Fence and Gates (CHS Posts and Stays)
R-21	STD.G-0003	50435	SR.37	Fencing – 4 & 6 Strand Wire Fencing
R-22	STD.G-0005	50440	SR.34	Fencing – Chain Wire Security Fencing
R-23	STD.G-0008	50438	SR.32	Fencing – Weldmesh Fencing & Control Fence
R-24	STD.G-0002	50439	SR.33	Fencing – Tubular Steel Fence with & without Chain Wire
R-25	STD.P-0002	50425		Bikepath Entrance to Road Reserve
R-26	STD.P-0003	50428		Bikepath Pavement Joints
R-27	STD.P-0004	50426		Bikepath Slowdown Control – Reverse Curve
R-28	STD.P-0005	50427		Bikepath Slowdown Control - Chicane

2.4.2 DRAINAGE STANDARD DRAWINGS

SRRC No./ DTMR No.	Superseded Drawings			Drawing Title
	Boonah No.	Beaudesert No.	Ipswich No.	
D-01				Drawing Index – Drainage
DTMR 1043				Reinforcing Steel – Standard Bar Shapes
DTMR 1044				Reinforcing Steel – Standard Hook, Lap and Bend Details and General Steel Reinforcement Information
DTMR 1174				RC Slab Desk Culverts – Construction of End Structure (H 150 – 600)
DTMR 1303				RC Box Culverts & Slab Link Box Culverts – Construction of Reinforced Concrete Wingwalls and Headwalls
DTMR 1304				Pipe Culverts – Construction of Reinforced Concrete Wingwalls and Aprons for Pipe Dia. Up to 2400
DTMR 1305				End to Pipe Culverts – General Arrangement and Installation of Wingwalls, Headwalls & Aprons
DTMR 1306				Ends to Pipe Culverts – Construction of Unreinforced Wingwalls, Headwalls and Aprons
DTMR 1309				Concrete Gully – Field Inlet Type 1
DTMR 1310				Concrete Gully – Field Inlet Type 2
DTMR 1316				RC Box Culverts & Slab Link Box Culverts – General Arrangement and Installation of Precast Units
DTMR 1317				RC Box Culverts & Slab Link Box Culverts – Construction of Bases with Nibs and Aprons
DTMR 1318				RC Box Culverts & Slab Link Box Culverts – Construction of Bases with Recesses and Aprons
DTMR 1319				RC Box Culverts & Slab Link Box Culverts – Construction of Unreinforced Wingwalls and RC Headwalls (H 750 – 2400)
DTMR 1320				RC Box Culverts & Slab Link Box Culverts - Crown Unit Holding Down Anchors
DTMR 1358				Maintenance Marker Posts – Post and Installation Details
DTMR 1359				Culverts – Installation, Bedding & Filling/Backing Against/Over Culverts
D-02	STD.D-0004	50536	SD.14	Sediment Control Devices – Kerb & Field Inlets, Check Dams & Straw Bale Bank
D-03	STD.D-0005	50500	SD.02	Stormwater Access Chamber Detail (Dia 1050 – 2100)
D-04	STD.D-0018	50516	SD.07	Stormwater Gully – Roadway – Grate and Frame
D-05	STD.D-0006	50501	SD.03	Stormwater Manhole Roof Slab – Dia 1050 – 2100
D-06	STD.D-0007	50502		Stormwater Manhole Roof Slab – Dia 1500 – Extended 600 and 900
D-07	STD.D-0012	50504		Stormwater Manhole Roof Slab – Rectangular Fabric Reinforcement
D-08	STD.D-0008	50503		Stormwater Manhole Roof Slab – Rectangular Standard Reinforcement
D-09	STD.D-0009	50505		Stormwater Manhole Cast Iron Cover & Frame C.I. Concrete Filled Cover
D-10	STD.D-0010	50506		Stormwater Manhole Cast Iron Cover & Frame Bolt Down
D-11	STD.D-0011	50507		Stormwater Manhole Step Irons

SRRC No./ DTMR No.	Superseded Drawings			Drawing Title
	Boonah No.	Beaudesert No.	Ipswich No.	
D-12	STD.D-0012	50508		Roofwater Inspection Chamber – Interallotment Drainage
D-13	STD.D-0028	50535		Sediment Control Devices – Sediment Fence
D-14	STD.D-0026	50531		Inlets & Outlets to Stormwater Drains (Stone pitched)
D-15	STD.D-0029	50518		Drainway Stormwater Inlet – Components
D-16	STD.D-0030	50521		Drainway Stormwater Inlet – Construction Setting Out
D-17	STD.D-0020	50520		Drainway Stormwater Inlet – Test Load Procedure
D-18	STD.D-0016	50517		Drainage Pits – Kerb Inlet – Kerb In Line
D-19	STD.D-0019	50517	SD.04	Drainage Pits – Kerb Inlet – Lip In Line
D-20	STD.D-0024	50522		Drainage Pits – Kerb Inlet – Kerb in Line (Anti-Ponding)
D-21	STD.D-0017	50515	SD.06	Drainage Pits – Precast Lintel Details
D-22	STD.D-0015	50525	SD.08/09	Drainage Pits – Field Inlet – Type 1 & 2
D-23				Drainage Details – Culvert Inlet Screen
D-24	STD.D-0013	50510	SD.11	Excavation, Bedding and Backfilling of Concrete Reinforced Drainage Pits
D-25	STD.D-0014	50511	SD.11	Excavation, Bedding and Backfilling of Precast Box Culverts

2.4.3 PARKS STANDARD DRAWINGS

SRRC No.	Superseded Drawings Beaudesert No.	Drawing Title
P-01		Drawing Index – Parks, Gardens & Cemeteries
P-02	50801	Park Name Sign
P-03	50802	Garden Bed Edges
P-04	50803	Lock Rail with Steel Post
P-05	50804	Round Top and Angle Top Bollard
P-06	50805	Log Barrier Fence
P-07	50806	Timber and Mesh Fence
P-08	50807	Timber One Rail and Two Rail Fence
P-09	50808	Steel Gate
P-10	50809	Horse Step Over
P-11	50810	Personnel Gate
P-12	50811	Turn style
P-13	50812	Removable Bollard
P-14	50813	Wheelie Bin Stand
P-15	50814	Wheelie Bin Enclosure
P-16	50815	General Tap and Maintenance Tap
P-17	50816	Water Tap and Bubbler with Dog Bowl
P-18	50817	Electric Barbecue
P-20	50819	Toilet Block Siting
P-21	50820	Picnic Node
P-22	50821	Park Bench – Bolt Down
P-23	50822	Park Bench – Embedded
P-24	50823	Picnic Table/Double Pedestal – Bolt Down
P-25	50824	Picnic Table/Double Pedestal – Embedded
P-26	50825	Picnic Table/Single Pedestal – Embedded
P-27	50826	Shelter Shed – Small
P-28	50827	Shelter Shed – Medium
P-29	50828	Shelter Shed – Large
P-30	50829	Specimen Park/Street Tree Planting
P-31	50830	Landscape Shrub/Ground Cover Planting
P-32	50831	Playground Siting Plant
P-33	50832	Playground Soft Fall Installation & Playground Shade Notes
P-34	50833	Park Footpath Design

2.5 ENVIRONMENTAL CONSIDERATION

2.5.1 INTRODUCTION

The purpose of this section is to ensure that development occurs in a manner which will have minimal adverse effect on the environment and the amenity of the area.

The Environmental Protection Act was introduced in 1994. The implications of the Act are:

All parties have a "general environmental duty" to ensure that all reasonable and practicable measures are taken to prevent or minimise damage to the environment. Financial penalties may apply if a person or persons cause environmental harm.

Land development which involves the clearing or reclaiming of more than 20,000 square metres of land may, in future, require an Approval under the Act.

Construction of premises (other than class 1 or 2 buildings) or engineering structures (including roads and bridges) is also intended to require an Approval under the Act. These provisions have not yet been enacted.

2.5.2 PREVENTING THE SPREAD OF FIRE ANTS

Under Queensland legislation, fire ants are a notifiable pest and suspected sightings must be reported to Queensland Primary Industries and Fisheries QPIF. As part of the fire ant eradication program, regulations apply to businesses that move high-risk materials within and out of the restricted areas and apply to both commercial and non-commercial activities. High risk materials are:

Soil	Machinery and equipment
Pot plants	Material stored on fire ant invested ground
Mulch	Baled hay or straw
Potting mix	Landscaping and construction material

To ensure development activities do not result in the spread of fire ants, all site works must be undertaken in accordance with the legislative requirements and regulations on the movement of high-risk materials (commercial). For further information, visit the Biosecurity Queensland website at www.dpi.qld.gov.au/fireants.

Consultation with QDPI regarding the legislation and movement controls should be undertaken prior to the commencement of site works. This will involve the use of Approved Risk Management Plans (ARMP) and Fire Ant Declarations (FAD). This is a simple form that:

- Records the fire ant status of the material to be used;
- Describes the prevention method used;
- Makes the mover or seller accountable for the declaration – not the receiver.

2.5.3 VEGETATION CLEARING

Any cleared vegetation must be chipped and reused on-site where possible and open burning of such materials is not to occur. In the event that on-site chipping and reuse is not possible, the applicant must provide, in writing, sufficient justification demonstrating this to be the case and outline appropriate proposed alternatives that will not impact on neighbouring residential dwellings, or result in environmental harm or environmental nuisance. Any approval of a proposed alternative is at the sole discretion of the Director Infrastructure Services and QLD Rural Fire Service.

Vegetation retention should always be the first option. Approvals will be based on relevant Planning Scheme Overlays, Department of Natural Resources and Mines Vegetation Management Act 1999 and the Sustainable Planning Act 2009.

2.5.4 SIGNAGE

The construction of signage requires the prior approval of Council's Development Assessment Department. Signage falls into two main categories:

2.5.4.1 ESTATE SIGNAGE

This permits signs on the road reserves of the estate for the duration of the construction of all stages of the development for advertising/marketing purposes. It is not envisaged that the estate signage will remain in place after completion of all stages of the development.. A full copy of the policy and fee structure can be obtained from Council's Development Assessment Department on request.

2.5.4.2 OTHER SIGNAGE

With the exception of estate signage (as above), all other signage is to be located on private land in accordance with Council's Policy for Advertising Signs and Devices.

A full copy of the policy and fee structure is available from Council's Development Assessment Department.

2.5.5 REGRASSING AND DUST SUPPRESSION

Cleared or disturbed areas should be regrassed as soon as possible after the disturbance. The areas should either be turfed or seeded with continuing adequate water supply to ensure growth of the grass.

In all cases the development is to be maintained in such a condition so as not to cause a nuisance to adjoining premises. Refer 2.8 for further details.

2.5.6 WEED CONTROL

Read in conjunction with 2.8, 3.11 and 3.13. Weeds fall into two main categories:

2.5.6.1 DECLARED PLANTS

Declared Plants are plants declared under the Land Protection (Pest and Stock Route Management) Act 2002 because of impacts on human health or the environment and considered a serious enough pest to warrant its control being enforced by legislation. The control mechanisms include destruction, reduction and prevention from spreading based on the plant species involved.

2.5.6.2 ENVIRONMENTAL WEEDS

Environmental Weeds have potential to cause harm to people, animals or the environment but have not been declared. Environmental weeds include:

- Mother of Millions;
- Morning Glory;
- Broad Leaf Pepperina;

- Privet;
- Camphor Laurel;
- Cats Claw; and
- Chinese Elm.

For lands to be placed under Council control, all declared plants and environmental weeds are to be managed to the satisfaction of the Director Regional Services.

For further information, please refer to Council's Pest Management Plan or telephone the Pest and Animal Management Department.

2.5.7 MOSQUITO CONTROL

All drainage lines and parkland areas are to be designed and graded such as not to provide a breeding ground for mosquitoes. Access by persons and preferably vehicles to all sites is required.

2.5.8 NOISE

Site work should generally be in accordance with the Environmental Protection Act 1994. Work shall be restricted to 6:30 a.m. to 6.30 p.m. Monday to Saturday
If the adjusted measured noise level (LAmax,adj,T) in a noise sensitive area does not exceed background noise by more than 10dB(A), extra hours may be worked in the periods 6.00 a.m. to 7.00 a.m. and 6.00 p.m. to 10.00 p.m. Monday to Friday and 6.00 a.m. to 7.00 a.m. and 1.00 p.m. to 10.00 p.m. Saturday. Work may be undertaken between the periods 10.00 p.m. to 6.00 a.m. Monday to Friday, 10.00 p.m. to midnight Saturday and all day Sunday only if noise is inaudible at adjacent noise sensitive areas.

If noise levels exceed LAmax,adjT of 75dB(A) 3.5 metres from the boundary of a noise sensitive place or background noise by more than 10dB(A), additional noise period restrictions may apply to the general work hours.

Work should not be carried out on public holidays.

In certain circumstances, a report from a suitably qualified acoustic consultant may be required outlining predicted noise levels from construction and operational activities. The report should recommend noise control measures and detail methodology and calculations used.

2.5.9 CONTAMINATED LAND

Where land to be developed may have been subjected to contamination, a Site Contamination Report shall be prepared to the satisfaction Department of Environment and Heritage Protection. A clearance from the Department of Environment and Heritage Protection will be required prior to development on the subject site.

To ascertain whether a property is listed on the Contaminated Sites Register a search may be undertaken through the Department of Environment and Heritage Protection. Further information on contaminated land management and related reporting processes (including applicable guidelines, application forms and details of the fees required) can be obtained on the Department's web site (www.ehp.qld.gov.au)

All operations on site (including, for example, fuel storage) must be conducted in such a manner so as not to cause land to become contaminated land. You are advised that landholders, operators and Council have obligations to notify the Department of Environment and Heritage Protection when they become aware of events or activities that result in the contamination of land (where these are identified as "modifiable activities" by the Environmental Protection Act 1994).

2.6 DESIGN OF ROADS AND STREETS

2.6.1 OBJECTIVES

The objectives of the Design of Roads & Streets requirements are as follows:

- to develop a network and alignment that balances the existing and future requirements;
- to provide a serviceable pavement for the specified lifetime with minimal maintenance;
- to ensure that staged construction methods are planned to meet the immediate, medium term and ultimate pavement and drainage design requirements;
- to provide smooth, safe, trafficable horizontal and vertical alignments, adequate sight distance with consideration being given to road classification requirements, road users and utilities.

2.6.2 URBAN STREETS (RESIDENTIAL, COMMERCIAL AND INDUSTRIAL)

The following requirements generally apply to new streets and upgrading of existing streets affected by urban residential, commercial and industrial developments.

2.6.2.1 GENERAL

The design and construction of urban streets and allotment accesses should meet or exceed the requirements of the "Austroads Guidelines", "Next Generation Planning Handbook", "Complete Streets", "Queensland Streets" (where applicable), this manual and any relevant Acts, Regulations and Australian Standards.

2.6.2.2 STREET CLASSIFICATION

The classification of urban streets shall be generally in accordance the ‘Urban Street Characteristics Table found within Section 2.6.2.3 of this manual.

The street classification referred to within this manual relate specifically to the design and construction of new or upgraded streets.

Ultimate traffic volumes for street classification and street design shall be based upon approved multipliers of existing traffic movements (measured), through traffic, and an estimate of traffic generated by proposed and future development.

Estimated traffic volumes for undeveloped areas shall be based upon the following:

- Residential allotments 10 vehicle movements per day per lot
- Commercial/Industrial 45 vehicle movements per day per lot

Where alternative traffic generations assumptions are used in the preparation of a Traffic Impact Study, details of alternatives shall be provided to Council for approval. Where Council holds traffic count data on relevant roads and streets, this information may be made available to the Design Engineer. In some instances, the Developer may be asked to undertake additional traffic count data collection on affected roads and streets to ascertain predevelopment traffic volumes and types. This will generally only be asked of the Developer when traffic count data is greater than three years old, or significant development has taken place since traffic count data was last collected. Where traffic volumes and type vary seasonally, the Design Engineer shall use data conservatively and clearly present assumptions.

2.6.2.3 URBAN STREET CHARACTERISTICS

The classification, function and general composition of streets within any development are detailed in the 'Urban Street Characteristics Table'. Road reserve widths must be sufficient to accommodate the carriageway, required services with approved clearances, pedestrian and bicycle access, parking, landscaping, drainage and bus routes. Should the development design incorporate Water Sensitive Urban Design (WSUD) principles the road reserve may need to be further increased. Minimum road reserve widths in urban residential developments detailed in the 'Urban Street Characteristics Table'. Lesser width industrial road reserve may be permitted for short industrial cul-de-sacs however turning at the cul-de-sac shall not be compromised.

Minimum road reserve widths will not be allowed where they compromise the provision and standard of pedestrians, bicycles and buses. Road reserve boundaries may be curved around cul-de-sacs, but where they are to be fenced as chords, these should not be less than 10 metres. Where a number of such chords occur adjacent to each other, they should, as far as possible, be practically equal.

Table 2.6A - Urban Street Characteristics Table

Street Type	Traffic Volume (AADT)	Carriageway Width	Min. Reserve Width	Min. Verge Width	Parking Provision	Pedestrian/Cycle Provision within Road Reserve	Kerbing
Trunk Collector/ Connector Street (Bus Route, No Lot Access)	>3000	7.00m	20.30m	5.15m	No	1.5m bicycle lane on each side of carriageway & 2.5m footpath one side and 1.5m footpath on opposite side	Type B1
Trunk Collector/ Connector Street (Bus Route)	3000 max	6.60m	21.90m	5.15m	2.5m parking lanes both sides	2.5m footpath one side and 1.5m footpath on opposite side	Type B1
Access/ Collector Street	1000 max	8.50m	16.80m	4.15m	No	1.5m footpath on lower side of street	Type B1
Access Place	300 max (min length 100m)	6.00m	14.30m	4.15m	No	No	Type B1

NOTE: Refer to Scenic Rim Regional Council standard drawing R-09 for further details.

2.6.2.4 STREET GEOMETRY

The subdivision shall generally be laid out in accordance with the principles in the Next Generation Planning Handbook and the geometric design shall be in accordance with Austroads requirements. The street geometry shall provide sufficient space such that emergency service vehicles, waste collection vehicles and street-cleaning vehicles may carry out their functions while travelling in a forward-only direction throughout the development.

Cul-de-sacs shall be avoided due the requirement to have permeable networks to distribute traffic more evenly and potentially provide more efficient walking, cycling and public transport. However where they are completely unavoidable, and prior approval has been granted by Council to use them in the street network in specific locations, they are to be of bowl geometry. 'T' or 'Y' cul-de-sac heads are not permitted.

Staging of works shall not negate this requirement and temporary turning areas need to be established between development stages.

Parking, bicycle and bus requirements may impact upon the minimum widths and adequacy for these functions shall be demonstrated.

Street design grading shall be extended a minimum of 100 metres beyond the end of the street where such street is to be extended in the future. Where new street meets an existing road or street the designer shall check the grading for a distance of 50 metres to check that the new street match well and that no abrupt change in grade occurs.

2.6.2.5 SIGHT DISTANCES

Consideration shall be given to sight distances, particularly at street intersections and on crest vertical curves. Reference shall be made to the Austroads Guidelines.

Landscaping plans shall be prepared with consideration to sight distance requirements, as shall any approved Estate Signage.

Plans submitted for approval shall show all existing and proposed features in sufficient detail to demonstrate that appropriate sight distances are achieved.

2.6.2.6 VEHICLE TURNING MOVEMENTS

Vehicle turning movements are to be examined for design vehicles and check vehicles in accordance with Austroads 'Guide to Road Design Part 4: Intersections and crossing - General'.

Street space should be provided such that the design vehicle is able to negotiate a left turn from the left lane without crossing adjacent lanes and without the need to reverse to complete the turning movement. Check vehicles may impinge upon adjacent lanes as they represent infrequent vehicles accessing local streets, such as articulated vehicles delivering building materials in new estates or furniture carrying vehicles.

The intersection design shall be such that 600mm clearance for above ground structures is applied to the total swept path of the design vehicle, and not just to the wheel path. Vehicle accesses and driveways are NOT to be used for turning movements. All roadway and vehicle crossings are desirable to be designed to accommodate the Australian Standard 99th percentile car, but as an absolute minimum the 85th percentile Australian Standard car.

Turning movement plans shall be provided to show turning movements.

2.6.2.7 CROSS SECTION PROFILES

Cross-sections shall accord with street carriageway and road reserve widths as per section 2.6.3.3. Typical cross-sections should be included in the documentation and should nominate:

- Type of kerb and channel
- Pavement construction including material type and depth
- Surface details
- Subsoil drainage, if required
- Typical footpath offsets
- Typical service corridors
- Typical landscaping corridors
- Crossfalls

Should design speeds require super-elevation of horizontal curves, design of crossfall should be based on the current Austroads design policy for urban roads.

Central spoon drains in the street pavement are undesirable and will only be permitted for road pavements that will be privately owned. This does not apply to fully concreted pavements with crossfall to the centre of the road with centrally graded pits.

Verge crossfalls between footpath and back of kerb shall be 2%, and shall extend into properties at the same grade for a nominal distance of 500 mm. Should steeper verges be proposed, the Designer shall demonstrate that car access can be provided to effected allotments.

Wherever new kerb and channel or footpath is to be constructed adjacent to existing roadways and/or wherever excessive crossfalls occur on either the road pavement or nature strip, all vehicle crossings to allotments shall be designed using standard car templates to ensure that car access can be provided.

Grading of residential allotments to a distance of 6m back from the property boundary may also be required in steeper locations as this will then set the RL of the Garage or carport of any future house to be built on the 6m front boundary offset.

Whenever it is impractical to provide batters flatter than the maximum slopes specified, developers shall provide special treatment such as retaining walls within the property and in areas prone to erosion, erosion control measures shall be used such as concrete, asphalt, diversion drains etc.

Street designs shall be such so as to avoid filling on the low side of the street, unless demonstrated to be impractical.

2.6.2.8 INTERSECTION DESIGN

2.6.2.8.1 General

Intersections are to be designed and constructed such that they function in a safe, convenient and appropriate manner for the type of street and development, and shall be designed in accordance with Austroads ‘Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings', ‘Guide to Road Design Part 4: Intersections and Crossings - General’, ‘Guide to Road Design Part 4A: Intersections - Unsignalised and Signalised' and ‘Guide to Road Design Part 4B: Roundabouts’.

2.6.2.8.2 Special considerations

For intersections where the proportion of over-dimension or large combination vehicles is higher than the normal percentage in the traffic stream the intersection requirements may be more significant. The Traffic Impact Assessment should address this issue and make recommendations regarding these intersections.

2.6.2.8.3 Splays

Splays of suitable dimensions shall be provided at all corners of all intersections.

At intersections involving at least one collector road (or higher classification) the minimum splay at the intersecting roads shall be 5 x 5 metre. Otherwise, at intersecting roads of lesser classification the minimum splay to be provided shall be 3 x 3 metre.

Notwithstanding the above minimum, larger splays may be required where engineering assessment indicates a need commensurate with traffic safety and the provision of service corridors and trunk drainage

2.6.2.8.4 Kerb returns

At intersections, the minimum kerb return or edge of seal radius shall be as follows:

- Residential areas 7.5 m
- Industrial / Commercial 12.0 m

Further to this, kerb radii shall be designed based upon turning movement requirements.

2.6.2.9 PAVEMENT DESIGN

The minimum depth of flexible or rigid pavement for the proposed pavement and proposed pavement materials shall be determined by design in accordance with Austroads 'Guide to Pavement Technology Parts 1-10', with the pavement design submitted to Council's Director Infrastructure Services for consideration. Samples and/or results of geotechnical testing and the source of the pavement material shall also be provided.

2.6.2.9.1 Sub-Grade Evaluation

Pavement design shall be based on the results of sub-grade analysis, including testing for soaked Californian Bearing Ratio (CBR), carried out by a NATA registered testing laboratory.

Sub-grade soil samples shall be taken at maximum intervals of 200 metres, in the bowls of Cul-de-sacs, at all intersections and at all obvious locations where existing sub-grade material changes suddenly. Core samples shall be bored to a minimum depth of 600 mm below final road sub-grade level. The soil sample used for laboratory testing shall be taken from the core at sub-grade level. Full details of sub-grade test results and core samples shall be submitted to Council with the detailed design plans.

2.6.2.9.2 Flexible Street Pavements

Flexible street pavement designs shall be in accordance with the Austroads 'Guide to Pavement Technology Part 2: Pavement Structural Design'.

Pavement design shall be carried out using equivalent standard axle loadings based on an average traffic generation rate of 10 vehicles per day per residential lot and a 20 year design life for residential and commercial streets. Pavement design for industrial streets shall be based on an average traffic generation rate of 45 vehicles per day per industrial lot and a 40 year design life.

2.6.2.9.3 Concrete Street Pavements

Concrete street pavement designs shall be based on Austroads 'Guide to Pavement Technology Part 2: Pavement Structural Design', with a minimum 40 year design life.

2.6.2.9.4 Interlocking Pavers

Due to safety, operational and maintenance issues interlocking block street pavements shall not be used. Alternatives such as stamped and coloured asphalt may be considered.

2.6.2.9.5 Minimum pavement thickness

Notwithstanding any of the above requirements, the pavement thickness, including the thickness of surfacing shall not be less than the amount specified in the Table 2.6B for streets in which kerb and channel is to be constructed, 200mm for unkerbed roads, and 150mm for carparks. The sub-base layer shall extend a minimum of 300mm past the rear face of any kerb. Note these minimums do not apply to roads serving industrial or commercial areas as pavement designs for these areas are to be higher than these minimums.

Table 2.6B - Minimum Total Pavement Thickness

ROAD CLASSIFICATION	MIN. TOTAL PAVEMENT (mm)	MIN. BASE COURSE (mm) (min CBR)	MIN. SUBBASE COURSE (mm) (min CBR)
Roads < 10^6 ESA **Roads > 10^6 ESA**	200 250	100 (CBR 60) 125(CBR 80)	100 (CBR 35) 125 (CBR 45)

The pavement thicknesses shall be subject to confirmation by the Director, following site inspection and further testing of the subgrade if required by Council prior to placement of pavement material.

The Director may require either local or general variation of the pavement thickness, dependent upon the actual subgrade conditions encountered.

2.6.2.9.6 Compaction Requirements

Depending on traffic volumes and actual pavement design, compaction will be in accordance with Transport and Main Roads Standard Specifications. Compaction testing of base and sub-base material must be carried out by a NATA approved laboratory. Copies of all geotechnical results are to be submitted to Council.

Compaction testing and proof-rolling shall be undertaken on the same day.

Sub-Grade
The street subgrade shall be compacted in accordance with Transport and Main Roads Standard Specification MRTS04, with all building sites compacted to 95% standard compaction, or in accordance with the Construction Specification and/or AS 3798.

Sub-Base
The street sub-base shall be compacted in accordance with Transport and Main Roads Standard Specification MRTS05.

The number of tests to be undertaken shall as specified In Table 2.6C.

Base
The street base shall be compacted in accordance with Transport and Main Roads Standard Specification MRTS05.

However the value shown for type 2 material in Table 9.1.2.1 - Maximum Degree of Saturation (DOS) of MRTS05 can be increased from 65% to 70%.

The number of tests to be undertaken shall as specified In Table 2.6C.

Table 2.6C Location and Number of Compaction Tests

Location	All Roads
Cul-de-sacs	3
Intersections	2
Straights	1 per 500 m²

Tests shall be taken on alternate sides of the road and be evenly spaced.

Proof-rolling
Proof rolling of the subgrade, subgrade replacement (if required), sub-base and base shall be undertaken at the expense of the contractor, in accordance with AS 3798. The subgrade shall not deflect more than 2 mm vertically within 300 mm of the test roller in isolated locations. If deflection of the subgrade is found in more than 20% of the project area then the total area shall be reworked. There must be no visible deformation or cracking of the pavement during a proof roll. Areas that fail a proof roll test are the responsibility of the contractor to rectify. Adequate notice must be given to Council's representatives for attendance of proof-rolling inspections, refer to Section 7.4 Construction supervision for Developers. It is the responsibility of the Supervising Engineer to inspect the pavement prior to a Council Inspection. If the proof-rolling test fails, another Council inspection is required and appropriate notice should be given. A fee may apply for repeat inspections.

2.6.2.9.7 Soft Areas in Sub Grades

Where unsuitable material exists or develops during construction, it must be rectified to the satisfaction of the Council. Possible treatment methods include cement and/or lime stabilisation, replacement of the underlying material with pavement, the use of geotextiles and/or the lowering of sub-surface drainage to below the level of the area to be rectified. Rectified subgrades must achieve the required levels of compaction as specified above.

'As Constructed' drawings or quality documentation must show the extent of all reworked soft areas and any form of treatment taken.

2.6.2.9.8 Pavement Wearing Course

Pavements must, at the expense of the contractor, be proof rolled and density tested, immediately prior to priming. The frequency of density tests shall be in accordance with AS 3798 and AS 1289 Geotechnical Testing or as otherwise specified by Council.

Pavements must be trimmed to shape, swept and have a surface consistency suitable for priming. Adequate protection shall be provided for signs, concrete edgings, and traffic control devices to prevent over-spray during priming or tack coating.

The wearing surface for all urban streets shall be a minimum of 30mm DG10 Asphalt, with a binder suitable for the traffic environment, and be in accordance with Transport and Main Roads Technical Specification MRTS30. The surface of the final wearing course shall be between 5-10 mm above the concrete edging and detailed on the construction plans for each edging type. The wearing course shall be flush with the lip of the kerb and channel at all footpath kerb crossings (to eliminate any trip hazard).

All new and upgraded roads, including widened roads, that are located in or adjacent to commercial or industrial developments shall be sealed with DG10 Asphalt in accordance with Transport and Main Roads Technical Specification MRTS30. The asphalt is to have with a binder suitable for the traffic environment and be of suitable thickness for the expected traffic loading, with the minimum thickness to be 40mm.

Where a dispute arises concerning the finished surface texture or construction methods, wearing course core samples and compaction testing may be required. The Developer’s Consultant shall, prior to construction, specify the hotmix design including aggregate size and any additives.

Where streets under this section may in Council's opinion be subject to turning movements that will cause deformation to the wearing surface, Developers may be required to provide either a deeper asphalt wearing course or structural asphalt Base layer.

2.6.2.10 TRAFFIC CONTROL DEVICES

The Supervising Engineer shall determine the requirement for any traffic control devices in accordance with Transport and Main Roads 'Manual of Uniform Traffic Control Devices (MUTCD)'.

2.6.2.10.1 Signposting and pavement marking

Signposting and pavement marking should generally be provided to roads, intersections, traffic control devices, cycleways and carparks in accordance with Transport and Main Roads 'Manual of Uniform Traffic Control Devices (MUTCD)'. Street name plates are to be the standard type throughout Council.

2.6.2.10.2 Road Side Barriers

Where there is a warrant (e.g. an identified hazard in the clear zone) a barrier is to be provided in accordance with Transport and Main Roads specifications, where shown on the approved engineering plan or as directed by Council’s Director Infrastructure Services.

2.6.2.11 PROPERTY ACCESSES

This section applies to urban areas regardless of whether there is kerb and channel.

Driveways and direct vehicle access to trunk collector streets should be designed to allow forward entry and exit from properties.

The maximum number of vehicle crossings to residential properties is one (1) crossing. Crossing shall be constructed in accordance with the requirements of Standard Drawing Numbers R-05 to R-08.

Where any crossing exceeds 3.5 metres width, the maximum width of that crossing is to be 6.0 metres. Crossings to adjacent properties shall be either fully combined, and of maximum width of 6.0 metres, or else have a minimum separation of 9 metres.

Vehicle crossings to residential corner allotments are to be located a minimum of 6 metres from the intersection of road reserves and 2 metres clear of pedestrian kerb crossings.

An Application for Property Access Approval is required to be submitted for each new property access. Property Access Approval is required to ensure that the access meets the following conditions:

1. The access is to be located in a position which can achieve the appropriate safe sight distance for the surrounding speed environment.
2. The construction standard of the access is to comply with Council's relevant standard drawings.
3. If a piped access is required, the pipe size is to be determined by Council after the initial site inspection. The minimum size required is 375Ø.
4. Guide posts must be installed on all rural piped accesses.
5. If the access is off of a sealed road, the access requires a 2 coat spray seal.

2.6.2.12 KERB AND CHANNEL

All urban streets shall be constructed with an asphalt sealed pavement and provided with cast in-situ concrete kerb and channel on both sides of all streets (unless alternative treatment is integral to a Water Sensitive Urban Design application.)

Kerb and channel profiles shall be constructed in accordance with Council's Standard R-04, and with the following:

- A flush kerb or a kerb and tray may be used on the high side of roads with one way crossfall.

- Barrier kerb and channel with a 450mm channel (Type B1) shall be used in the following locations:

    - Adjacent to parks
    - Industrial Streets (Heavy duty barrier to be used i.e.: standard barrier type with an additional 50mm base thickness)
    - Sub-Arterial and Arterial urban streets
    - Commercial areas such as Shopping Centres,
    - In locations where higher pedestrian volumes are likely, for greater pedestrian safety.

- Semi-mountable kerb shall be used adjacent to medians and traffic islands;

- Pram ramps as indicated on Standard Drawings R-16A (and R-16B, R-16C, R-16D, R-17 where applicable) shall be provided at all kerb returns, unless approved otherwise.
- Transitions between differing types of kerb and channel shall be either (i) immediately after a kerb crossing, or (ii) over a 3 metre length after a gully pit that has standard/barrier lintel and pit is located at tangent point of kerb return;
- Subsoil drainage shall be required at all roundabouts and medians unless fully hard surface infilled; and
- Subsoil drainage shall be provided below all kerb and channel unless the following conditions apply:

    - Subgrade is rock or sand
    - No underground drainage is available to connect the subsoil drainage to

Where non-standard kerb profiles are to be matched, consultation with Council's engineering department will be required to determine the most appropriate kerb to be used.

Kerb and channel shall generally be constructed in accordance with AS2876**.**

2.6.3 RURAL AND RURAL RESIDENTIAL ROADS

The following requirements generally apply to new roads and upgrading of existing roads affected by rural and rural residential developments, as well as rural roads impacted by commercial and industrial developments in rural areas.

2.6.3.1 GENERAL

The design and the construction guidelines of roads and allotment accesses should meet or exceed the requirements of Austroads, this manual and any relevant Acts, Regulations and Australian Standards.

New and upgraded roads in rural residential developments shall be to full road construction standards.

Traffic generated as a result of rural developments and rural residential development must in all instances be encouraged to use the route as identified for access in the submitted documents. Council may require the design and upgrade of off-site intersections and reinforcement signage.

2.6.3.2 ROAD CLASSIFICATION

The classification of rural and rural residential roads shall be generally in accordance the 'Rural & Rural Residential Road Characteristics Table' found within Section 2.6D of this manual.

The road classification referred to within this manual relate specifically to the design and construction of new or upgraded roads.

Ultimate traffic volumes for road classification and road design shall be based upon approved multipliers of existing traffic movements (measured), through traffic, and an estimate of traffic generated by proposed and future development.

Estimated traffic volumes for undeveloped areas shall be based upon the following:

- Rural and Rural Residential allotments 8 vehicle movements per day per lot

Where alternative traffic generations assumptions are used in the preparation of a Traffic Impact Study, details of alternatives shall be provided to Council for approval. Where Council holds traffic

count data on relevant roads and streets, this information may be made available to the Design Engineer. In some instances, the Developer may be asked to undertake additional traffic count data collection on affected roads and streets to ascertain predevelopment traffic volumes and types. This will generally only be asked of the Developer when traffic count data is greater than three years old, or significant development has taken place since traffic count data was last collected. Where traffic volumes and type vary seasonally, the Design Engineer shall use data conservatively and clearly present assumptions.

2.6.3.3 RURAL & RURAL RESIDENTIAL ROAD CHARACTERISTICS

The classification, function and general composition of roads within any development are detailed in the 'Rural & Rural Residential Road Characteristics Table'. Road reserve widths must be sufficient to accommodate the carriageway, required services with approved clearances, pedestrian and bicycle access, parking, landscaping, drainage and bus routes. Should the development design incorporate Water Sensitive Urban Design (WSUD) principles the road reserve may need to be further increased. Minimum road reserve widths in rural and rural residential developments shall be as detailed in the 'Rural & Rural Residential Road Characteristics Table', with the minimum being 20 metres, however additional reserve width is encouraged to facilitate landscaping and pedestrian/bicycle facilities.

Minimum road reserve widths will not be allowed where they compromise the provision and standard of pedestrians, bicycles and buses. Road reserve boundaries may be curved around cul-de-sacs, but where they are to be fenced as chords, these should not be less than 10 metres. Where a number of such chords occur adjacent to each other, they should, as far as possible, be practically equal.

Table 2.6D - Rural & Rural Residential Road Characteristics Table

Street Type	Traffic Volume (AADT)	Min. Pavement Width	Min. Seal Width	Min. Sealed Shoulder Width
Class 4A - Rural Connector	1000 - 3000	9m	7m	1m
Class 4B - Rural Collector	500 - 1000	8m	7m	0.5m
Class 5A - Rural Access	150 - 500	7m	7m	0.5m
Class 5B - Rural Access	80 - 150	7m	6m	0.5m
Class 5C - Rural Access	40 - 80	7m	Unsealed	Unsealed
Class 5D - Rural Access	0 - 40	5.5m	Unsealed	Unsealed

NOTES:

1. Refer to Scenic Rim Regional Council standard drawing R-10 & R-11 for further information.
2. For traffic volumes >3000 vehicles/day cross section requirements shall be in accordance with Department of Transport and Main Roads' *Road Planning and Design Manual.*

2.6.3.4 ROAD GEOMETRY

The geometric design of rural roads, including horizontal and vertical alignments, is to be based on Austroads 'Guide to Road Design, Part 3 - Geometric Road Design', unless otherwise noted within this manual.

Further to this, road geometry in rural residential developments shall provide sufficient space such that emergency service vehicles and waste collection vehicles may carry out their functions while travelling in a forward-only direction throughout the development. Significant rural and rural residential developments may require provision for school buses. Roads shall be designed such that these vehicles shall not need to reverse.

Staging of works shall not negate the requirement for forward only turning and temporary turning areas may need to be established between development stages. This may therefore require temporary table drains around these turning areas.

Road design grading shall be extended a minimum of 100 metres beyond the end of the street where such street is to be extended in the future. Where new roads meet existing roads the designer shall check the grading for a distance of 100 metres to check that roads match well and that no abrupt change in grade occurs.

Vertical curve design shall generally comply with Austroads 'Guide to Road Design, Part 3 - Geometric Road Design'. Vertical curves on rural roads shall be designed to provide Stopping Sight Distances for the design speed for the particular road. If the road is on a grade, ensure the stopping sight distance is adjusted before calculating the required "K" value for each vertical curve, as the stopping sight distances used in the tables are calculated on a level grade.

Horizontal and vertical geometry shall be co-ordinated for appearance and safety. In principle, co-ordination mean that the horizontal and vertical curves should either be completely superimposed of completely separated. The related horizontal and vertical elements should be of similar lengths with the vertical curve contained within the horizontal curve.

2.6.3.5 SIGHT DISTANCES

Adequate horizontal and vertical sight distance should be provided for the design speed in accordance with Austroads publication 'Guide to Road Design, Part 3 - Geometric Road Design'. The design speed shall be determined using the Austroads "Operating Speed Model". (Software is available to download from the Queensland Department of Transport and Main Roads to assist with this process and should be provided with the design plans and other calculations)

Landscaping plans shall be prepared with consideration to sight distance requirements, as shall any approved Estate Signage. Plans submitted for approval shall show all existing and proposed features in sufficient detail to demonstrate that appropriate sight distances are achieved.

2.6.3.6 VEHICLE TURNING MOVEMENTS

Vehicle turning movements are to be examined for design vehicles and check vehicles in accordance with Austroads 'Guide to Road Design Part 4: Intersections and Crossings - General'.

Street space should be provided such that the design vehicle is able to negotiate a left turn from the left lane without crossing adjacent lanes and without the need to reverse to complete the turning movement. Check vehicles may impinge upon adjacent lanes as they represent infrequent vehicles accessing local streets, such as articulated vehicles delivering building materials in new estates or furniture carrying vehicles.

The intersection design shall be such that 600mm clearance for above ground structures is applied to the total swept path of the design vehicle, and not just to the wheel path. Vehicle accesses and driveways are NOT to be used for turning movements. All roadway and vehicle crossings are desirably to be designed to accommodate the Australian Standard 99th percentile car, but as an absolute minimum the 85th percentile Australian Standard car.

Turning movement plans shall be provided to show turning movements.

2.6.3.7 CROSS SECTION PROFILES

There shall be two lanes of traffic on rural and rural residential developments.

Cross section design should not be terminated at the property boundaries but should be extended sufficiently to determine cut and fill requirements and to show such on plans.

Should crossfalls of greater than 6% at intersections or horizontal curves be proposed, approval should be sought from Council's engineering department.

Batter slopes shall be as is appropriate for the predominant use of the locality and shall be designed with consideration of clear zones as defined in Austroads Guidelines.

Whenever it is impractical to provide batters flatter than the maximum slopes specified, barriers may be required.

2.6.3.8 INTERSECTION DESIGN

2.6.3.8.1 General

Intersections are to be designed and constructed such that they function in a safe, convenient and appropriate manner for the type of street and development, and shall be designed in accordance with Austroads 'Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings', 'Guide to Road Design Part 4: Intersections and Crossings - General', 'Guide to Road Design Part 4A: Intersections - Unsignalised and Signalised' and 'Guide to Road Design Part 4B: Roundabouts'.

2.6.3.8.2 Special Considerations

For intersections where the proportion of over-dimension or large combination vehicles is higher than the normal percentage in the traffic stream the intersection requirements may be more significant. The Traffic Impact Assessment should address this issue and make recommendation regarding these intersections.

2.6.3.8.3 Splays

Splays of suitable dimensions shall be provided at all corners of all intersections.

At intersections involving at least one collector road (or higher classification) the minimum splay at the intersecting roads shall be 5 x 5 metre. Otherwise, at intersecting roads of lesser classification the minimum splay to be provided shall be 3 x 3 metre.

Notwithstanding the above minima, larger splays may be required where engineering assessment indicates a need commensurate with traffic safety and the provision of service corridors and trunk drainage

2.6.3.8.4 Kerb Returns

At intersections, the minimum kerb return or edge of seal radius shall be as follows:

- Rural Residential areas 7.5 m
- Rural areas 12.0 m

Further to this, kerb radii shall be designed based upon turning movement requirements.

2.6.3.9 PAVEMENT DESIGN

The minimum depth of flexible or rigid pavement for the proposed pavement and proposed pavement materials shall be determined by design in accordance with Austroads 'Guide to Pavement Technology Parts 1-10', with the pavement design submitted to Council's engineering department for consideration. Samples and/or results of geotechnical testing and the source of the pavement material shall also be provided

2.6.3.9.1 Sub-Grade Evaluation

Pavement design shall be based on the results of sub-grade analysis, including testing for soaked Californian Bearing Ratio (CBR), carried out by a NATA registered testing laboratory.

Sub-grade soil samples shall be taken at maximum intervals of 200 metres, in the bowls of Cul-de-sacs, at all intersections and at all obvious locations where existing sub-grade material changes suddenly. Core samples shall be bored to a minimum depth of 600 mm below final road sub-grade level. The soil sample used for laboratory testing shall be taken from the core at sub-grade level. Full details of sub-grade test results and core samples shall be submitted to Council with the detailed design plans.

2.6.3.9.2 Flexible Road Pavements

Flexible road pavement designs shall be in accordance with the Austroads 'Guide to Pavement Technology Part 2: Pavement Structural Design'.

Pavement design shall be carried out using equivalent standard axle loadings based on an average traffic generation rate of 8 vehicles per day per rural or rural residential lot and a 20 year design life for residential and commercial roads. Pavement design for industrial road shall be based on an average traffic generation rate of 45 vehicles per day per industrial lot and a 40 year design life.

2.6.3.9.3 Concrete Road Pavements

Concrete street pavement designs shall be based on Austroads 'Guide to Pavement Technology Part 2: Pavement Structural Design', with a minimum 40 year design life.

2.6.3.9.4 Interlocking Pavers

Due to safety, operational and maintenance issues interlocking block road pavement shall not be used. Alternatives such as stamped and coloured asphalt may be considered.

2.6.3.9.5 Minimum pavement thickness

Notwithstanding any of the above requirements, the pavement thickness, including the thickness of surfacing shall not be less than the amount specified in the Table 2.6E below (from old D&C) for streets in which kerb and channel is to be constructed, 200mm for unkerbed roads, and 150mm for carparks. The sub-base layer shall extend a minimum of 300mm past the rear face of any kerb. Note these minimums do not apply to roads serving industrial or commercial areas as pavement designs for these areas are to be higher than these minimums.

Table 2.6E - Minimum Total Pavement Thickness

ROAD CLASSIFICATION	MIN. TOTAL PAVEMENT (mm)	MIN. BASE COURSE (mm) (min CBR)	MIN. SUBBASE COURSE (mm) (min CBR)
Roads < 10^6 ESA **Roads > 10^6 ESA**	200 250	100 (CBR 60) 125(CBR 80)	100 (CBR 35) 125 (CBR 45)

The pavement thicknesses shall be subject to confirmation by the Director, following site inspection and further testing of the subgrade if required by Council prior to placement of pavement material.

The Director may require either local or general variation of the pavement thickness, dependent upon the actual subgrade conditions encountered.

2.6.3.9.6 Compaction Requirements

Depending on traffic volumes and actual pavement design, compaction will be in accordance with Transport and Main Roads Standard Specifications. Compaction testing of base and sub-base material must be carried out by a NATA approved laboratory. Copies of all geotechnical results are to be submitted to Council.

Compaction testing and proof-rolling shall be undertaken on the same day.

Sub-Grade

The street subgrade shall be compacted in accordance with Transport and Main Roads Standard Specification MRTS04, with all building sites compacted to 95% standard compaction, or in accordance with the Construction Specification and/or AS 3798.

Sub-Base
The street sub-base shall be compacted in accordance with Transport and Main Roads Standard Specification MRTS05.

The number of tests to be undertaken shall as specified In Table 2.6F.

Base
The street base shall be compacted in accordance with Transport and Main Roads Standard Specification MRTS05.

However the value shown for type 2 material in Table 9.1.2.1 - Maximum Degree of Saturation (DOS) of MRTS05 can be increased from 65% to 70%.
The number of tests to be undertaken shall as specified In Table 2.6F.

Table 2.6F Location and Number of Compaction Tests

Location	All Roads
Cul-de-sacs	3
Intersections	2
Straights	1 per 500 m²

Tests shall be taken on alternate sides of the road and be evenly spaced.

Proof-rolling
Proof rolling of the subgrade, subgrade replacement (if required), sub-base and base shall be undertaken at the expense of the contractor, in accordance with AS 3798. The subgrade shall not deflect more than 2 mm vertically within 300 mm of the test roller in isolated locations. If deflection of the subgrade is found in more than 20% of the project area then the total area shall be reworked. There must be no visible deformation or cracking of the pavement during a proof roll. Areas that fail a proof roll test are the responsibility of the contractor to rectify. Adequate notice must be given to Council's representatives for attendance of proof-rolling inspections. It is the responsibility of the Supervising Engineer to inspect the pavement prior to a Council Inspection. If the proof-rolling test fails due to excessive moisture etc. then another Council inspection is required and appropriate notice should be given. A fee may apply for repeat inspections.

2.6.3.9.7 Soft Areas in Sub Grades

Where unsuitable material exists or develops during construction, it must be rectified to the satisfaction of the Council. Possible treatment methods include cement and/or lime stabilisation, replacement of the underlying material with pavement, the use of geotextiles and/or the lowering of sub-surface drainage to below the level of the area to be rectified. Rectified pavements must achieve the required levels of compaction as specified above.

'As Constructed' drawings shall show the extent of all reworked soft areas and any form of treatment taken.

2.6.3.9.8 Pavement Wearing Course

Pavements must, at the expense of the contractor, be proof rolled and density tested, immediately prior to priming. The frequency of density tests shall be in accordance with AS 3798 and AS 1289 Geotechnical Testing or as otherwise specified by the Council.

Pavements must be trimmed to shape, swept and have a surface consistency suitable for priming. Adequate protection shall be provided for signs, concrete edgings, and traffic control devices to prevent over-spray during priming or tack coating.

The wearing surface for all rural residential roads shall be a minimum of 30mm DG10 Asphalt with a binder suitable for the traffic environment and be constructed in accordance with Transport and Main Roads Technical Specification MRTS30. The surface of the final wearing course shall be between 5-10 mm above the concrete edging and detailed on the construction plans for each edging type. The wearing course shall be flush with the lip of the kerb and channel at all footpath kerb crossings (to eliminate any trip hazard).

All new and upgraded roads, including widened roads, that are located in or adjacent to commercial or industrial developments shall be sealed with DG10 Asphalt in accordance with Transport and Main Roads Technical Specification MRTS30. The asphalt is to have with a binder suitable for the traffic environment and be of suitable thickness for the expected traffic loading, with the minimum thickness to be 40mm.

Where a dispute arises concerning the finished surface texture or construction methods, wearing course core samples and compaction testing may be required to be provided at the developer's expense. The Developer’s Consultant shall, prior to construction, specify the hotmix design including aggregate size and any additives.

Where roads under this section may in Council's opinion be subject to turning movements that will cause deformation to the wearing surface, Developers may be required to provide either a deeper asphalt wearing course or structural asphalt Base layer.

All new and upgraded roads, including widened roads, which are located in rural areas are to be spray sealed. The seal is to be designed in accordance with the 'Austroads Technical Report AP-T68/06: Update of the Austroads Sprayed Seal Design Method'. The seal is to be designed by a person who has undertaken the required official training on the method, and is to be certified by an RPEQ.

Where roadways under this section may in Council's opinion be subject to turning movements that will cause stone loss from a sprayed seal or large numbers of heavy vehicles, the Developer may be required to provide an asphalt wearing course or asphalt base layer.

2.6.3.10 TRAFFIC CONTROL DEVICES

The Design Engineer shall determine the requirement for any traffic control devices in accordance with Transport and Main Roads 'Manual of Uniform Traffic Control Devices (MUTCD)'.

2.6.3.10.1 Signposting and pavement marking

Signposting and pavement marking should generally be provided to roads, intersections, traffic control devices, cycleways and carparks in accordance with Transport and Main Roads 'Manual of Uniform Traffic Control Devices (MUTCD)'. Street name plates are to be the standard type throughout Council.

2.6.3.10.2 Road Side Barriers

Where there is a warrant (e.g. an identified hazard in the clear zone) a barrier is to be provided in accordance with Transport and Main Roads specification, where shown on the approved engineering plan or as directed by Council’s Director Infrastructure Services.

2.6.3.11 PROPERTY ACCESSES

Roads should be located and designed such that vehicular access can be readily obtained at every allotment of a subdivision. Where the natural surface slopes steeply to or from the road, the access to each lot should be given special consideration. The locating of an access is to be avoided if effect to the vertical alignment of the road will occur.

All rural vehicle access crossings shall be designed to be in accordance with Council's Standard Drawing R-08 & R-09.

Culverts shall be designed with the following hydraulic capacity:

- 1 in 5 year ARI capacity before property culvert overtops;
- 1 in 50 year ARI capacity results in overtopping of maximum depth of 300mm; and
- No water shall encroach on edge of shoulder on sealed roads, or edge of gravel on gravel roads.

Industrial and commercial developments located in areas without kerb and channel shall comply with or exceed the guidelines presented in Austroads publication ‘Guide to Road Design Part 4A: Unsignalised and Signalised Intersections' with the minimum requirement being a BAL and BAR

Council shall generally require rural vehicle crossings to be upgraded to meet current standards whenever rural land is subdivided or where a planning permit relates to boundary realignment.

An Application for Property Access Approval is required to be submitted for each new or existing property access. Property Access Approval is required to ensure that the access meets the following conditions:

6. The access is to be located in a position which can achieve the appropriate safe sight distance for the surrounding speed environment.
7. The construction standard of the access is to comply with Council’s relevant standard drawings.
8. If a piped access is required, the pipe must be a minimum of 375Ø to allow for stormwater flow.
9. Guide posts must be installed on all rural piped accesses.
10. If the access is off of a sealed road, the access requires a 2 coat bitumen seal.

2.6.3.12 REQUIREMENT FOR DUST SUPPRESSION WORKS

Dust suppression works may be required where a proposed new house or an existing dwelling is likely to experience significant detrimental impacts arising from the dust generated by traffic travelling along a gravel road created from either:

- Additional traffic resulting from a proposed development
- Existing traffic.

2.7 STORMWATER DRAINAGE

The purpose of this section is to provide Council's minimum stormwater drainage design parameters, which allow the safe and efficient removal of stormwater from urban and rural living environments.

2.7.1 DEVELOPMENT REQUIREMENTS

Council requires that the Developer meet the full cost of providing an appropriate drainage system, with sufficient capacity to pass through the Development the design runoff from all upstream catchments.

The Developer shall provide easements/reserves dedicated in favour of Council for all drainage paths through the development and for all drainage paths downstream of the development to the legal point of discharge.

The proposed drainage system, and earthworks for the development shall be such that the upstream and downstream drainage is not adversely affected.

The Developer shall maintain the pre-development rates of discharge from the site unless approved otherwise by Council.

2.7.2 GENERAL DESIGN CRITERIA

Scenic Rim Regional Council has a drainage philosophy involving the improvement of the effectiveness of natural systems rather than replacing, upgrading or ignoring them.

The impact of development, and particularly urban development, on flow regimes, erosion, silting and flooding is to be controlled by adopting stormwater management techniques that maintain the function of natural drainage systems as far as possible.

2.7.2.1 URBAN STORMWATER SYSTEMS

All urban stormwater systems are to be designed and documented in accordance with the current version of the Queensland Urban Drainage Manual (QUDM) (except where varied within this manual), and subsequently certified that they are in accordance with this Manual and QUDM.

The QUDM partners recognise that QUDM is not a stand-alone planning and design guideline for stormwater management. It must be used in coordination with other recognised manuals covering topics such as:

- Water Sensitive Urban Design
- Water Sensitive Road Design
- Natural Channel Design
- Waterway management including fauna passage
- Erosion & Sediment Control
- Bridge and culvert design manuals
- Australian Rainfall and Runoff (ARR)
- Australian Runoff Quality (ARQ)
- Various Australian Standards on product manufacture and installation

The hydrologic procedures provided in QUDM are considered appropriate for small catchments of up to 500 hectares. These procedures are generally not considered appropriate for the

determination of design flood levels along vegetated (i.e. non-grassed) waterways. Readers should refer to the latest version of Australian Rainfall and Runoff (ARR) for guidelines on:

- the assessment of urban catchments larger than 500 hectares and,
- determination of design flood levels along vegetated waterways.

2.7.2.2 RURAL & RURAL RESIDENTIAL STORMWATER SYSTEMS

All rural and rural residential stormwater systems are to be designed in accordance with the current version of the Transport and Main Roads "Road Drainage Manual".

2.7.3 ADDITIONAL DESIGN CRITERIA

The purpose of this section is to:

- Supplement QUDM by providing further detail and guidance where QUDM only provides general guidance,
- Specify the criteria to be adopted for certain parameters that QUDM leaves up to the determination of the local government and
- Document where Scenic Rim Regional Council's requirements vary to QUDM, due to Regional Factors as listed in Section 1.02 of QUDM.

2.7.3.1 ROOF, ALLOTMENT AND INTER-ALLOTMENT DRAINAGE

Below are some points that the Local Government are required to nominate in regard to Section 7.13 of QUDM:

- The level of roof and allotment drainage required is specified as an addition to the extract from the "Recommended design average recurrence intervals" Table 7.02.1 from QUDM below.

(ii) MINOR SYSTEM DESIGN ARI (years)		**Level of Allotment Drainage**
Development Category		
Central Business and Commercial	10	V
Industrial	2	V
Urban Residential High Density - greater than 20 dwelling units/ha	10	III
Urban Residential High Density - greater than 5 & up to 20 dwelling units/ha	2	III
Rural Residential - 2 to 5 dwelling units/ha	2	II

- Unless approved otherwise by the Director inter-allotment drainage (Refer Figure 7.13.2 QUDM) shall be located on the low side of any sewer reticulation and generally 1.5 metres clear of the sewer alignment (or 1.5 metres from the property boundary alignment where no adjoining sewer).

- Easements are required for inter-allotment drainage. Refer Section 2.10

- Kerb adaptors must be installed within the kerb and channel for each allotment not serviced via an inter-allotment drainage system. The kerb adaptors shall be of a fabricated metal construction.

2.7.3.2 INTENSITY-FREQUENCY-DURATION DATA (REFER QUDM 4.07)

IFD data may be generated using the procedures given in ARR (1998) Book 2. Book 2 provides both algebraic and graphical procedures that allow the user to determine either complete or selected IFD design rainfall information for any location in Australia. The procedures enable the determination of rainfall intensities for durations of 5 minutes to 72 hours and ARIs from 1 year to 100 years. Book 2 also describes procedures for extrapolation of ARIs up to 500 years.

Alternatively the Bureau of Meteorology has a free program available on their website (listed below) to generate IFD charts that is also acceptable to Council.

http://www.bom.gov.au/water/designRainfalls/ifd/index.shtml

2.7.3.3 STORMWATER INFRASTRUCTURE LOCATION

Particular attention should be paid to the Design Procedure in Section 7.15.3 of QUDM as this will guide the layout of the site to achieve the drainage philosophy of *"improvement of the effectiveness of natural systems rather than replacing, upgrading or ignoring them"*.

At the start of this procedure consideration should be given to maximising the use of "Natural" drainage solutions (i.e.: naturally vegetated channels beside the road as a feature etc.) before opting for "Built" (pits and pipes) infrastructure.

By following this procedure the designer can readily determine the approximate maximum size of the sub-catchment area that is likely to be acceptable to minimise the infrastructure required to convey the minor storm flows, whilst still maintaining the safety requirements of the major storm overland flows.

Below are some more specific requirements:

- Roads are to be located in gullies to enable appropriate overland flow paths that don't impact private properties.

- Stormwater lines are to be located under the kerb and channel with gully pit to gully pit connections.

- For pipelines greater than 600mm the location of the pipeline is to be behind the kerb and channel. This will require a wider verges on one side of the road and hence a wider road reserve, for stormwater space allocation in accordance with Section 7.01.1 QUDM. (Therefore layouts should be designed to keep catchments small to keep pipe sizes 600mm and avoid this requirement)

- Stormwater manholes and pits are not to be located within the road or street pavement and the length of stormwater pipe under roads or streets is to be minimised. This is to reduce the risk of pavement failures due to differential settlement and allow economical pavement rehabilitation when required in the future.

2.7.3.4 STORMWATER INLETS AND MANHOLES (REFER QUDM 7.05.1)

The following criteria apply to stormwater inlets and manholes:

- Gully inlets shall be a combination grate and side inlet pre-cast lintel.
- They shall generally be Lip-in-Line, however Kerb-in-Line is more suitable where parking is allowed near barrier kerb.
- Maximum outlet pipe of gully connections in series is 525mm dia
- The desirable maximum inlet pit depth should be limited to 1.5m to enable safe maintenance,
- The desirable minimum and maximum stormwater manhole depth is to be limited to 1.2m and 3.0m respectively
- Gully grates shall be "bike proof"
- Kerb inlet pits at intersections are generally to be located at the tangent point taking into account the position of pedestrian paths and kerb ramps. Inlets shall not be placed on kerb return unless specifically approved by Council.
- Pits are to be free draining.
- Pipe work openings are to be located within a single wall. i.e. pipes shall not be permitted to enter through the corner of the pit structure.
- Inlet pits should be located at the midpoint of allotment frontages to reduce the likelihood of conflict with service conduits and future driveways

2.7.3.5 OUTLETS AND OUTLET PROTECTION

- All outlets shall be located to facilitate inspection and maintenance access
- Protection works to outlet shall be designed to meet the following criteria:
    - Dissipate the outflow velocity to minimise scouring,
    - Provide protection from flows in receiving waters,
    - Provide protection from overland (Major Storm) flows,
    - Provide protection from local scouring or undermining of the outlet structure.

2.7.3.6 OPEN CHANNELS

- All open channels shall have adequate access provisions for maintenance and cleaning,
- Subsurface drainage shall be provided in grass-lined channels to prevent water logging of the channel bed.

2.7.3.7 PIPES AND BOX CULVERTS

- Stormwater drainage pipes and boxes shall be generally be of reinforced concrete (including FRC) construction (unless approved by Council) and in accordance with the following:

- Minimum pipe size 375mm dia in Urban environments and 450mm dia for rural cross road pipes,

- Minimum box culvert size 450mm x 300mm.

2.7.3.8 CROSS ROAD CULVERTS

Cross road culverts shall be designed to pass the flow of an ARI 50 year storm with the top water level (TWL) not exceeding edge of carriageway except as indicated below:

- For roads servicing less than 20 lots and where average lot area fronting the road is greater than 7999m2, ARI 5 years with TWL not exceeding the edge of carriageway. A design check should also be undertaken for Q50 assuming the road acts as a floodway. The floodway should be trafficable at Q50 with a maximum submergence of 200mm and maximum velocity shall be 1.85m/s. Floodway to be designed to Austroads Standards

- The culvert may be designed for an ARI of 10 years with TWL not exceeding the edge of carriageway if the subject road has less than 2000 AADT at the 20 year horizon and where there exists an alternate route above the ARI 50 year flood, which is within an acceptable proximity. This relaxation is subject to the discretion of the Director. Other factors pertinent to any approval, are road geometry (sight distance to flood affected area); the speed environment; the period of time the road would be impassable; the location of alternate routes and the standard of other nearby cross road drainage.

Designers must also check: (i) that the backwater for the ARI 100 year storm does not exceed permissible limits; and (ii) whether or not embankments require facing where overtopping is likely to occur.

- In residential and residential low density areas where the pipe extends through private property downstream of the road the culverts and downstream drainage shall be designed for ARI 100 years

2.7.3.9 CULVERT BACKWATER

In rural, rural residential and low density residential areas, backwater from culverts can extend into private property provided the area of inundation is shown on flood plans lodged at sealing stage and the affected area is excluded from the building envelope and the minimum building envelope criteria are satisfied.

2.7.3.10 CULVERT LENGTH CRITERIA

Where kerb and channel or flush kerb with shallow table drains:

Culvert to be full width of road reserve except where the cumulative span of culvert internal diameters/box widths exceeds 3m. If the latter case applies, culvert length shall be in accordance with Australian Standard 5100, with provision for a footpath on one side of the road. The minimum clear width available for use by pedestrians shall be 1.8m. (Where pedestrian movements are considered significant, the Director may indicate footpaths to be included on both sides of the culvert.)

In Rural Residential areas (Note: This does not include Residential Low Density)

Where road frontage is less than or equal to 50m, Culvert to extend from road formation on upstream side to 5 m beyond the building envelope of the affected and adjoining lot on the

downstream side. Where this criterion cannot be achieved, the watercourse downstream of the culverts should be dedicated to Council as Park or Reserve.

Otherwise

Road formation width and in accordance with AS5100 with provision for a footpath on one side of the road. The minimum clear width for use by pedestrians shall be 1.8m.

2.7.3.11 MAJOR STORM OVERLAND FLOWPATH AND NATURAL WATERCOURSES

In rural and rural residential areas:

- Major storm flows may pass overland through these properties subject to assessment of the ARI 100 year flood level and compliance with minimum building envelope criteria being satisfied. Where cross road culverts discharge into private property, an easement shall be provided for the extent of any pipeline in the property (if applicable) and for a minimum distance of 30m beyond the culvert apron or channel outfall. (This latter requirement may be waived if the cross-road culvert discharges into a recognisable creek system.)

- Natural watercourses may be contained within private property. Easements are required over the defined width including and allowance for access and maintenance berms.

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2.7.3.12 LOW DENSITY RESIDENTIAL ALTERNATIVE DRAINAGE SYSTEM

- Table drains to be maximum 400mm deep and fully turfed except where cement grouted stone pitching or concrete lining or approved equivalent is required for scour protection. Side batters to be 1V:4H maximum.

- Pipe/table drain major system to be designed for ARI of 50 years with top water level not exceeding edge of shoulder level.

- Access culvert crossings shall be provided for entry to all allotments in accordance with Council's Standard Drawings

- At or adjacent to road crests, concrete invert style crossings may be used in lieu of pipe crossings subject to the approval of the Director.

2.7.3.13 TABLE DRAINS - RURAL & RURAL RESIDENTIAL AREAS

The invert of table drains to be 150mm lower than the subgrade level. With localized deepening at pipe crossovers, if required. The side batters of table drains shall be 1V:4H maximum. Some road reserve widths on existing roads may preclude such flat batters. Where this is the case Council is to be consulted and alternatives such as a concrete v-drain with subsoil drain are to be investigated.

Table drains shall be fully turfed except where velocities exceed limits in Table 9.05.3 QUDM, in which case alternative permanent erosion control measures shall be incorporated.

2.8 LANDSCAPING

2.8.1 GENERAL

Council recognises the value of landscaping in beautifying and characterising private and public open space.

Developers are often keen to provide landscaping in new public lands (be they road, park or other reserves) to help with the marketing of their development. Council supports this enthusiasm but no works can be undertaken without the formal approval of concept and detailed design of landscaping proposals. Where landscaping is incorporated in existing or proposed public lands, the landscaping works are subject to the review and approval by Council's Operational Works Section.

Landscaping is often a condition of a development approval and in such instances, the landscaping works are subject to the review and approval of Council's Planning Department.

Council supports innovative design however, there is a specific criterion that must be conformed to, viz:

- The minimum design, performance and maintenance standards specified by Council for landscape works.

- Due consideration of the surrounding environment. Design principals must take cognisance of adjacent land uses to ensure that uniform and coherent landscaped corridors are created within particular development zones.

Landscaping designs shall be undertaken by a suitably qualified Landscape Architect. Any elements of the landscaping design that the Director considers to be of structural/building form shall be certified by an RPEQ (Civil) and where applicable the Consultant shall be responsible for the lodgement of either an Operational Works and/or Building Application. Council will not approve any landscaping works on public lands that the Director considers could be a hazard to pedestrians or vehicles.

Where landscaping works form part of a subdivision development, the civil Consultant shall be responsible for coordinating the lodgement of any landscaping plans. The Consultant prior to lodgement shall review the drawings for potential clashes between landscaping works and proposed or existing services. Further, the Consultant shall review any landscaping drawings to ensure the designs do not compromise road or pedestrian safety concerns and that adequate provision has been made in the design for the protection of road pavements or services from water damage (irrigation/watering) or root damage.

Refer also section 3.13 for Works Permit and construction requirements.

2.8.2 LANDSCAPED ELEMENTS

The general landscape elements addressed in this Manual include:

- Streetscaping
- Parks and Public Open Space
- Carparks
- Landscaped Buffers
- Building Development
- Construction Sites

2.8.3 LANDSCAPE DOCUMENTATION STANDARDS

Design drawings and documentation lodged with Scenic Rim Regional Council shall conform to the requirements of Section 2.4.

2.8.4 LANDSCAPED DESIGN & ENVIRONMENTAL CONSIDERATIONS

2.8.4.1 GENERAL

The Consultant shall investigate and research the following parameters when preparing a landscape design for submission to Scenic Rim Regional Council:

- Surrounding native flora and fauna
- Existing site vegetation
- Soil types and characteristics
- Topography and slope stability
- Natural drainage patterns and catchments including overland flow paths
- Local climatic elements:
    - rainfall (annual precipitation and seasonal dominance or intensity Refer Section 2.7)
    - temperature
    - frost occurrence
    - solar radiation (intensity and seasonal direction patterns)
    - wind (prevailing direction and expected velocity)
- Surrounding human influence and cultures
- Dominant local treatments and styles that have been developed or introduced
- Current Local Council and State Government Requirements, Local Laws, Council's Recreation Strategy, etc.
- Special or additional requirements of applicants and intended users of the habitat

In addition the Consultant shall ensure the design performs the functions of the intended use and purpose of the landscape. Functional elements include:

- traffic flows (pedestrian, cyclist and vehicular)
- focus on features and visual outlooks
- provision of shade and shelter
- retardation of undesirable visual or acoustic elements
- provision of reasonable access to services for maintenance purposes
- the creation of space and comfort
- the provision of recreation facilities
- the encouragement of and nurture of environmental attributes
- the promotion of aesthetic enhancement
- short and long term maintenance requirements
- provision of water storage
- ability to retard bushfires

When assessing plant species the following plant characteristics should be researched, in particular:

- dimensions at maturity
- rate of growth
- form or pattern of growth
- cultural and maintenance requirements
- compatibility with aforementioned site, environmental and climatic elements

- root aggression and effect on adjacent roads' water and sewer mains
- potential to drop litter: leaves, flowers, seed and fruit
- shading effect of canopy on surrounding plants or grasses
- ability to regenerate or spread
- characteristics (size, shape and colour) of plants aesthetic features: trunk, leaves, flowers, etc.
- any restrictive characteristics, poisonous, noxious, spikes or prickles, etc.
- ability to be trained
- fragrance
- availability in local nurseries
- fire resistance
- fire retardance

In Schedule 1 attached herewith is a comprehensive listing of shrub and tree species which are suitable for use within the Scenic Rim Regional Council region. The schedule is divided into various landscaping environments: Major road corridors; Parklands; Streets and avenues; Creek corridors; and Medians, Roundabouts and Screenings. Consultants are encouraged to use the species within the Schedule when selecting plants for landscape treatments.

2.8.5 LANDSCAPE DESIGN REQUIREMENTS

2.8.5.1 GENERAL

Landscaping plans may be in the form of concept sketches or working drawings. Refer Section 2.4 for details of the appropriate information in landscaping plans.

2.8.5.2 MINIMUM PLANTING REQUIREMENTS

All trees and shrubs required to be planted shall be at least 750mm and 500mm high respectively when planted. Each required shrub shall attain a height of not less than 600mm when fully matured.

Council expects all existing trees and shrubs between three metres and twenty metres of any building work or approved car parking area or access thereto to be retained and included in a landscape plan. Furthermore, Council desires appropriate action to be undertaken to minimise disturbance to this vegetation during on-site building work including the need to adhere to Australian Standard 4970-2009 Protection of Trees on Development Sites.

Where trees are planted, Council will require them to be staked using a minimum of two approved wooden stakes per tree, or an approved metal tree guard well secured into the ground so as to assist in the establishment of the plant's rooting system and as partial protection against vandalism. Refer to Scenic Rim Standard Drawing P-30 (Specimen Park/Street Tree Planting).

2.8.5.3 STREETSCAPING

Streetscaping guidelines shall be used where the Developer proposes to incorporate landscaping within the verges or medians of new roads in a subdivision. Concept sketches shall be lodged with a formal written application to the Director requesting approval for landscaping within any road. If a preliminary approval is granted by the Director, detailed working plans of the landscaping shall be lodged with the engineering documentation as part of an Operational Works application.

Conceptual sketches illustrating typical streetscaping treatments and considerations are shown in attached Figures (Source: Hervey Bay City Council).

Design shall generally satisfy the following criteria:

- Planting should be in scale with streetscape.
- Street trees are not to be planted within 6m of light poles.
- Plants are not to be placed at access points.
- Plants shall not obstruct access to services.
- Planting with limited species variation is preferred.
- The street tree alignment shall be within the corridor shown on Standard Drawing R-02.
- Earthworks should not be carried out within close proximity of existing vegetation.
- All street gardens including roundabouts and medians shall be provided with an automatic irrigation system.
- Subsoil drainage shall be provided between all street gardens and the road pavement.
- Pedestrian access shall be maintained around, and where applicable through, all street planting.
- Visibility lines are to be checked to ensure that the minimum stopping distance for vehicular traffic is maintained. Care should be taken to ensure that the visibility lines are checked assuming the plantings have grown to full maturity.

Notwithstanding the approval process for landscaping generally, subdivision works must incorporate a minimum level of landscaping as outlined below:

(a) Unstable slopes will require stabilising with retainer wall treatments and revegetated appropriately. Stable slopes will be rehabilitated using low maintenance grasses and/or revegetation techniques.
(b) All road verges including table drains in rural zones are to be grassed with a minimum aerial coverage of 80 percent before acceptance off maintenance. The grass coverage shall also have been significantly established and maintained by the Developer for a minimum period of twelve months before acceptance off maintenance.
(c) Acoustic barriers to be provided for all new roads with design traffic >5000AADT where the abutting properties are residential and have an average lot area <2000m2.

2.8.5.4 *PARKS AND PUBLIC OPEN SPACE*

As part of the development approval for major estates Council requires the preparation of a management plan for the parkland. This management plan will identify the intended uses of the parkland. In particular the management plan will identify those areas suitable to be used for active sport and recreation and those areas to be preserved for environmental reasons. Refer to Scenic Rim Regional Council's Parks standard drawings for further details.

Minimum Works Required In All Parkland Areas

- Removal and safe disposal of noxious weeds.
- Hardwood bollards with appropriate access lock rails/gates are to be installed to all road frontages or access points
- All substantial and significant trees are to be retained where ever practical and protected in accordance with Australian Standard 4970-2009.
- All retained trees over 200m diameter at breast height are to be assessed by an independent qualified Arborist (as per AQF and Australian Standards) and the recommendations from the Arborist report are to be implemented prior to the on maintenance period in accordance with Australian Standard 4373-2007. The Arborist report is to be provided/detailed to Council before any construction commences on the site.
- Removal and safe disposal of environmental weeds (as defined in Council's Pest Management Plan Policy D0018) unless otherwise specified by Council.

- Selective tree planting to areas where weeds have been removed to stabilised soils and suppress regrowth of weeds.

Site Specific Works

- Pathway/bikeway/horse trail construction
- Playground equipment, seating, shelters and picnic facilities where required in management plan.

Minimum Design Requirements

Landscaping to parkland:

- Specify and detail a multi-purpose landscape, through the design and placement of plantings, earthworks, hardscape and park furniture.
- Site preparation:
- Specify and detail ground preparation and grassing of the parkland so as to provide an area free from sudden undulations, ponding and extraneous materials that may injure children performing play activities in the parkland.

Plantings:

- Specify and locate vegetation to the frontages and boundaries of parkland, so as to delineate and promote the location of the parkland.
- Specify and locate plant species, earthen mounding, boulders and other features adjacent to play equipment for the protection from sun, wind and air pollutants, control of surface drainage and provision of innovative play options.
- Locate play areas in proximity to shelters, picnic areas, pathways and amenities and where visible from access roads and pathways.
- Locate play areas no closer than 10m from private properties, road reserves, dense bush land, water courses and any other areas that may jeopardise the safety of children or where their play may disturb neighbours.
- Provide seating and shelter for supervisors orientated to clearly view children at play.
- The relevant sections of AS 2155 - Australian Standard for playgrounds and the draft standard where better specified.

Bikeways:

- Bikeways are typically 2.5m wide concrete paths for use by cyclists and pedestrians.
- Where bikeways exit parkland onto busy streets, include a physical barrier to restrict accidental movements onto the road pavement.
- Where bikeways restrict access to particular areas of the parkland, provide maintenance vehicle crossovers at practical points to avoid damage to concrete.

Where the requirements for structural improvements are not clearly defined in the conditions of subdivision or Council's strategy for the dedication of the area, liaise with Council's relevant officer to confirm:

- The siting of the parkland and bikeway routes.
- The specific function, targeted user groups and intended frequency of use.
- The items to be provided per park, including play equipment and park furniture.
- The method of drainage required where springs, seepage and overland flow paths exist.

- Provision for access by disabled persons. Note: Any clearing in parkland is to be constructed in accordance with the approved management plan and confirmed on site by the Director or one of their delegates.
- Any clearing in parkland is to be constructed in accordance with the approved management plan and confirmed on site by the Director or one of their delegates.
- No fill batters, generated by the Development, shall encroach onto the parkland.
- All structures, infrastructure and equipment are to be designed by an appropriately qualified engineer. The improvements shall comply with the relevant Australian Standards, Council Standards and where no recognised standard exists the design shall be subject to Council approval.

2.8.5.5 CARPARKS

Carparking facilities and vehicle access should generally conform to the requirements of AS2890, Austroads Guidelines, Council's Planning Scheme, relevant Development Conditions and should also address the following design issues unless approved otherwise by the Director:

Location/Layout:

- Concentrate carparks to the rear of buildings and/or divide large carparks with buildings, covered walkways or open space.
- Provide pedestrian set-down bays and public transport stops. Set-down bays may be used for small-scale commercial deliveries only.
- Provide walkways/aisles for circulation of pedestrians. Protect walkways with wheel stops or kerbs. Check vehicle overhang.
- Provide landscaped medians incorporating shade trees within the car parking layout.
- Orientate parking bays and shade tree planting patterns to optimise the seasonal shade patterns and minimise the glare from the afternoon sun.

Construction - dual use:

- Design carparks as detention basins, without inconveniencing the motorist, to detain increases in runoff that may overload the existing stormwater system, or in combination with a series of "small" detention basins to ease the overall load on the development.
- Replace concrete kerbs, excluding those at the base of batters, with wheel stops to allow runoff to irrigate surrounding landscaped areas; include a stone and sand filter trench drain to trap contaminants (not proved in field to date), reduce runoff flow and increase percolation.

Landscaping:

- Each landscaped island shall be of sufficient size to accommodate a mature shade tree.
- All landscaped areas to be provided with an irrigation system.
- Subsoil drainage and root barrier protection to be provided around landscaped areas.

2.8.5.6 LANDSCAPED BUFFERS

Where a proposed development abuts an existing development and the land uses are not compatible, a buffer strip is to be used to reduce the impact as follows:

Locate and landscape a buffer strip or combination landscaped strip with screen fencing or earthen mound, on the abutting common boundary and within the proposed development.

Wherever buffer strips 2.0 metres wide or greater are required by Council's planning scheme alongside or rear boundaries in order to screen or separate different land use zonings they are to be landscaped by means of trees and shrubs of approved varieties which together will form an effective screen of vegetation at least 3.0 metres high. Required trees and shrubs shall be so located as to form the points of a series of imaginary equilateral triangles, the sides of which shall not be greater than 1.5 metres. One of each five such trees shall be of a variety planted along the street reservation by Council or as nominated by Council.
Wherever landscape strips 2.0 metres wide or greater adjoin the frontage(s) of a site to be developed, they shall be planted with trees and shrubs or stated varieties, the shrubs to achieve a mature height of at least 600mm. The required trees or shrubs shall be so located as to form the points of a series of imaginary equilateral triangles, the sides of which shall not be greater than 1.5 metres. Interspersed amongst low shrubs there shall be at least four (4) trees for each 20.0 metres of road frontage(s) to which the landscape strip adjoins to achieve a mature height of at least four (4) metres.

Wherever buffer or landscape strips are permitted by Council to be less than the width prescribed above, they are to be landscaped by trees and shrubs of stated varieties which together will form an effective vegetation screen, interspersed amongst shrubbery.

In industrial areas, all fencing types, including security fencing, shall be located behind the landscaped strip to any street frontage, and a mower strip or its approved equivalent shall be provided along the property frontage.

2.8.5.7 LANDSCAPING FOR VISUAL SCREENING

Landscaping may be required by Council to screen buildings from view. The type of vegetation used (medium height or tall), density of plantings and depth of planting is to be determined based on the location of the view point/s and the distance to the viewpoints. The greater the distance the less vegetation is required.

Where the building to be screened is a residential building and the view point is a large distance away the screening vegetation should be placed to not inhibit views out from the residential building provided that is compatible with the intent to screen the building from view.

2.8.5.8 CONSTRUCTION SITES

Where as part of construction works associated with any development the natural ground cover is disturbed by earthworks or traffic movements, Council's minimum requirement will be for all disturbed areas to be grassed with a minimum 80% aerial coverage within 12 months of completion of the works. The grass coverage shall have been significantly established and maintained by the developer for a minimum period of 12 months before being considered acceptable. Any disturbed areas of public space in a development that is steeper than 5%, as well as any flow paths, should be turfed. Further, that where a berm is required on the top of a road

cutting and is on private property, the developer provides Council with an easement over the berm area, with a minimum width of three metres.

The grass mixture chosen for the revegetation shall be suitable for the soil type and be recognised as low maintenance species. It may be necessary to plant short term grass and legume species to assist in soil conditioning and early erosion resistance while the favoured low maintenance species are established.

Specifications should be performance based and clearly identified that the required grass coverage is to be achieved within the time limit. Most sites are expected to require more than topsoiling and seeding. Soil testing maybe required to determine the need for soil conditioning and the appropriate fertiliser application. In most cases irrigation will also be necessary during establishment of the grasses. Maintenance mowing will be required to be provided by the developer during the 12 months after the grass is established.

Certain sites, where erosion by wind or water may cause a public nuisance or have a detrimental effect on the adjacent environment, may be required to have protective surface treatments applied while the grass is established. Treatments to be considered should include hydro mulching, bitumen emulsion mulching, vegetative mulching and proprietary revegetation matting.

Schedule 1 - Landscape Plant Schedule

Major Road Corridors (also see Street and Avenue Species)

Botanical Names	Common Name	Botanical Names	Common Name
Acacia species	Wattles		
Acmena species	Lillypillies		
Agathis robusta	Kauri pine		
Alphitona excelsa	Red ash		
Araucaria cunninghamiispecies	Hoop pines		
Banksia species			
Brachychiton acerifolia	Flame tree		
Brachychiton discolour	Lace bark		
Brachychiton populneus	Kurrajong		
Buckinghamia celsissima	Ivory curl	Flindersia species	Crows ashes
Callistemon species	Bottle brushes	Glochidion ferdinandii	Cheese tree
Casuarina species	She oak	Grevillea robusta	Silky oak
Cupaniopsis anacardiodes	Tuckeroo	Guioa semiglauca	Guioa
		Harpullia pendula	Tulipwood
		Hymenosporum flavum	Native frangipani
		Lophostemon confertus	Brush box
		Melaleuca bracteata	White cloud tree
		Melaleuca linariifolia	Narrow leaved paperbark
Eucalyptus curtisii	Plunkett mallee	Melaleuca quinquenervia	Broad leaved paperbark
		Melaleuca stypheloides	Prickely paperbark
		Notolea longifolia	Native olive
		Podocarpus elatus	Brown pine
		Syzygium species	Lilly pilly / satinash

Parkland Trees Species (also see Street and Avenue Species)

Botanical Name	Common Name
Agathis robusta	Kauri pine
Aleurites moluccana	Candle nut
Araucaria cunninghamii	Hoop pine
Backhousia myrtifolia	Grey myrtle
Brachychiton acerifolius	Flame tree
Castanospora alphandii	Brown Tamarind
Castenospermum australe	Black bean
Cryptococarya obovate	Pepperberry ash
Cupaniopsis anacarddioides	Tuckeroo
Dysoxylum fraserianum	Rosewood
Eleocarpus grandis	Blue Quandong
Eleocarpus obovatus	
Eucalyptus intermedia	Pink bloodwood
Eucalyptus maculate	Spotted gum
Eucalyptus microcoris	Tallowwood
Eucalyptus pilularis	Black butt
Eucalyptus propinqua	Grey gum
Eucalyptus signata	Scibbly gum
Euodia elleryana	Pink evodia
Ficus benjamina	Weeping fig
Ficus macrophylla	Moreton bay fig
Ficus species	Figs
Flindersia australis	Crows ash
Flindersia collina	Leopard wood
Flindersia schottiana	Bumpy ash
Gmelina leichhardtii	White beech
Grevillea robusta	Silky oak
Harpullia pendula	Tulipwood
Hymenosporum flavum	Native frangipani
Jacaranda mimosifolia	Jacaranda
Melaleuca species	Paperbarks
Melia azedarach	White cedar
Peltophorum pterocarpum	Yellow poinciana
Podocarpus elatus	Brown pine
Syzygium australe	Brush cherry
Syzygium luehmanii	Small-leaved Lilly-pilly
Xanthostemon chrysanthus	Golden penda

Notes:
Criteria for species suitability:

(a) species with low limb loss
(b) species are to be drought / frost resistant

Street and Avenue Species

Native Species

Botanical Name	Common Name
Alphitona excelsa	Red ash
Banksia integrifolia	**Coastal banksia**
Brachychiton acerifolia	**Flame tree**
Buckinghamia celsissima	**Ivory curl**
Callistemon salignus	**Bottle brushes**
Callistemon viminalis	**Bottle brushes**
Cupaniopsis anacardiodes	Tuckeroo
Elaeocarpus reticulatis	**Blueberry ash**
Harpullia pendula	Tulipwood
Hymenosporum flavescens	**Native frangipani**
Flindersia species	Broadleaf leopardwood
Geijera parviflora	**Wilga**
Lophostemon confertus	Brush box
Melaleuca linariifolia	**Snow in summer**
Melalleuca leucodendron (broadleaf)	Weeping paperbark
Melalleuca leucodendron (fineleaf)	Weeping paperbark
Pittosporum rhombifolium	**White holly**
Podocarpus elatus	Brown pine
Rhodosphaera rhodanthema	Tulip satinwood
Stenocarpus sinuatus	Wheel of fire tree
Syzygium luehmanii	Small-leaved Lilly-pilly
Trisianiopsis laurina	**Water gum**
Xanthostemon chrysanthus	Golden penda

Notes:

Criteria for species suitability:

(a) compact growth habitat
(b) ability to handle pruning
(c) moderate root system
(d) resistance to drought and/or frost
(e) resistance to limb loss (storm and wind damage)
(f) evergreen species

Those species which may be maintained under Power Lines with only moderate maintenance / pruning are marked in bold lettering.

Street and Avenue Species (Continued)

Exotic Species

Botanical Name	**Common Name**
Bolosanthus speciosus	Sth African wisteria
Calodendron capense	Cape chestnut
Jacaranda mimosaefolia	Brazilian rosewood (deciduous)
Largerstroemia species	Crepe myrtle (deciduous)
Schotia brachypetala	Drunken parrot tree

Notes:
Natives are the preferred species. Exotic species may be allowed only if natives are not available or are not aesthetically suited to the area.

Creek Corridors and Creek Crossings Tree Species

Botanical Name	Common Name
Acacia species	Wattles
Acmena smithii	Lilly pilly
Alphitona excelsa	Red ash
Angophora costata	Smooth barked apple
Austromyrtus species	Myrtles
Backhousia citriodora	Lemon cented myrtle
Backhousia myrtifolia	Grey myrtle
Brachychiton acerifolia	Flame tree
Callistemon salignus	White bottlebrush
Callistemon viminalis	Weeping bottlebrush
Castanospermum australe	Black bean
Casuarina cunninghamiana	River oak
Casuarina glauca	Swamp oak
Casuarina littoralis	Forest she oak
Casuarina torulosa	Forest oak
Commersonia bartramia	Brown kurrajong
Cryptocarya glaucescens	Brown beech
Cryptocarya microneura	Murrogun
Cryptocarya triplivensis	Brown laurel
Elaeocarpus grandis	Blue quandong
Elaeocarpus obovatus	
Elaeocarpus reticulatis	Blueberry ash
Eucalyptus intermedia	Pink bloodwood
Eucalyptus propinqua	Grey gum
Eucalyptus ptychocarpa	Swamp bloodwood
Eucalyptus robusta	Swamp mahogony
Eucalyptus tereticornis	Blue gum

Botanical Names	Common Name
Ficus coronatas	Sandpaper fig
Ficus obliqua	Small leaved fig
Flindersia bennettiana	Bennett's ash
Glochidion ferdinadii	Cheese tree
Glochidion perakense	
Gmelina leichhardtii	White beech
Grevillea robusta	Silky oak
Harpullia pendula	Tulipwood
Hymenosporum flavescens	Native frangipani
Jagera pseudorhus	Foambark tree
Leptospermum species	Tea tree
Lophostemon confertus	Brush box
Lophostemon suaveolens	Swamp mahogony
Macaranga tanarius	Macaranga
Malloyus phillipensis	Red kamala
Melaleuca bracteata	River tea tree
Melaleuca leucadendron fine leaf	Long leaved paperbark
Melaleuca leucadendron broad leaf	Long leaved paperbark
Melaleuca linariifolia	Snow in summer
Melaleuca nodosa	Prickely paperbark
Melaleuca quinquinervia	Broad leaved paperbark
Melaleuca stypheloides	Prickely paperbark
Notolea longifolia	Native olive
Omolanthus populifolius	Bleeding heart
Pittosporum revolutum	Rough fruit pittosporum
Pittosporum venulosum	Rusty pittosporum
Podocarpus elatus	Brown pine

Creek Corridors and Creek Crossings Tree Species (Continued)

Botanical Name	Common Name	Botanical Names	Common Name
Euodia elleryana	Pink evodia	Polyscias elegans	Celerywood
Rhodomyrtus psidiodes	Native guava	Syzygium tierneyanum	River cherry
Sterculia quadrifida	Peanut tree	Tristaniopsis laurina	Water gum
Syzygium australe	Brush cherry	Waterhousea floribunda	Weeping lilly pilly
Syzygium francisii	Rose satinash	Xanthostemon crysanthus	Golden penda
Syzygium leuhmanii	Small leaved lilly pilly		

Medians, Roundabouts and Screening Species

Trees

Botanical Name	Common Name	Botanical Name	Common Name
Acacia species	Wattles	Eucalyptus tessellaris	Moreton bay ash
Acmena smithii	Lilly pilly	Euodia elleryana	Butterfly tree
Alphitonia excelsa	Red ash	Ficus species	Figs
Backhousia citriodora	Lemon scented myrtle	Grevillea ballyana	
Backhousia myrtifolia	Grey myrtle	Grevillea banksia	
Banksia integrifolia	Coastal banksia	Grevillea hilliana	White silky oak
Buckinghamia celcissima	Ivory curl tree	Hakea salicifolia	Willow leaved hakea
Callicoma serratifolia	White alder	Hibiscus tiliaceus	Cottonwood
Callistemon salignus	White bottlebrush	Lagunaria patersonii	Norfolk island hibiscus
Callistemon viminalis	Weeping bottlebrush	Leptospermum laevigatum	Coast tea tree
Casuarina cunninghamiana	River oak	Leptospermum petersonii	Lemon scented tea tree
Casuarina glauca	Swamp oak	Melaleuca leucadendron	Narrow leaved paperbark
Casuarina littoralis	Black she oak	Melaleuca linariifolia	Snow in summer
Casuarina torulosa	Forest oak	Melaleuca quinquinervia	Broad leaved paperbark
Commersonia bartramia	Brown kurrajong	Omolanthus populifolius	Bleeding heart
Eleocarpus reticulatis	Blueberry ash	Pittosporum rhombifolium	White bolly
Eucalyptus curtisii	Plunkett mallee	Pittosporum undulatum	Native daphne
Eucalyptus microcorysi	Tallow wood	Pittosporum venulosum	Rusty pittosporum
Eucalyptus ptychocarpa	Swamp bloodwood	Rhodosphera rhodanthema	Deep yellow wood
Eucalyptus robusta	Swamp mahogany		

Screening Species - 4 to 5 metres

Botanical Name	Common Name
Acacia species	Wattles - A.bailyana
	A.deanii
	A.fimbriata
	A.floribunda
	A.longifolia
	A.podalriifolia
Baeckea virgata	Twiggy baeckea
Banksia species	Banksias - B.collina
	B.ericifolia
	B.spinulosa
Callistemon species	Bottlebrushes - C.citrinus
	C.endeavour
	C.eureka
	C.formosus
	C.hannah ray
	C.kings park special
	C.pindi pindi
	C.wildfire
Grevillea species	Grevilleas - G.banksii
	G.costal glow
	G.hookeriana
	G.ned kelly
	G.poorinda constance
	G.superb
Hakea species	Hakeas - H.salicifolia
Leptospermum species	Tea trees - L.copper glow
	L.laevigatum
	L.petersonii
Melaleuca species	Paperbarks - M.incana
	M.golden gem
	M.linariifolia

Dwarf Shrubs - 1 to 1.5 metres

Native Species	Exotic Species
Acacia fimbriata 'dwarf'	Hebe species
Agonis flexuosa 'nana'	Juniperus species
Austromyrtus dulcis	Largerstroemia 'little chief'
Baeckea virgata 'dwarf'	Nadina domestica 'nana'
Baeckea la petite	Russelia equisetiformis
Callistemon captain cook	Spiraea catoniensis
Callistemon little john	Thuja species
Grevillea coconut ice	
Grevillea forest rambler	
Grevillea lilliane	
Grevillea olympic flame	
Grevillea robyn gordon	
Hardenbergia violacea	
Leptospermum pacific beauty	
Leptospermum pink cascade	
Melaleuca incana 'nana'	
Melaleuca claret tops	
Melaleuca snowflakes	
Melaleuca snowstorm	
Melaleuca thymifolia	

Screening Species - 4 to 5 metres (Continued)

Botanical Name	Common Name
	M.nodosa
	M.revolution gold
	M.snowfire

Groundcovers

Native Species	Exotic Species
Acacia amblygona	Alternanthera
Brachycombe species	Evolvulus pilosus
Damperia species	Felicia amelloides
Goodenia species	
Grevillea biternat	
Grevillea bronze rambler	
Grevillea juniperina	
Grevillea lanigera	
Hibertia species	
Myoporum parvifolium	
Phyla nodiflora	

Clumping Bulbs, Lillies and Grasses

Native Species	Exotic Species
Crinum species	Agapanthus species
Dianella species	Festuca glauca
Lomandra species	Hemerocallis species
	Hippeastrum species
	Hymenocallis species
	Liriope species
	Orphiopogon species
	Phormium species

2.8.6 PEST MANAGEMENT

2.8.6.1 WEED CONTROL

Weeds fall into two main categories:

2.8.6.2 DECLARED PLANTS

Declared Plants are plants declared under the Rural Lands Protection Act because of impacts on human health or the environment and considered a serious enough pest to warrant its control being enforced by legislation. The control mechanisms include destruction, reduction and prevention from spreading based on the plant species involved. There are 38 plants declared under the Rural Lands Protection Act in this region.

2.8.6.3 ENVIRONMENTAL WEEDS

Environmental Weeds have potential to cause harm to people, animals or the environment but have not been declared.

Both Declared Plants and Environmental Weeds are listed in Schedule 2. It is the responsibility of the Developer to ensure all lands are cleared of declared plants and lands that are being dedicated as open public space, park or easement, have both declared plants and environmental weeds removed and disposed of to the satisfaction of the Director Regional Services.

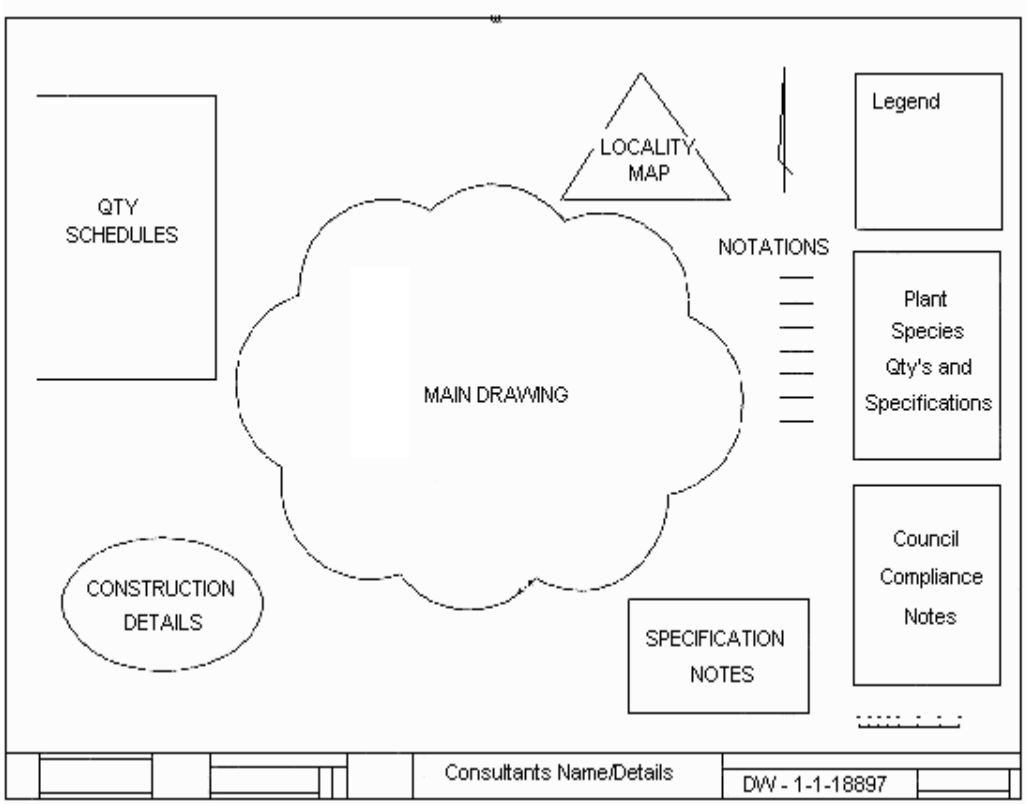
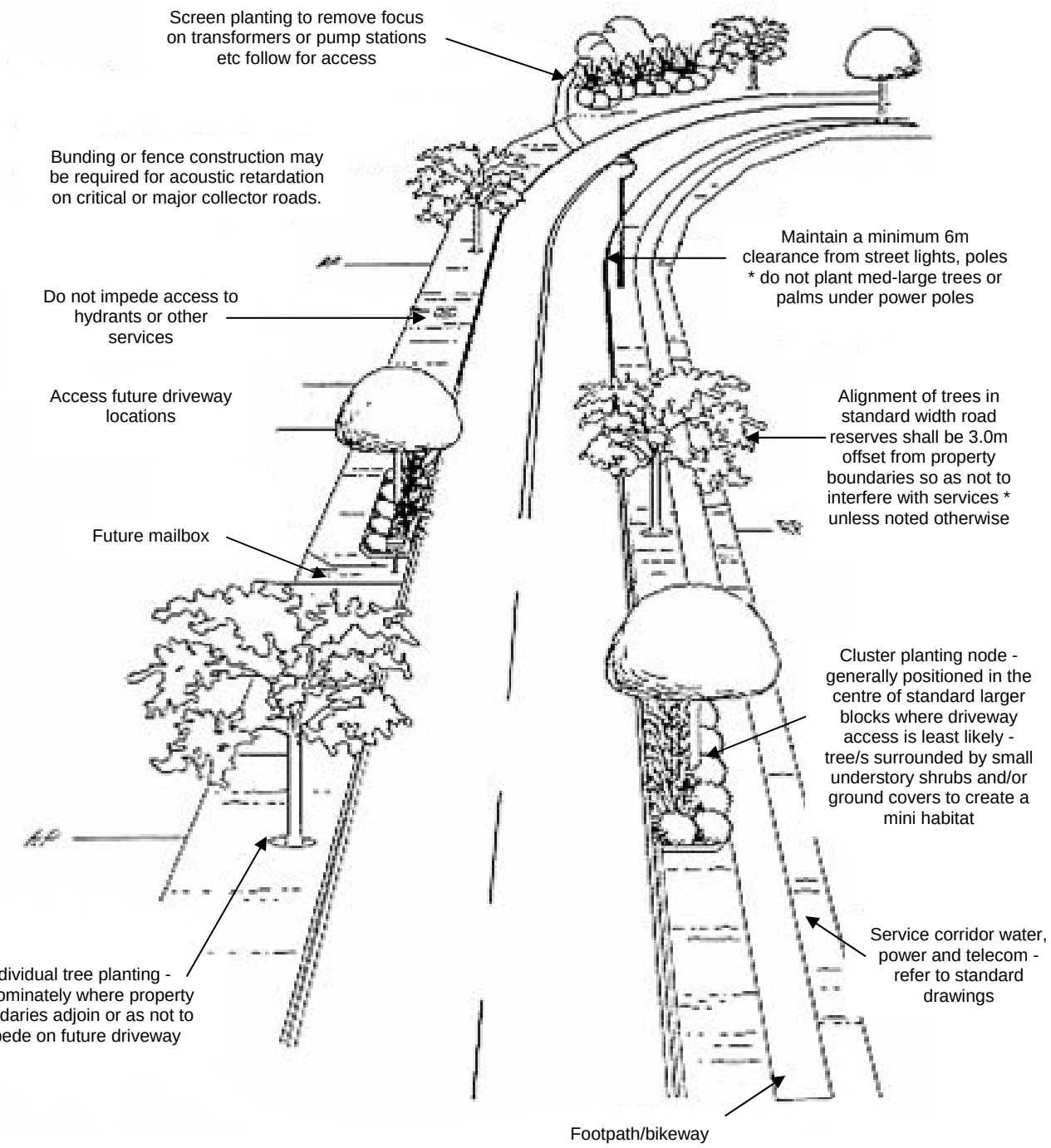


Figure 2.8A – Typical Base Sheet Layout (Source Hervey Bay City Council)

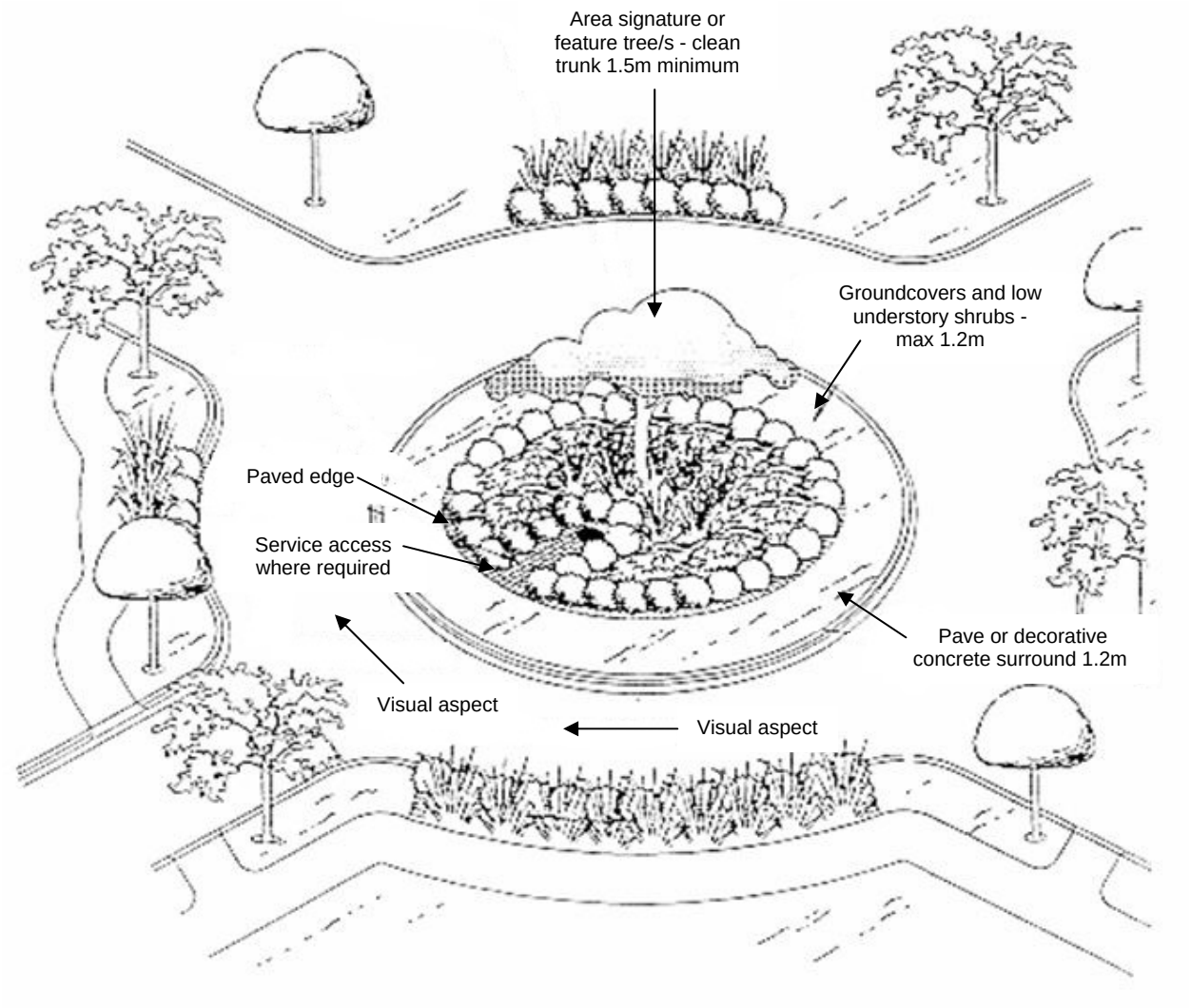


CONCEPTUAL DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

Note:
This illustration is not an exclusive representation. Refer relevant design requirements and construction specifications.

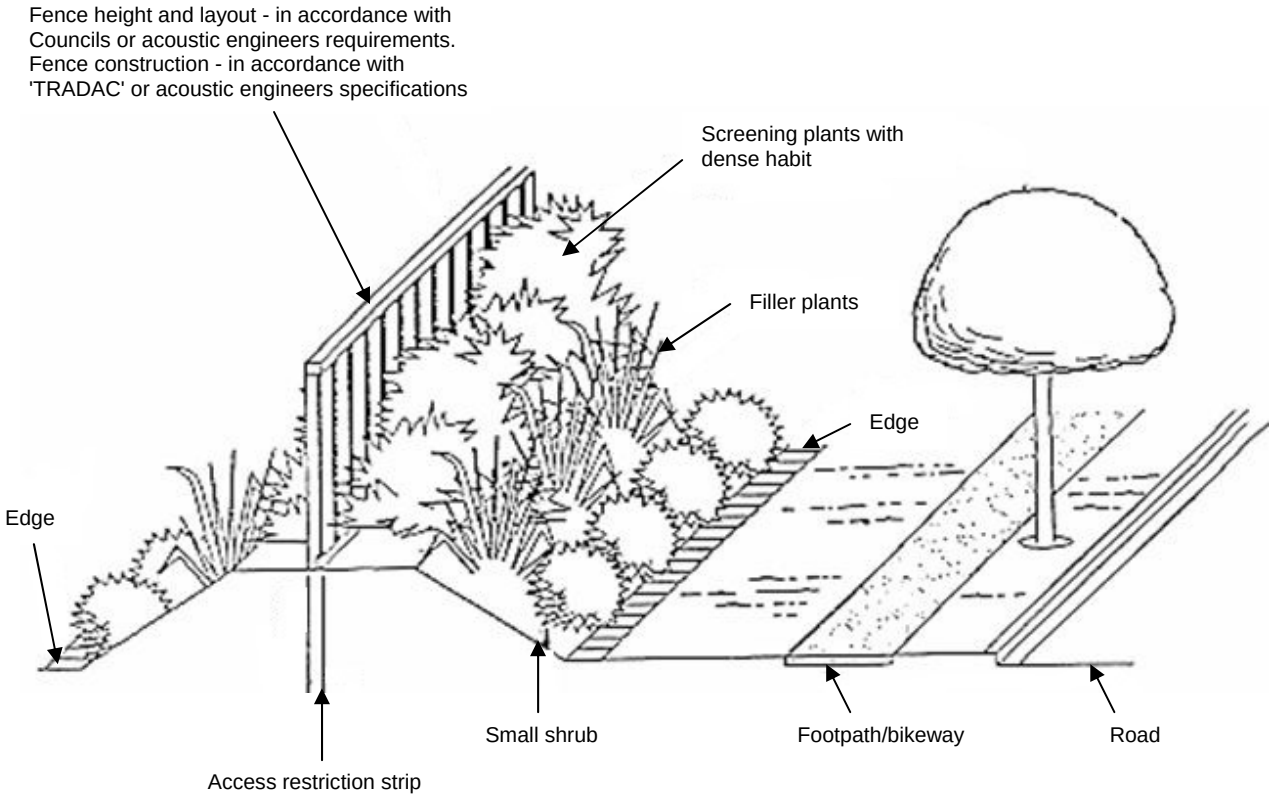
Generally use of different plant species, particularly for street trees, to create a more harmonious street or area. Plants in their native environments normally occur en-masse or in groups.

Figure 2.8B – Streetscaping Guide (Source Hervey Bay City Council)



CONCEPTUAL DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

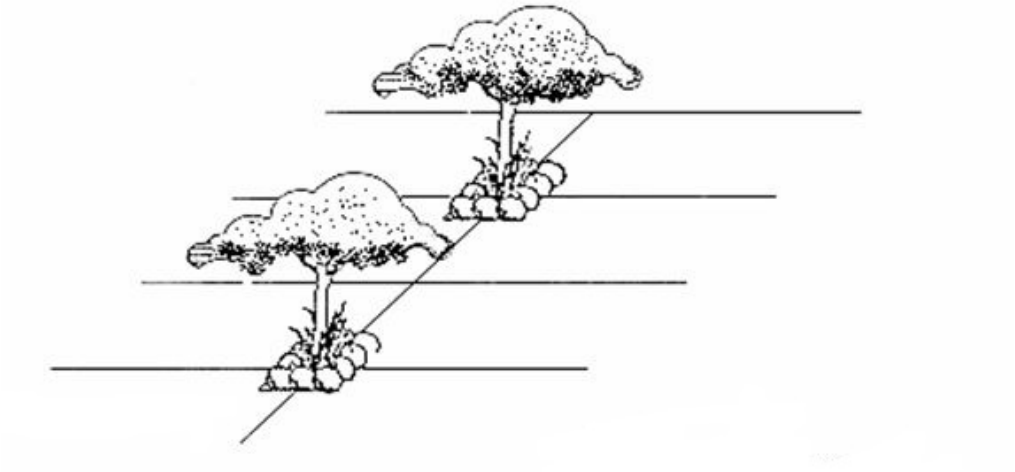
Figure 2.8C - Typical Roundabout Landscape Treatment (Source Hervey Bay City Council)



CONCEPTUAL DRAWING ONLY - NOT FOR CONSTRUCTION PURPOSES

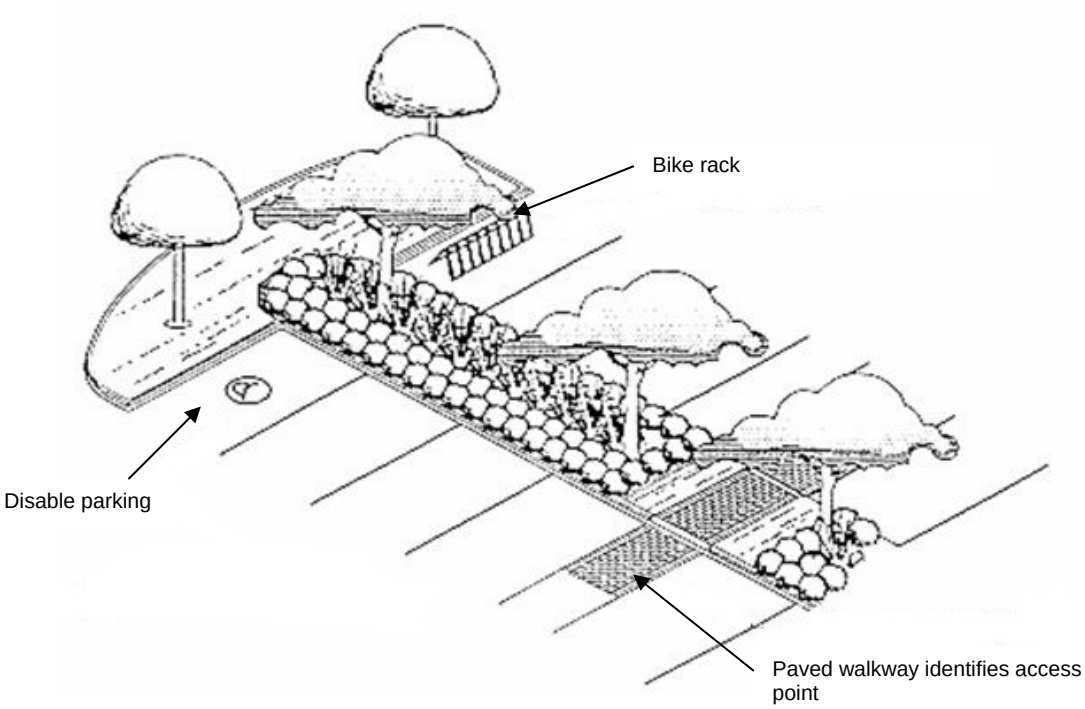
NOTE:
Fence construction shown with capping, plinth and shiplap palings, to minimise air gaps. Where lay of land falls away from the road, acoustic fences required are generally lower in height than where land is higher than the road.

Figure 2.8D - Landscaping Solutions to Acoustic Structure along Arterial or Major Collector Roads (Source Hervey Bay City Council)



INDIVIDUAL PLANTING NODES

NOTE: Minimum soil landscape planted area is 10% of car park area.



TRAFFIC ISLAND PLANTING TREATMENT

NOTE:
Layout and selection of species are key factors. Designers should aim at one tree per 4 carparks minimum where possible. Species should generally:

- be hardy
- have an upright trunk or trained accordingly
- not have an overly aggressive root system that may disrupt pavement or services when planted
- provide good shade canopy
- not drop much undesirable litter e.g. fruit
- sub-surface drainage and/or irrigation may be required

Figure 2.8E - Landscape Solution to Open Car Parking Area (Source Hervey Bay City Council)

2.9 LIGHTING AND SERVICES

2.9.1 PURPOSE OF SECTION

The purpose of this Section is to provide Council's requirements for developments in relation to street lighting and services and highlight the need for Developers to comply with statutory requirements.

The objective of Street Lighting is to increase the safety and amenity of pedestrians and to improve traffic operations at intersections and hazardous locations.

The relative significance of these objectives varies between Major Roads and Minor Streets and Roads.

On Major Roads the lighting is classified in AS1158 as Category V lighting.

On Minor Streets and Roads the lighting is classified in AS1158 as Category P lighting.

Council requires that the Developer shall appoint a Principal Consultant to liaise with Council. The Principal Consultant shall be Council's only contact for the design and construction of street lighting and shall complete Section G of the “Application Checklist - Engineering Documentation” (refer Appendix B).

Electricity reticulation lighting shall be designed, supervision of works and certified by a Registered Professional Engineer Queensland (Electrical) currently registered in the electrical college.

The provision and detailed design of street lighting installations are to be in accordance with the following standards, except as otherwise specified in this Section, or as directed by Council:-

- AS1158, Public Lighting Codes - Standards Association of Australia
- Energex Policies Manuals and Standards

Lighting on Main Roads Infrastructure shall be approved by and designed and built to the requirements of Department of Transport and Main Roads.

2.9.2 OVERHEAD POWER

Street lighting poles are to be located opposite common allotment boundaries, to minimise potential interference with vehicle access, and glare complaints from residents. It is desirable that poles not be located opposite boundaries of "battle axe" allotments due to a higher potential for vehicle collision.

Pole location should avoid likely vehicle conflict points to minimise the risk of damage to both poles and vehicles and injury to vehicle occupants. Consideration should be given to potential paths of vehicles accidentally leaving the carriageway, and also to the swept path of oversize vehicles which may need to leave the carriageway to manoeuvre, (e.g. at cul-de-sac turning areas, speed control devices, bends, and intersections).

2.9.2.1 POWER POLE LOCATIONS AND ALIGNMENTS

Pole alignments shall be 3.4 metres from property boundary and no closer than 1.6 metres to the edge of bitumen in non-kerbed areas. Pole alignments may be reduced to 0.3 metres in the following circumstances:

- at property boundaries of hatchet blocks with narrow frontages

- in cul-de-sacs with narrow frontages

Poles shall not be placed to coincide with water services. Poles may be placed 1.0 metre offset from physically located conduits, if no alternative layout is feasible. Conflicts with drainage structures and table drains, cut batters etc. are to be avoided.

Non-standard alignments are subject to the approval of the Director and a letter of support from Energex must accompany any application for a non-standard alignment.

2.9.3 UNDERGROUND POWER

2.9.3.1 CONDUIT LOCATION AND ALIGNMENT

Shared trenching with telecommunications cables is permitted. No sharing of trenches shall occur with water or gas.

Road crossings should be at right angles and in no case shall skew exceed 45º. Electrical crossings should be to the opposite boundary to water service crossings. Refer Standard Drawing R-02 & R-03.

Electrical crossings are not permitted within the area defined as an intersection under the Traffic Regulations, unless on the standard alignment off the projected intersecting property boundary.

Laying of conduits is only permissible within the designated service corridor in the road reserve or between service pillars, lamp posts and transformers. Conduits may not be laid outside the service corridor or as service connections between overhead reticulation and properties, without the prior approval of the Director.

2.9.3.2 PILLARS AND PAD MOUNT TRANSFORMERS

Pillars shall be provided at all entry points, adjacent to the side boundary of each private property, except that for 11kV entry points to an internal transformer, Council may approve a "Cabmarked" Cable Marker post or equivalent.

Pillars shall not be located at the same side boundaries as fire hydrants, nor on truncated boundaries. Placement on the tangent point will be subject to the approval of the Director.

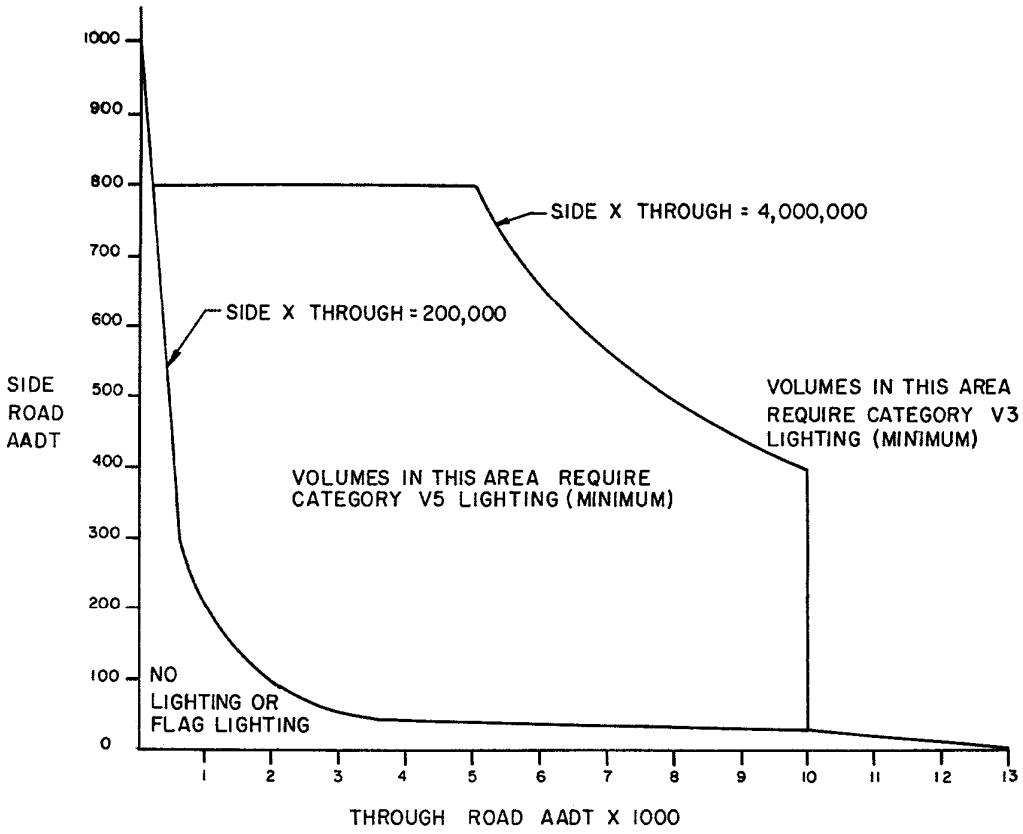
Should pad mount transformers be proposed to be located within the frontage of proposed or existing parkland, the location shall be subject to approval of the Director.

All pad mounted transformers should be located in areas of level, flood free ground. The area required for a pad mounted site shall comply with Energex specifications and shall be set aside as New Road in the survey plan.

2.9.4 STREET LIGHTING

2.9.4.1 INTERSECTION LIGHTING FOR MAJOR ROADS

Intersection lighting may be required at intersections with major roads. Council has adopted the traffic warrants for lighting at intersections as indicated in the Main Roads Departmental Policy & Guidelines for the Provision of Public Lighting as shown in Graph 2.9A. The category of lighting to be applied in accordance with the Public Lighting Code is also given. Strict adherence to these warrants is not the intention, particularly where traffic volumes suggest no lighting is warranted. Designers are to exercise good engineering judgement and consider all relevant issues such as road geometry, visibility, speed environment etc.



Graph 2.9A - Source Queensland Department of Main Roads Departmental Policy & Guidelines for the Provision of Public Lighting Services

2.9.4.2 ISOLATED INTERSECTIONS

Where isolated intersections are deemed to require category V lighting and the approach roads are presently unlit, an additional 2 spans of lighting (luminance based, for the category specified) shall be provided as per AS/NZS1158.1.1 Clause 3.5.

Some judgement needs to be taken in ascertaining whether this additional lighting is covered under the extents of the intersection conflict points or changes in carriageway width to avoid unnecessary costs in over extending the design limits. E.g. In Figure 2.9A the first luminaire is located approximately 2 spans away from the key luminaire to light the first change in carriageway width. An additional luminaire is provided between these two to meet the requirements for lighting the intersection to the Australian Standard. Under this circumstance no additional lighting is necessary beyond this point as the “lead in lighting” is covered within the extents of the intersection.

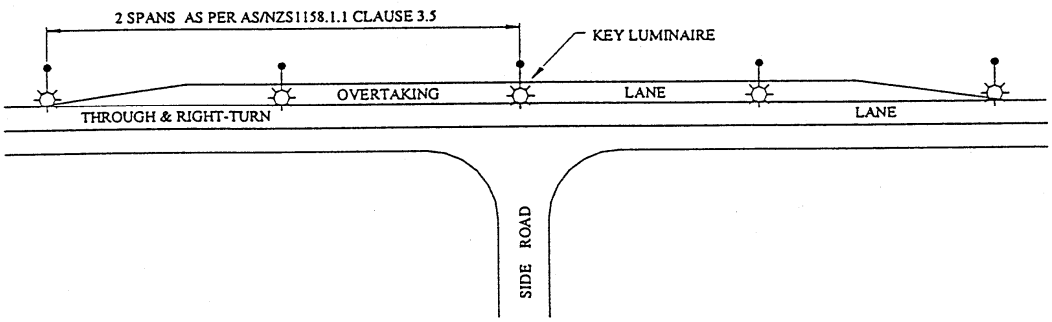


Figure 2.9A

2.9.4.3 SPECIAL CASES

Provision of lighting under special cases is subject to the approval of the Director.

For volumes less than those requiring lighting according to Graph 2.9A or at intersections without physical channelisation, other conditions that may suggest intersection lighting include:-

(a) Restricted Visibility: Where traffic facilities are not visible at night over an approach distance of:

- 120m in a 60km/hr. zone
- 200m in a 100km/hr. zone.

(b) Adverse conditions such as:

- road location and geometry,
- background lighting (including offset of opposing headlights),
- weather conditions (such as fog),
- separate needs of pedestrians indicates the existence of a special road safety risk, or
- accident history.

(c) Painted Channelisation or Auxiliary Passing Lanes in cases such as:

- predominant heavy right turn volumes,
- predominant movements of heavy vehicles, or
- tourist areas where drivers are not familiar with local conditions.

In practice there will be locations that will require lighting for indication purposes only or to highlight isolated localised conflicts and does not meet the requirements of the aforementioned warrants. Such lighting is known as “flag” lighting. These locations may require special treatment that is not strictly in accordance with the lighting objectives of the Public Lighting Code. However, where the aforementioned warrants exist full road lighting must be provided.
Examples of some special location that may require consideration are as follows:
Isolated intersections in fog prone areas. These locations may require one or two luminaries so that on foggy nights the turn-off can be readily identified.

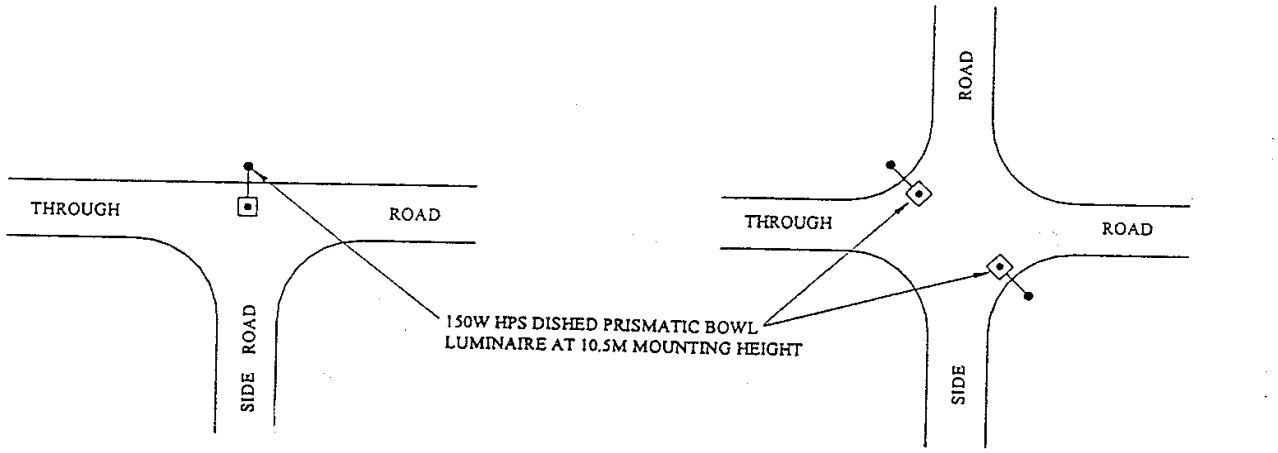


Figure 2.9B

Any "flag" lighting must not constitute a safety hazard.

At locations involving the upgrading or installation of traffic signals it is recommended that intersection lighting be provided regardless of the road lighting categories or vehicle volumes of the intersecting roads.

2.9.4.4 STREET LIGHT POLE ALIGNMENT

Street light poles shall be located in accordance with 2.9.2. Alternative proposed alignments addressing engineering and safety aspects will be assessed on their merits. Supporting documentation should address potential runoff impact from vehicles, road geometry and speed environment, kerb type and streetscaping to protect or easily identify such poles, particularly at night.

All poles painted in a dark colour shall have a reflectorised band placed or painted around the pole with a minimum width of 50 millimetres and located at a height of one metre above the base of the pole.

Streetlight poles should not be located in the central median of roundabouts if the diameter of the island is less than 6m.

Streetlight poles should not be located in the central median of a road if the median width is less than 3 metres. Further recommendations on setbacks and clearances are outlined in Appendix B of AS 1158.1.3:1997.

2.9.4.5 LUMINARIES

Except where approved otherwise by the Director, Mercury Vapour lights are to be used on all minor roads where B2 standard is specified.

New lamps and brackets shall be the same or of similar appearance to those in adjacent existing developments.

Aeroscreen luminaires shall be provided where:

- Residences abut roads with Category V or B1 lighting
- Background lighting is dark and the aeroscreen will help reduce glare including: isolated intersections, or isolated ends of road or isolated speed control devices, or steep crests, or bridges.

Post-top and opal sphere lanterns shall not be used

2.9.5 GAS

Where reticulated gas is proposed an approved design plan must be prepared by the responsible gas supply company. A copy of the plan must be provided to Council.

Reticulation gas pipelines may only be installed by the responsible gas supply company or their approved contractors.

2.9.6 TELECOMMUNICATIONS/NBN

Evidence of the telecommunications agent's agreement to provide services must be provided to Council prior to the pre-start meeting. Conduit crossing layouts and alignment shall be provided with engineering documentation.

2.10 EASEMENT/S – DRAINAGE, WATER, SEWER/CED

The purpose of this Section is to detail the type/s and extent/s of easement/s in favour of Scenic Rim Regional Council required in future allotments created under development proposals within the Region.

2.10.1 EASEMENT DETAILS

Indicative location/s and extent/s of easement/s required by engineering design shall be shown on affected drawings submitted for review by Council.

Final location/s and extent/s of easement/s, following completion of man-made works, shall be determined by field survey and detailed on the final Survey Plan/s, and accompanied by Easement Documents, prior to submission of the plan/s to Council for signing and sealing.

Final Survey Plan/s submitted for Pre-sealing by Council shall only be considered by Council when all required man-made works for inlet/outlet channel/s within proposed lots have been completed, and final extent/s of the easement/s shown on the appropriate Linen Survey Plan/s.

Table 2.10A details Council's requirements for the various types of installations.

2.10.2 CONSTRUCTION OVER/OR ADJACENT TO EASEMENTS

Construction of buildings and works, excluding boundary fences across easements, shall be the subject of project specific approvals, except where works are prohibited in Table 2.10A.

Table 2.10A - Drainage Easements

PURPOSE	TYPE OF CONSTRUCTION	REQUIRED EASEMENT/S
1. Stormwater Drainage – Street Discharge System	1.01 Piped system within proposed allotments.	4.0 metres wide, adjacent to side boundary for the full length of the pipe and any extended area as required in Section 2.5. OR 1.0 metres wider than the distance between the outer edges of the pipe or box-culvert or as determined by Council. Whichever is greater.
	1.02 Open outlet channel in proposed Rural/Rural Residential lots.	Extent of man-made works, plus 3 metres on one side for maintenance access purposes, with a minimum width of 6 metres – thence for the width of flow, symmetrical about the low point to the legal point of discharge.
	1.03 Inlet and/or Outlet works for cross road culverts.	Refer 1.02.
	1.04 Downstream discharge works – external Stage or development.	Refer 1.01 and 1.02, as applicable.
2. Stormwater Drainage – Inter-allotment System	2.01 Piped system within proposed allotments.	4 metres wide for the full length of the pipe, with 4 metres by 4 metres in lot at the head of the line.

Notes: This type of construction shall only be considered by Council when all other alternatives including widening of road reserves and provision of pathways have been exhausted.

3 SPECIFICATIONS AND CONSTRUCTION

3.1 PURPOSE OF SECTION

The purpose of this section is to outline the minimum requirements for construction of Subdivisions and Developments within the Scenic Rim Region.

Information will also be used to accumulate a data base of test results, which will lead to a more efficient determination of construction procedures and developments.

3.2 SCOPE

Section 3 sets out specification requirements for the construction of infrastructure. The following issues are covered in Section 3:

- Inspections / On and Off Maintenance
- Pavement Design
- Earthworks and Roadworks
- Stormwater Drainage
- Water Reticulation
- Sewerage Reticulation
- Landscaping
- Electrical and Mechanical Requirements for Sewerage Pump Stations
- Works Permits

3.3 REFERENCE DOCUMENTS

This manual is based on the following reference documents.

- Queensland Department of Transport and Main Roads "Standard Specification Roads"
- Australian Road Research Board (ARRB) "Sealed Local Roads Manual" which is a guideline to good practice for the construction, maintenance and rehabilitation of pavements.
- Queensland Streets "Design Guidelines for Subdivision Streetworks" prepared for the Institute of Municipal Engineering Australia Queensland Division.
- Refer also documents listed in Section 2.6.

3.4 STANDARD SPECIFICATIONS

Queensland Department of Transport and Main Roads "Standards of Specification Roads" shall apply to all works except where modified or replaced by this Manual. In addition the following specifications shall also apply and are supplied herein:

- The Consultant may elect to create a supplementary specification on measurement and payment clauses if the "Standard Work Items" and there associated measurement and payment clauses are not appropriate.
- Where specifications refer to "Addendums" for specific site requirements, such requirements are to be provided by the Consultant as applicable.
- Where specifications refer to the "Superintendent" in the case of Council's works this person will be the appointed representative of Council and in the case of private development works this person will be the supervising engineer representing the developer (viz the Consultant).

3.5 INTERPRETATION

In case of any discrepancies between this guideline and the reference documents Council's Director Infrastructure Services will make the final decision.

3.6 GENERAL

When making an application for Operational Works, the Consultant shall lodge the Engineering Documentation Checklist (Appendix A and B). In signing the declaration on the checklist the Consultant certifies that the engineering documentation complies with:

- Conditions of the Development Permit;
- The provisions of the Design and Construction Manual; and
- Relevant Council Local Laws, State or Commonwealth Legislation, Australian Standards and Codes of Engineering Practices.

Approval of Operational Works Application is conditional on the works being designed in accordance with the Design and Construction Manual.

During the construction it is expected that the Consultant shall:

- allocate competent, experienced staff to conduct site inspections
- be satisfied of the competency and resources of the contractors prior to engagement
- provide adequate site supervision to monitor the contractors progress and workmanship
- inspect and confirm acceptability of works prior to booking or confirming a Council Inspector.
- The Consultant supervising the civil works shall apply for a Works Permit prior to the commencement of any development works. Refer Section 3.14 and 3.15 of the Manual.

The Consultant named in the Works Permit undertakes responsibility for all works that pertain to the Subdivision or Development. This includes civil works, landscaping, electrical and other services and environmental works and any other improvements involving the Development.

Council shall only deal with the Consultant as named for any issue arising from work within the Development.

3.7 WORKS PERMIT

3.7.1 WORKS PERMIT CONDITIONS FOR COUNCIL CONTROLLED ROADS

Prior to the commencement of any development works within the boundaries of a Council Controlled Road (but excluding the operations of power/telecommunications or gas authorities which have separate approval systems), the Consultants supervising the civil works shall make application for a Works Permit. The issue of the Works Permit is subject to the Conditions outlined in Section 3.14 of the Manual.

3.7.2 WORKS PERMIT CONDITIONS FOR SUBDIVISONS

No earthworks, road construction, drainage or other development works associated with a subdivision (reconfiguration of a lot) shall commence prior to the application and issuing of a Works Permit. The issue of the Works Permit is subject to the Conditions outlined in Section 3.15 of the Manual.

3.8 INSPECTIONS

3.8.1 GENERAL

The Consultant shall undertake sufficient testing to ensure works are completed to the standards tolerances and finishes outlined in the Manual.

Minimum testing requirements and the frequency of tests are outlined in Appendix H for the following work items:

- Traffic Control
- Excavation
- Road Pavements
- Subsoil Drainage
- Stormwater Drainage
- Sewerage Reticulation
- Water Reticulation
- Bitumen Sealing
- Miscellaneous

The inspection and testing program as outlined in Appendix H shall be used as an aid to achieving compliance with the standards of construction in the specifications and for documenting such compliance. In no way shall the program relieve either the Consultant of their responsibility to monitor the workmanship and materials of use of the Contractor or the Contractor of their responsibility to satisfy specification requirements.

Council will undertake inspections at the mandatory hold points. Mandatory Council inspections shall be undertaken jointly by Council and the Consultant with the Contractor during normal business hours. **It is Council's expectation that Council's role in the testing is generally one of an observer, and the Consultant should issue directions to the Contractor with respect to any corrections to work. The inspection by Council at hold points is only an audit of workmanship and in no way relieves the Consultant of their overall supervision responsibilities.**

Inspections at mandatory hold points shall be booked with Council's Technical Officer for Operational Works – phone (07) 5540 5111 – not less than 24 hours prior to the intended date of the inspection. The Consultant shall verify the conformance of the work item to specification requirements before confirming the inspection with Council. Should Council fail the inspections, a further inspection will be required. The Contractor shall supply at his cost all equipment or labour as necessary for site inspections by Council. A fee may be charged for repeat inspections.

3.8.2 STORMWATER DRAINAGE

All stormwater drainage shall be constructed in accordance with Section 3.12. Council may undertake random audit inspections during construction.

3.8.3 SUBGRADE AND PAVEMENT INSPECTIONS

Council shall approve proposed pavement designs in writing prior to any subgrade inspection.

Mandatory Council inspections apply at subgrade and each pavement layer. All levels of pavement, subgrade, subgrade replacement, sub-base and base course will be subjected to testing by proof rolling for compaction and by stringing for depth and crossfall. All levels of pavement must be of a compacted state with no movement under load, and clean of debris and

organic material. Compaction test results and material quality tests are to be verified by the Consulting Engineer prior to proceeding with any further works.

3.8.4 PRESEAL INSPECTION

A mandatory Council inspection applies at the pre-seal stage. This inspection includes audits by Council of:

- subsoil drainage;
- earthworks profiles of table drains, batters, and the services allocation;
- conduit crossings for depth, shape, location and alignment (check also marker locations against service conduits);
- of stormwater drainage affecting roadworks;
- kerb and channel for line and level.
- evidence provided for testing of the base course layer (as per 3.8.3);

For spray sealed surfaces, proposed application rates of prime, and binder and spread rates of pre-coated aggregate shall have been approved prior to the inspection. Where the seal surface is asphalt, proposed application rates of prime and results of mix acceptance tests shall have been approved prior to the inspection. A pavement design and seal design shall be submitted to Council for approval prior to pavement and seal works commencing.

The base course shall not be sealed if any of the above items require rectification work.

3.9 EARTHWORKS AND ROAD CONSTRUCTION

3.9.1 OPERATIONS

3.9.1.1 DAMAGE

The Contractor shall be responsible for all damage to grass, cultivation, fences, existing services, buildings or stock, by fire, falling timber or other causes arising from its operations.

Any fences damaged during the execution of work shall be immediately repaired by the Contractor at its expense and in a manner approved by Council.

During the clearing of lines and designated areas the greatest care shall be taken not to disturb any Survey Marks.
The Contractor shall take care in its operation not to interfere with nor damage or interrupt any existing services.

If the Contractor damages any existing services it shall immediately arrange for the relevant service authority to make good such damage and all costs for this work shall be borne by the Contractor.

3.9.1.2 DUST CONTROL

The Contractor shall take adequate precautions to effectively minimise any dust related conditions which may occur during the construction of the subdivision or development works and which may affect the safety or general comfort of the public, the Contractor's employees and/or occupants of nearby buildings.

Council's Officers will undertake regular inspections during the construction phase and may issue Notices if necessary.

3.9.1.3 SOIL DROPPED ON PUBLIC ROADS

The Contractor shall ensure trucks and other vehicles from the development works do not deposit soil or rubbish on any adjoining public roads. Any soil or rubbish deposited on roads by any vehicles from the Development shall be cleaned at the Contractor's expense.

3.9.1.4 DECLARED PLANTS/NOXIOUS (ENVIRONMENTAL) WEEDS

The accidental spreading of declared plants and environmental (noxious) weeds in soil on earth moving equipment is a serious concern within the Region. Where earthmoving equipment is moved from an area with an existing declared plant or noxious weed problem to a new site within the Region the Contractor shall take all reasonable measures to ensure equipment does not introduce seeds or other material which could allow the propagation of the declared plants/weeds. Such measures could include the cleaning of vehicles prior to transportation to the Development site.

Section 2.8 has a list of declared plants and noxious weeds.

3.9.1.5 TRAFFIC CONTROL

Construction on any existing road reserve, which has a trafficable road, shall satisfy the requirements of MRS02 and MRTS02. The Consultant shall be responsible for ascertaining Council's requirements with respect to any side tracks prior to the pre-start meeting.

3.9.2 SETTING OUT

The Contractor shall be responsible for survey control and shall only use a Qualified Surveyor for all level and set out control.

3.9.3 CLEARING AND GRUBBING

Clearing and grubbing operations shall comply with the requirements of MRS 11.04 except as noted herein.

The Contractor shall clear the area of the road reserve for roadworks and areas of earthworks to allotments of all boulders, deposited rubbish and vegetation within the clear zone. Clearing shall include the removal of all man made obstructions, including fences, buildings, etc.

In environmentally sensitive areas clearing shall be kept to the full width of the earthworks or roadworks, whichever is the greater plus a further 1.0m on each side.

All dead and dying trees, trees or any trees or large boughs overhanging the road reserve or any dangerous tree must be cut down and removed from the site. Site burn offs shall require approval from the Director and a permit from the local fire authority. All unburnt stumps and limbs must be removed prior to On Maintenance and the area must be clean from ashes.

A 3.0m wide strip clear of all vegetation and accessible by vehicle is to be provided around all boundaries on all proposed Public Open Spaces. All Declared Pests/Plants are to be identified and removed.

Grubbing, or the removal of tree stumps, roots, rocks etc. shall be to a depth of 300mm below the surface of the ground. Grubbing shall be carried out for the full width of the cleared area.
All grub holes shall be filled in with good selected material and compacted thoroughly.

3.9.4 DAMAGE

Every effort must be taken to prevent timber from falling onto adjacent properties. Any timber falling onto adjacent properties, shall be removed by the Contractor at their own expense unless produced prior to On Maintenance, the written consent of the owner of the property that the timber may remain.

The Contractor is responsible for all damage occurring to persons, grass, cultivation, crops, property, livestock, timber, domestic animals or any other such item that is deemed damaged by the Director, arising from their work.

Any fence damaged during the execution of the work shall immediately be repaired by the Contractor at their cost.

The Contractor must carry out work so that underground services are not displaced or disturbed. In the case of any such displacement or damage occurring to such services, the Contractor shall be responsible for the entire cost of such repairs, and must notify the authority concerned that displacement or damage has occurred.

3.9.5 EARTHWORKS

Earthworks shall be carried out in accordance with Queensland Department of Transport and Main Roads - Standard Specification Roads Manual MRS 11.04 except as varied otherwise herein.

Earthworks shall be taken to include all operations necessary to excavate earth and rock, irrespective of type and subsurface conditions, to construct embankments and allotment filling, including the placing of selected material in connection therewith as specified; to place backfill for structures, and culverts, unless separately specified and designated; to remove and replace unsuitable material; to construct road formation; all shown in the drawings and specified in the specifications and any special provisions and as directed by the Director.

Any specific reference in MRS 11.04 to an earthworks item or operation for a road shall be deemed to include such same works within allotments. (E.g. The words “road embankment fill” shall be read as “road or allotment fill”.)

Any specific reference in MRS 11.04 to other Main Roads Specifications or drawings which have not been adopted by this Council shall be deemed to mean the relevant specification (or drawing) contained in this Manual.

AS 3798 is a useful reference for earthworks operations and testing. With respect to earthworks operations generally (including allotment filling) Council specification and testing requirements as outlined herein are equivalent to Level 2 as nominated in AS3798.

ARRB Sealed Local Roads Manual contains useful technical information and construction tips for general earthworks and road construction.

3.9.6 DAMS

All existing dams shall be dewatered, all silt removed and the dam wall levelled to the surrounding ground level. Compaction certificates of dam filling shall be provided to Council for positions and levels agreed to by Council.

3.9.7 PAVEMENT MATERIALS

3.9.7.1 UNBOUND PAVEMENTS

As specified in Queensland Department of Transport and Main Roads - Standard Specification Roads Manual MRS 11.05 Unbound Pavements. The Unbound Material type as specified by Council is Type 2 and is per Table 3.9A.

Table 3.9A

Property	Subtype				
	2.1	2.2	2.3	2.4	2.5
CBR (soaked) min	80	60	45	35	15

CBR tests to verify the quality of base and subbase pavement materials shall be in accordance with Main Roads Test Method Q113C. The single point CBR test shall be carried out at OMC and at the relative compaction indicated in the specification. (E.g. for base and subbase layers test at 100% RDD (standard compactive effort).

CBR tests to verify the quality of subgrade replacement material (Type 2.5) shall be in accordance with Main Roads Test Method Q113A (4-5 point test).

Important Construction Issues Include:

- The subgrade and each subsequent pavement layer shall be checked for compaction (refer Table 3.11B), tolerance (refer Table 3.11C), material quality and any soft spots (by proof rolling) prior to proceeding with the next stage of construction. Mandatory hold points apply at subgrade and each pavement layer. Refer also Section 3.8 and Appendix H.
- Prior to coordinating the subgrade inspection, the Consultant shall have submitted for approval a pavement design in accordance with the requirements of Section 2.6 together with all of the nominated field and laboratory test results. The pavement design shall be submitted to Council on the standard form Appendix E. The subgrade inspection can only proceed subject to approval of the pavement design.

A qualified representative of the soil testing company may be required to attend the subgrade inspection to verify boundaries of material types. This would typically be necessary if materials with similar visual descriptions have substantially different CBR results or properties.

3.9.7.2 BOUND PAVEMENTS

As specified in Queensland Department of Transport - Standard Specification Roads Manual MRS 11.08 Plant-Mixed Stabilised Pavements.

Refer Section 2.6 for bound pavement design.

3.9.8 BITUMINOUS SURFACING

All surfacing shall comply with the relevant Main Roads Standard Specifications as listed below:

MRS 11.11 - Sprayed Bituminous Surfacing
MRS 11.17 - Bitumen
MRS 11.18 – Polymer Modified Binder
MRS 11.19 - Cutter and Flux Oils
MRS 11.20 - Cutback Bitumen
MRS 11.21 - Bituminous Emulsion
MRS 11.22 - Supply of Cover Aggregate
MRS 11.30 Dense Graded Asphalt Pavements

Important Construction Issues Include:

- The Consultant shall submit to Council a wearing course design prior to coordinating the preseal inspection. The preseal inspection may proceed subject to approval of the wearing course design. Seal designs are to be submitted to Council's on Standard Form, Appendix E a minimum of two weeks prior to the seal date.
- Within two weeks of sealing a road, all loose screenings are to be swept from the surface and removed from the site.
- Unless approved otherwise by the Director, core sampling shall be used for compaction testing and thickness verification of asphalt.

3.9.9 KERB AND KERB AND CHANNEL

All concrete kerb, channel and kerb and channel shall be constructed in accordance with Section 3.12.17 and Council's Standard Drawing.

Important Construction Issues Include:

- control joints 5.0 m centres 40 mm deep and 6 mm wide
- expansion joints not to exceed 20 m spacing and adjoining structures
- expansion joint material to be 6 mm thick bitumen impregnated fibre board or equiv.
- kerb to be bedded on 75 mm min compacted Type 2.5 material
- concrete to be cured for 7 days prior to undertaking adjoining works
- channels on grades less than 1 % to be water tested for ponding
- concrete with any faults or chipping may be rejected.

3.9.10 SUB-SOIL DRAINAGE

Details and locations of sub-soil drainage shall be in accordance with Council's Standard Drawing.

Important Construction Issues Include:

- Unless approved otherwise by the Director, sub-soil drainage shall be provided behind the kerb of all roads which incorporate kerb or kerb and channel. Some discretion on this requirement may be applied where the kerb level is more than 300 mm above natural surface or where the natural materials are free draining.
- Mitre drains shall be incorporated as deemed required by the Consultant or Council. Typically mitre drains shall be used where the road centreline is perpendicular (or nearly) to the natural contours.
- Sub-soil drainage lines shall be located below any service or conduit crossing.

3.9.11 SEEDING AND GRASSING

Refer Sections 2.8 and 3.11 for seeding and turfing requirements.

3.9.12 EROSION CONTROL MEASURES

Where stipulated in the development assessment conditions, Council may require an Erosion and Sediment Control Management Plan to be submitted for approval at time of lodgement of the engineering documentation.

Relevant guidelines for this management plan are contained in The Institute of Engineers Australia (Qld) Soil Erosion and Sediment Control Guidelines and shall be in accordance with Best Practice and Sediment Control, International Erosion Control Association, (IECA) Australasian Chapter, 2008.

3.9.13 CONDUITS AND CROSSINGS

3.9.13.1 GENERAL

The work covered by this specification comprises the installation of conduits across roadways and footpaths for water, gas, electricity and telecommunication services; installation of conduits longitudinally along footpaths for electricity and telecommunication services, and fixing of brass indicator discs embossed 'W', 'G', 'T' and 'E' respectively at water, gas, telecommunication and electricity conduit locations, including supply of materials as specified herein.

3.9.13.2 ACTS, REGULATIONS AND BY-LAWS

The Contractor shall comply with all Acts, By-Laws and Regulations having jurisdiction over work under the Contract and shall be fully responsible for any breaches thereof.

3.9.13.3 LOCATION AND SETTING OUT

Conduits shall be constructed at locations and to details, lines and depths shown on the drawings approved by the relevant authority or as directed by Council.

The Contractor shall ensure that the utility trenches are on the correct alignment measured from property boundaries. Failure by the Contractor to arrange its work in this way will result in the services being re-laid on the correct alignment at the Contractor's expense. It shall be the Contractor's responsibility to ensure that sufficient survey information is available so that it may accurately set out this work on the correct alignment.

3.9.13.4 TRENCHES

Trenches shall be excavated to the dimensions shown on the drawings. The bottoms of trenches shall be firm and smooth and where they change in level from footpath to roadway or up an embankment, the change shall be gradual. Trenches shall be excavated so that the conduits may be laid with 75mm clearance all around from other obstructions. Conduits shall be bedded for 120 degrees of their circumference on at least 75mm of compacted approved sand or approved trench backfill material.

Unless otherwise approved by the Works Inspector trenches across roadways and pavement areas shall be excavated before pavement material has been placed. Trenches along footpaths shall be excavated before topsoiling and grassing has been carried out.

Excavation in all materials where referred to herein shall include removal of rubbish, tree stumps, roots etc. encountered, and making good poor or uneven foundations with approved material or additional bedding sand as directed by the Works Inspector.

3.9.13.5 MATERIAL FOR UTILITY SERVICE CONDUITS

All uPVC pipe conduits, joints and couplings shall comply with AS1477, AS2053 and AS2439 and shall be of the class specified on the drawings or Bill of Quantities.

Conduits for electricity services shall comply with Energex requirements.

3.9.13.6 INSTALLATION OF ELECTRICAL CONDUITS

Electrical conduits shall be located as shown on the drawings or as directed by the Operational Works Inspector. They shall be installed in accordance with Energex requirements.

3.9.13.7 INSTALLATION OF TELECOMMUNICATION CONDUITS

Telecommunication conduits shall be located as shown on the drawings or as directed by the Operational Works Inspector. They shall be installed as required by telecommunication authorities.

3.9.13.8 LIAISON WITH PUBLIC UTILITY AUTHORITIES

The Contractor shall liaise with all relevant Public Utility Authorities prior to completion of earthworks and commencement of pavement material to ensure correct sequence of construction activities.

3.9.13.9 END CAPS

After laying, all conduits shall be cleaned internally and subjected to the Operational Works Inspector's inspection before end caps are installed.

3.9.13.10 BRASS MARKER DISCS

Brass marker discs shall be supplied and installed in accordance with the drawings.
In locations where there is no kerb and channel, concrete marker blocks shall be constructed. The marker blocks shall consist of Grade N25 concrete blocks 225 mm x 75 mm x 450 mm long with indentation for the indicator disc centrally placed on the top face of each block.

3.9.13.11 BACKFILL AND COMPACTION

Backfill material type shall be in accordance with the Standard Drawing and shall be compacted by mechanical means to 100% Standard Density or 70% density index as applicable.

3.9.13.12 STANDARDS AND CODES

This specification makes reference to the following Australian Standards:

AS1159	Polyethylene Pipes for pressure applications
AS1289	Method of Testing Soils for Engineering Purposes
AS1477	Unplasticized PVC (uPVC) pipes and fittings for pressure applications
AS2053	Non-metallic conduits and fittings
AS2439	Perforated plastics drainage and effluent pipe and fittings

Where in this specification, Australian Standards are referred to, the edition of such standard current at the time of tendering will be deemed to apply.

3.9.14 ROAD FURNITURE AND LINE MARKING

Road furniture and line marking shall be in accordance with the Queensland Department of Main Roads “Manual of Uniform Traffic Control Devices” volumes 1 and 2 and the Main Roads Standard Specifications MRS 11.14 and 11.15.

3.9.15 COMPACTION REQUIREMENTS

The minimum relative compaction values for earthworks and unbound pavement construction are outlined in Table 3.9B.

Table 3.9B Minimum Relative Compaction

Item	Application	Minimum relative compaction %	
		Min. density ratio (Cohesive soils) (see Note 1)	Min. density index (Cohesionless soils) (see Note 2)
1	Ground surface treatment below embankments MRS 11.04 Cl.7.		
1a	Ground surface treatment beneath allotment filling	95	65
1b	Ground surface > 300mm below subgrade level of road pavements	95	65
1c	Ground surface < 300mm below subgrade level of road pavements	97	69
2	Filling Operations MRS 11.04 Cl.10		
2a	Residential- allotment fill, house sites	95	65
2b	Commercial- fills to support minor loadings, incl floor loadings of up to 20Kpa and isolated pad or strip footings to 100Kpa	98	70
2c	Road embankment fill > 300mm below subgrade level of road pavements	95	65
2d	Road embankment fill < 300mm below subgrade level of road pavements	97	69
2e	Mat'l in unsealed verges and within medians up to base of topsoil	95	65
2f	Spoil Areas (See Note 2)	95	65
2g	Fill/Backfill Against In-Place Structures MRS 11.04 Cl.13 > 300 mm below subgrade < 300 mm below subgrade	 95 97	 70 Not Permitted Cl.13.3.1
3.0	Cuttings MRS 11.04 Cl 8.0 Refer also Ground Surface Preparation		
3a	Road Cuttings. Insitu Mat'l to 150 mm below subgrade	97	69
3b	Other cuttings	95	65
4.0	Unbound Pavement Materials MRS 11.05 Cl.8		
4a	Subgrade replacement Type2.5 mat'l	98	NA
4b	Subbase and Base Course Mat'ls	100	NA
5	Bound Pavements MRS 11.07 or MRS 11.08	Project Specified	Project Specified

Notes:

1) All compaction requirements refer to standard compactive effort. See AS 1289.5.1.1
2) Building works on residential allotment fill are assumed to impose loadings not exceeding: 20kPa floor slab; or 100kPa for strip or pad footings. Refer also AS 3798.
3) Building works on commercial allotment fill may require assessment of load carrying capacity of the filling. Refer also AS 3798.
4) Spoil areas within developments, which have not been compacted in accordance with the allotment filling requirements, shall be excluded from building envelopes. Unsuitable material excluded from allotment filling or road filling shall be stockpiled as directed by the Consultant and lightly compacted.
5) Proof rolling is mandatory in road pavement construction to verify compaction. Refer 3.9.7.1.
6) Proof rolling of allotment filling is recommended at ground surface and finished platform levels. Consultant to nominate extent of proof rolling (and appropriate loading) in the supplementary specification.

3.9.16 TOLERANCES

The tolerance limits in Table 3.11C shall take precedence over limits specified in the Main Roads Standard Specifications. Where tolerance limits for a work item are not included in Table 3.11C, the Main Roads tolerances shall apply.

Table 3.9C - Tolerance Requirements

Course	Design Level Tolerance	Horizontal Tolerance (defined pts)	Thickness Tolerance	Shape Tolerance	Crossfall Tolerance
General Earthworks	For other than subgrade: + 75 mm in rock otherwise + 40 mm	-50 +250 mm Refer also MRS 11.04 Cl 5.2 Note 4	N/A	N/A	As directed
Batters Excavation	For other than subgrade: + 75 mm in rock otherwise + 40 mm	-50 +250 mm Refer also MRS 11.04 Cl 5.2		+ 300 Refer MRS 11.04 Cl 8.3,10.3.5	+ 1.0 %
Embankment	For other than subgrade: + 75 mm in rock otherwise + 40 mm	-50 +250 mm Refer also MRS 11.04 Cl 5.2		+ 300 Refer MRS 11.04 Cl 10.3.5	+ 1.0 %
Subgrade	+ 10 mm - 40 mm	-50 +250 mm Refer also MRS 11.04 Cl 5.2		25 mm in 3 m max	+ 1.0 %
CBR 15 Material (subgrade replacement)	+ 10 mm - 40 mm	-50 +250 mm Refer also MRS 11.04 Cl 5.2	+ 40 mm - 20 mm	25 mm in 3 m max	+ 1.0 %
Sub-base	+ 15 mm - 15 mm	-50 +250 mm Refer also MRS 11.05 Cl 8.2.4	+ 40 mm - 20 mm	25 mm in 3 m max	+ 1.0 %
Base Note 3	+ 15 mm - 15 mm	-50 +250 mm Refer also MRS 11.05 Cl 8.2.4	+ 20 mm - 15 mm	12 mm in 3 m max	+ 0.5 %
Kerbing	+ 10 mm - 10 mm	+ 20 mm - 20 mm		Match Std Dwgs	
AC Surfacing Note 3	+ 10 mm - 5 mm	+ 50 mm Refer also MRS 11.09 Cl 8.2.2.2	+ 15 mm - 5 mm	5 mm in 3 m max	

Notes:

1) Level tolerance on inverts of open drains is + 40 mm and within 1 m of the plan location.
2) All embankments, subgrades, benches, berms and drains shall be free draining.
3) For pavements with kerbing, the finished base levels plus design thickness of wearing course must match kerb lip levels + 5 mm.
4) The horizontal (and possibly the vertical) tolerance may be relaxed with respect to the general earthworks for allotment filling. The Consultant may indicate alternative tolerances in the supplementary specification

3.9.17 TESTING

Mandatory minimum testing requirements for Roadworks and Earthworks are listed in Appendix H. The Contractor shall be responsible for obtaining sufficient tests to ensure the works comply with all the standards and requirements of the specification. Testing shall be undertaken at random test locations within each lot. The Consultant may at their discretion order additional testing.

Testing of earthworks and road pavements shall be undertaken by a NATA registered testing authority approved by the Consultant.

Should any inspection or testing indicate the material quality or standard of workmanship does not satisfy specification requirements, the relevant material shall be replaced and the area reworked by the Contractor at its expense until further testing (also at the Contractors expense) indicates satisfactory compliance with specification requirements.

The following test methods in Table 3. 9D are acceptable to Council. Main Roads Standard Test Methods as nominated in each relevant Main Roads Standard Specification shall be utilised where no other approved test method is listed below.

TABLE 3.9D TEST METHODS FOR EARTHWORKS AND PAVEMENTS

AS 1289.1.2.1-1998	Sampling and preparation of soils – Disturbed samples – Standard method
AS 1289.2.1.1-1992	Soil moisture content tests – Determination of the moisture content of a soil – Oven drying method (standard method)
AS 1289.3.1.1-1995	Soil classification tests – Determination of the liquid limit of a soil – Four point Casagrande method
AS 1289.3.1.2-1995	Soil classification tests – Determination of the liquid limit of a soil – One point Casagrande method (subsidiary method)
AS 1289.3.2.1-1995	Soil classification tests – Determination of the plastic limit of a soil – Standard method
AS 1289.3.3.1-1995	Soil classification tests – Calculation of the plasticity index of a soil
AS 1289.3.4.1-1995	Soil classification tests – Determination of the linear shrinkage of a soil – Standard method
AS 1289.3.6.1-1995	Soil classification tests – Determination of the particle size distribution of a soil – Standard method of analysis by sieving
AS 1289.5.1.1-1993	Soil compaction and density tests – determination of the dry density/moisture content relation of a soil using standard compactive effort
AS 1289.5.3.1-1993	Soil compaction and density tests – Determination of the field density of a soil – Sand replacement method using a sand-cone pouring apparatus
AS 1289.5.4.1-1993	Soil compaction and density tests – Compaction control test – Dry density ratio, moisture variation and moisture ratio
AS 1289.5.4.2-1993	Soil compaction and density tests – Compaction control test – Assignment of maximum dry density and optimum moisture content values
AS 1289.5.5.1-1998	Soil compaction and density tests – Determination of the minimum and maximum dry density of a cohesionless material – Standard method
AS 1289.5.6.1-1998	Soil compaction and density tests – Compaction control test – Density index method for a cohesionless material
AS 1289.5.8.1-1995	Soil compaction and density tests – Determination of field density and field moisture content of a soil using a nuclear surface moisture-density gauge – Direct transmission mode
Q110A - 1996	Dry Density/Moisture Relationship – Standard Compaction
Q110E - 1991	Laboratory Compaction to Nominated Levels of Dry Density and Moisture Content
Q113A - 1993	California Bearing Ratio (Standard compactive effort)
Q113C - 1998	California Bearing Ratio at Nominated Levels of Dry Density and Moisture Content
Q114B - 1978	Insitu California Bearing Ratio (Dynamic Cone Penetrometer)

3.10 STORMWATER DRAINAGE

3.10.1 GENERAL

This specification covers the construction of concrete kerb, kerb and channeling, stormwater drains, inter allotment drainage, manholes, gullies, gully connections, headwalls and other miscellaneous drainage works.

The specification applies to the supply, delivery, laying and jointing of drainage pipes, reinforced concrete box culverts and drainage works components including excavation, bedding and backfilling.

3.10.2 ACTS, BY-LAWS AND REGULATIONS

The Contractor shall comply with all Acts, By-Laws and Regulations having jurisdiction over work under the Contract and shall be fully responsible for any breaches thereof.

3.10.3 EXISTING SERVICES

It shall be the Contractors responsibility to contact all public utility authorities to ascertain the location of services prior to commencing the work under the contract. In carrying out the works the Contractor shall be responsible for all damage caused to any gas or water main, telecommunication, or electric power cable or conduit or any other public utility whatever.

Before undertaking any work which may interfere with any drain, public utility, railway, road, watercourse or tidal waters or with any structure, the Contractor shall give the required notice in writing to the department or authority concerned. The Contractor shall not commence the work until it has received the necessary permits and it shall carry out the work in accordance with the conditions set out in these permits.

If the Contractor damages any existing services it shall arrange for the relevant service authority to make good such damage and the cost thereof shall be borne by the Contractor.

Where the design of the works requires alterations to existing services and such alterations are to be organised by the Contractor then the Contractor shall liaise and arrange with the relevant department or authority to effect such alterations and the Contractor shall pay all costs, fees, and charges of the department or authority. All of the Contractor's costs in performing this function shall be deemed to be included in the relevant Bill Item (if part of the Contract) and the Lump Sum of the Contract generally.

3.10.4 EXCAVATION

Excavation for stormwater drainage construction covered by this specification shall be completed to the lines and levels shown on the drawings.

Where the Contractor over-excavates, it shall make good the over-excavation at its own expense with bedding material as specified.

The Contractor shall at its own expense do all things necessary to divert any water interfering with the progress of the works, keep the excavations and trenches free from water while the works are in progress and prevent any damage to the works by water due to floods or other causes. The Contractor shall have approved pumping gear for keeping the excavation or trenches constantly dewatered during the times the works are in progress. Any work or material damaged by water shall be made good by the Contractor.

Where directed by the Consultant the bottom of trenches or excavations shall be compacted prior to the placing of any bedding or concrete materials. Should, in the opinion of the Consultant, the foundation material be incapable of effective compaction, the material shall be removed and replaced with approved material.

If approved by the Consultant excavated material may be used for backfill over pipes. This material shall remain the property of the Principal and any excess shall be spoiled or used as filling within the site as directed by the Consultant.

All excavated material which is classified by the Consultant as unsuitable shall be removed from the site. The cost of this work shall be deemed to be included in the relevant Bill Items (if part of the Contract) and the Lump Sum of the Contract generally.
The Contractor shall be solely responsible for the maintenance of excavations and is liable for any damage which may be caused to any water pipe, public utility, conduit, etc., through the collapse of the excavation.

Unless a separate item is included in any applicable Bill of Quantities for rock excavation, the items entered in the Priced Bill of Quantities and the Lump Sum of the Contract generally shall be deemed to include full compensation for excavation of material of all types and subsequent backfill and compaction of the trench or excavation with approved material.

Extra over for Rock - Where a Bill of Quantities is part of the Contract and this Bill contains a separate item for excavation in rock (as defined herein), extra payment will be made for the Bill Item for all rock removed within the limits of the excavation as defined or as ordered by the Consultant. The quantity for payment shall be the net quantity in place within the limits of the excavation shown on the drawings. No claim for excavation in rock will be entertained unless the method of measurement is agreed in writing with the Consultant prior to material being excavated.

Rock shall be defined as material which cannot be excavated at the rate of 15m3/hour by a hydraulic tracked excavator with engine gross power output of 148 kW at maximum RPM and a rated breakout force on the bucket of 148 kN with standard bucket. It shall be the responsibility of the Contractor to provide the excavator and bucket for this purpose at its cost. The Consultant shall have the right to nominate an operator for the machine.

In the event of disagreement with any decision made by the Consultant in accordance with the above definition, rock shall be defined as material geologically in place of a hardness when first exposed of three or greater in the Mohr scale of material hardness. Testing of material to determine classification as rock (by the Mohr scale) shall be carried out by an approved laboratory at the expense of the Contractor.

Use of Explosives - Where approved, rock may be carefully excavated by blasting procedures. Prior to commencing any blasting operation the Contractor shall, obtain any blasting permit required. The depth, spacing, location, type of explosive and method of firing shall comply with any permit issued for blasting operations.

In the handling, storage and use of explosives, the Contractor shall comply with all state and local authority laws and by-laws, and with AS2187, SAA Explosives Code. The Contractor shall in particular comply with Section 11.2 of the Code.

Where directed the Contractor shall provide measurements from a vibograph or similar instrument. If these measurements indicate that the requirements specified herein are not being complied with the Contractor shall reduce the amount of charge used or take such other action as will ensure compliance with the Code.

The Contractor may be required to carry out trial blasting in order that the Consultant may determine the peak vibration effects caused by the trial charges and so limit the maximum charge to be employed. The Contractor shall be responsible for all costs associated with the supply, operation and reporting of the vibograph or similar instrument.

The Contractor shall give the Consultant at least three (3) days' notice of any intention to excavate by blasting and shall furnish full details of the location thereof and the methods it proposes to adopt. Subject to approval by the Consultant for blasting at any location, such blasting shall be carried out only at times approved by the Consultant.

The Contractor shall provide screens, barriers, mats and/or other protective devices as directed by the Consultant to limit the effects of blasting. Notwithstanding the provision of such protective devices, the Contractor shall be responsible for any loss, damage or injury sustained by the public, workmen, the works and for damage to property or public utilities of any description whatsoever caused directly or indirectly by such blasting.

Secure storage places shall be provided for explosives and all such places shall be clearly marked with warning signs. Only persons trained and experienced in the handling of explosives shall be allowed to use them on the work under the Contract, and no shot shall be fired until a warning has been sounded and all persons within the radius of danger removed. The warning device shall give an audible warning clearly different from any other sound normally heard on the site.

In the event that the vicinity of work under the Contract is accessible to the general public, the Contractor shall, before any shots are fired, post personnel about the works in various directions to warn all persons of the danger existing and to prevent them approaching closer than safety will permit.

Where blasting is likely to endanger life or property, the Consultant shall have the power to prohibit the use of explosives or prescribe and enforce such rules and regulations as it may deem necessary but the prescribing or failure to prescribe such rules and regulations shall not relieve the Contractor from any responsibility under the Contract.

No explosives shall be left in holes overnight.

Where explosives are used in rock excavation, the charges shall be so proportioned and placed that they will not loosen the rock outside of the excavation lines shown on the drawings or as provided for in the Contract. If the rock below the line or slopes designated should be loosened by blasting to such an extent as to render it (in the Consultant's opinion) liable to slide, fall or have a detrimental effect to the works such loosened rock shall be removed by the Contractor. The removed material shall be made good with material acceptable to and in a manner approved by the Consultant.

All work associated with the use of explosives shall be deemed to be included in the relevant Bill Item (if part of the Contract) and/or the lump sum of the Contract generally.

3.10.5 PIPE BEDDING

Bedding and haunch material shall comply with the grading limits on SRRC Standard Drawing D-15.

All proposed bedding and haunch material for stormwater drainage shall be subject to approval by the Consultant.

In wet or unstable ground conditions where the trench bottom requires further stabilising, additional bedding of 20mm and/or 30mm nominal size (as directed by the Consultant), shall be placed below

the standard bedding to a depth determined by the Consultant. An approved filter fabric shall be used in conjunction with the additional bedding. Grading limits for the additional bed thickening material (detailed as Type 6 on SRRC Standard Drawing D-15) are shown in Table 3.10E.

The bed and haunch material shall be compacted for the full width of the trench by two passes of a vibrating plate or hand tamping method to the satisfaction of the Consultant.

Table 3.10E

A.S. SIEVE (mm)	PERCENTAGE PASSING BY WEIGHT	
	Crushed Rock Nom Size 20mm (additional bedding)	Crushed Rock Nom Size 30mm (additional bedding)
37.5	-	100
26.5	100	80-100
19.0	90-100	70-90
13.2	50-80	60-80
9.5	30-40	50-70
6.7	0-5	
4.75		
2.36		

3.10.6 REINFORCED CONCRETE PIPES AND BOX CULVERTS - SUPPLY AND DELIVERY

Reinforced concrete pipes and box culverts shall conform in all respects to the following Standards:-

- For Precast Concrete Drainage Pipe - AS4058
- For Small Precast Reinforced Concrete Box Culverts - AS1597 Part 1
- For Large Precast Reinforced Box Culverts - AS1597 Part 2

Pipe classes shall be as shown on the drawings. The class of pipe shall be suitable for the intended construction and final traffic loadings. Spigot and socket rubber ring joints shall be used on pipes up to and including 600mm diameter. Interlocking flush joints may be used for pipes greater than 600mm diameter.

Where rubber ring jointing of pipes other than specified above is required, this will be indicated on the drawings or in the Bill of Quantities.

The outside and inside surface of the pipe shall be smooth, dense and hard and shall not be coated with cement wash or other preparation, unless so authorised by the Consultant.

All finished reinforced concrete pipes and box culverts shall, before acceptance, be subject to inspection and approval by the Consultant.

Notwithstanding the above, all finished reinforced concrete pipes and box culverts shall be subject to final inspection at the site and any pipes and box culverts which, independent of any physical tests specified herein, fail to meet the specified requirements will be rejected.

3.10.7 REINFORCED CONCRETE PIPES AND BOX CULVERTS - LAYING AND JOINTING

Pipes, and precast or cast-in-situ box culvert bases shall be bedded on approved material as specified in section 3.12.5 herein. The depth and extent of bedding and haunch support shall be as shown on the drawings or as specified. Cast-in-situ box culvert bases shall be constructed to the details shown on the drawings.

Pipe laying shall begin at the downstream end of the line with the socket or grooved ends of the pipe facing upstream. When the pipes are laid, the barrel of each pipe shall be in contact with the bedding material throughout its full length exclusive of the socket. Pipe sockets shall not bear on the bottom of the trench.

When elliptical pipes with circular reinforcement or circular pipes with elliptical reinforcement are used, the pipes shall be laid in such a position that the manufacturer' marks, designating the "Top" or "Bottom" of the pipe shall not be more than 5 degrees from a vertical plane through the longitudinal axis of the pipe.

For rubber ring joints the pipe ends shall be thoroughly cleaned before the joint is made. The two pipe sections shall then be tightly joined with their inner surfaces at the manufacturer's nominated laying gap.

Jointing mortar for pipes (other than rubber ring jointed pipes) shall be of a smooth consistency, consisting of 1 part Portland Cement to 2 parts of fine sand, with water content not greater than 20 litres/bag of cement.

After the joint is made, the inside of the pipes and annular recess at the ends of the pipes shall be cleaned. The recess shall then be filled with mortar and finished smooth and even with the inside surface of the pipes. Joints on pipes greater than 600mm in diameter shall not be finished on the inside until all fill over the pipe has been completed. No backfill shall be carried out until joints have been inspected and passed by the Consultant.

Where shown on the drawings or specified elsewhere that flush jointed pipes are externally jointed these shall have the external joint mortared and covered with an external band.

External bands shall be installed in accordance with the manufacturer's recommendations.

Joints in box culvert segments shall be made using cement mortar to provide as thin a joint as possible. The external faces of the units shall be bandaged with "Denso Tape 600" or approved equivalent 200 mm wide lapped by at least 100 mm.

Lifting holes in pipes and culverts shall be plugged with mortar, precast tapered plugs mortar or tape surrounded, or other approved means prior to backfill material being placed.

Cutting operations for concrete pipe and box culverts shall provide neat end surfaces. The cut surfaces shall be given two coats of tar epoxy paint.

Joints shall not be made under water. The trench shall be de-watered to facilitate joint making and inspection. Precautions shall be taken to prevent erosion of joint material by moving currents of water.

Completed cement mortar joints shall be kept damp and protected from the direct rays of the sun until backfilling takes place.

Drainage lines shall be constructed to the tolerances set out in section 3.10.12 herein.

3.10.8 uPVC PIPES - SUPPLY AND DELIVERY

uPVC pipes shall conform in all respects with the requirements of AS1254. The class of pipes shall be uPVC "Stormwater HD" designed for solvent weld spigot and socket connection. Prior approval for their use shall be subject to the requirements of Council.

uPVC pipes shall be supplied with sufficient quantities of solvent for making of the pipe joints.

uPVC pipes shall be transported, handled and stacked in accordance with manufacturer's recommendations.

3.10.9 uPVC PIPES - LAYING AND JOINTING

Pipe laying shall begin at the downstream end of the line with the socket end of the pipe facing upstream. When the pipes are laid, the barrel of each pipe shall be in contact with the bedding material throughout its full length.

The pipe ends shall be thoroughly cleaned before the joint is made. Jointing shall be in accordance with manufacturer's directions using jointing solvent.

Joints shall not be made under water. The trench shall be de-watered to facilitate joint making and inspection. Precautions shall be taken to prevent erosion of joint material by moving currents of water.

Drainage lines shall be constructed to the tolerances set out in section 3.10.12 herein.

3.10.10FRC - PIPES SUPPLY AND DELIVERY

FRC pipes and fittings shall comply with the requirements of AS4139.

The class of pipes shall be as shown on the drawings or in the Bill of Quantities. The class of pipe shall be suitable for the intended construction and final traffic loadings.

The pipes shall carry the manufacturers distinguishing mark, date of manufacture, nominal size and class of pipe.

The pipes shall be transported handled, stacked and protected in accordance with the manufacturer's recommendations.

The Contractor shall provide evidence that compliance testing of process and proof load testing verify that the pipes supplied meet the manufacturer's product specification.

Bends, junctions and associated couplings shall comply with the same requirements as for pipes.

Unless otherwise specified all pipe joints shall be made using an approved internal rubber ring joint.

3.10.11FRC - PIPES LAYING AND JOINTING

Laying and jointing shall be in accordance with the manufacturers recommendations unless otherwise directed by the Consultant.

Construction of pipelines on curves shall require the approval of the Consultant and shall not be carried out at greater deflections than that recommended by the manufacturer. Where approved by the Consultant, fittings with glued joints shall be concrete surrounded as directed or as shown on the drawings.

Joints shall not be made under water. The trench shall be de-watered to facilitate joint making and inspection.

Drainage lines shall be constructed to the tolerances set out in section 3.10.12 herein.

3.10.12DRAINAGE LINE PIPE LAYING TOLERANCES

All drainage lines shall be constructed within 100mm of design line, not less than the design grade and not more than 25mm above the design grade.

3.10.13RUBBER RINGS AND GASKETS

Rubber rings and gaskets shall be manufactured and tested in accordance with AS1646.

3.10.14SUB-SURFACE, MITRE DRAINS AND SEEPAGE DRAINS

Sub-surface, mitre drains, seepage and diversion drains shall be constructed in accordance with the SRRC Standard Drawings R-18, R-19, R-20, the project drawings and as directed by the Consultant.

Flushing points and sub-surface inlets are to be provided as shown on the drawings, and/or as directed. All sub-surface and mitre drains shall be tested by flushing to the satisfaction of the Consultant. The cost of this work shall be included in the relevant Bill Item (if part if the Contract) and the Lump Sum of the Contract generally.

3.10.15BACKFILLING

Under roadways and footpaths the backfill material above the haunch zone shall be compacted in layers not greater than 200mm thick to the standard specified in Appendix H. If, in the opinion of the Consultant, the "on site" material is not suitable for backfilling over pipes, the Contractor shall import at its own expense a material acceptable to the Consultant (material with a soaked CBR not less than 15% will be acceptable).

In locations other than under roadways and footpaths (e.g. allotments and parks, etc.) the backfill material shall consist of either of the following:

(a) the best of the material (selected and approved by the Consultant) from trench excavation; or
(b) material from "on site" earthworks selected and approved by the Consultant.

If, in the Consultant's opinion, material from item (a) above is not suitable for backfilling then material from item (b) above shall be used by the Contractor.

The backfill material (in locations other than under roadways and footpaths) shall be compacted to the standard specified in Appendix H. Any settlement shall be made good by the Contractor, prior to the end of the On Maintenance Period.

Where work is being constructed on private property, and it shall be done only with the written consent of the property owner, the Contractor shall carry out such work with a minimum of inconvenience to the owner or occupier. All items located on such property including lawns, gardens, etc., shall be reinstated and left in the same condition as before the commencement of the work unless the owner or occupier of the property agrees otherwise in writing.

All direct and associated costs regarding protection and reinstatement of public utility and services and the reinstatement of private property shall be deemed to be included in the relevant Bill Item (if part of the Contract) and the Lump Sum of the Contract generally.

3.10.16GULLIES, MANHOLES, INLETS, OUTLETS AND OTHER STRUCTURES

The grade and slump of concrete to be used in the works shall be as shown on the drawings. The manufacturer, supply, handling and placing of concrete shall comply with the requirements of AS1379 and AS3600.

Reinforced concrete drainage elements such as manholes, wingwallls, and aprons shall be inspected by the Consultant prior to the placement of any concrete. (For significant concrete pours (individual element volume > 15 m3) project testing of concrete strengths and slumps is warranted and the Consultant shall provide a supplementary specification outlining project testing requirements.) Delivery dockets (Manufacturer's Certificate) for ready mixed concrete shall be provided to the Consultant as soon as practical after the pouring of concrete works. The destination element of the relevant delivery shall be shown on the docket.

Steel reinforcing bars shall comply with the requirements of AS1302. Welded wire reinforcing fabric shall comply with AS1304.

Galvanising shall comply with the requirements of AS1397.

Formwork shall comply with the requirements of AS3610.

Reinforcing shall conform to the requirements of AS3678.

Gullies, manholes, headwalls, and other miscellaneous structures shall be constructed to the forms and dimensions shown on the drawings. Where the ground is solid the Consultant may permit that back forms need not be used in the construction of manholes and gullies, the concrete being poured against the earth. Where this is done, the thickness of the wall of such gullies or manholes shall be increased by a minimum of 50mm greater than the dimension shown on the drawings. All costs associated with this increase in wall thickness shall be deemed to be included in the relevant Bill Item (if part of the Contract) and the Lump Sum of the Contract generally.

The thickness of the walls of gullies and manholes shown on the drawings shall be the minimum adopted when back forms are used. Benching and rendering shall be as shown on the drawings. Gully gratings, manhole covers and frames shall be provided as shown on the drawings.

Gully gratings and frames and manhole lids and frames shall comply with the following criteria:-

(a) Loading requirements to AS3996 Class D
(b) Bicycle safety to AS3996
(c) Finished cast iron products shall be dipped in hot bitumen before leaving the manufacturers works

(d) Finished steel products shall be hot dip galvanised in accordance with AS1650

Manhole covers and frames shall be best quality grey cast iron grade T200 complying with the requirements of AS1830. They shall be free from cracks, flaws and porous spots, and shall be approved by the Consultant before being placed in the works.

Casting inspection certificates shall be provided by the Contractor for all cast iron covers and frames incorporated in the works.

3.10.17CONCRETE KERB, KERB AND CHANNEL, KERB CROSSINGS

Kerb, kerb and channel or channel shall be bedded on a foundation of a minimum of 75 mm thick of compacted Type 2.5 gravel.

Concrete grade shall be as shown on the drawings and shall conform to the requirements of section 3.10.16 herein.

The whole of the water channel cross section shall be cast simultaneously i.e. casting of invert and kerb at different times will not be permitted.

Where kerb or kerb and channel are constructed by an extrusion process, the extrusion machine shall be fitted with a tamper and an automatic control which allows adjustment of the position of the forming mould while the machine is in operation. The horizontal and vertical alignments of kerb, kerb and channel and channel shall be controlled by means of a sensor working to a control line. The finished kerb, kerb and channel or channel shall be well compacted and shall have exposed surfaces free from voids.

Prior to the placing of concrete all loose material shall be removed and the surface of the foundation shall be watered to produce a damp surface.

Rendering shall be used only when approved or directed by the Consultant and shall be mixed in the proportion of one (1) part Portland Cement to two (2) parts fine sand.

Rendering to kerb and invert (when approved) shall be broken at the joints and shall show a neat joint line at right angles to the length of the kerb on top of the kerb and the invert of the channel. Joint lines shall not exceed 6mm in width and depth.

Connection of extruded kerb and channel to gully pits or existing kerb and channel shall be made by hand to give a smooth transition.

Concrete kerb and channel with a longitudinal design grade less than 1% shall be subject to a water test within 24 hours of placing. The test shall consist of placing sufficient water at the high point to make the channel flow over its full length. The criteria for acceptance shall be that not more than 6mm of water ponds in the channel twenty minutes after the flow ceases. All testing shall be carried out in the presence of the Consultant. A similar test may be required prior to the commencement and the expiration of the Defects Liability Period.

The cost of supplying all plant, tools, material and labour for carrying out the water test shall be deemed to be included in the relevant Bill Item (if part of the Contract) and the Lump Sum of the Contract generally.

The vertical alignments of kerb and kerb and channel shall not vary from that specified by more than ±10mm. The horizontal alignment of the kerb and kerb and channel shall not vary from that specified by more than ±20mm. Notwithstanding the above tolerances, the alignments of the kerb and kerb and channel shall have smooth lines.

Expansion joints shall be made at regular intervals not exceeding 20 m. The joints shall be made by installing 6 mm maximum thickness bitumen impregnated fibre board compressible packing in the full cross section of the kerb, kerb and channel and channel. Expansion joints shall also be provided at the interface with drainage structures.

Contraction joints between expansion joints shall be made at regular intervals not exceeding 5 m. The joints shall be made by forming grooves 40 mm deep and not more than 6 mm wide in all exposed surfaces of the kerb, kerb and channel and channel. All grooves shall be normal to the top surfaces and square to the alignment of the kerb, kerb and channel and channel.

Concrete shall be cured for a period not less than 7 days before any other roadworks operations are carried out adjacent to the kerb, kerb and channel and channel.

3.10.18STONE PITCHING

Stone pitching shall be laid as shown on the drawings or elsewhere specified, and shall consist of sound igneous, metamorphic or approved sedimentary rock which will not disintegrate in water. Unless larger stones are specified in the Contract, the stones shall be not less than 0.015m3, and generally no dimension shall be less than 250mm; but where the face area of the stones is 0.1m2 or greater the depth may be reduced to 150mm. The stones shall be properly bedded to even planes on approved loam or sand, and wedged together with broken rock.

Mortar for grouted stone pitching shall consist of one (1) part Portland Cement to three (3) parts of fine sand. Mortar shall be used within one (1) hour of mixing.

The mortar shall be applied by means of a trowel, and shall be worked between the stones, so that the interstices are completely filled as far down as practicable, but to a depth of at least 75mm. Exposed stone surfaces shall be cleaned free of any coating of cement mortar. The grouted stone shall be shaded and kept damp for at least 48 hours. After the mortar has set, if any stones are not firmly held in position, the mortar shall be removed around such loose stones and the area re-grouted.

Stone pitching shall not be used as headwalls by itself.

3.10.19RUBBLE MASONRY

Rubble masonry shall be laid as shown on the drawings or elsewhere specified, and shall consist of sound igneous, metamorphic or approved sedimentary rock which will not disintegrate in water. Unless larger spalls are specified in the Contract, the spalls shall be not less than 0.015m^3, except spalls for wedging.

Spalls shall be placed in cement mortar beds in horizontal layers. All spalls shall be thoroughly wetted before placing. All voids shall be filled with cement mortar and/or smaller size spalls.

Mortar for grouted rubble masonry shall be as for Stone Pitching. Hydrated lime may be incorporated into the cement mortar to the extent of 1 part hydrated lime to 10 parts cement (loose volume).

3.10.20MEASUREMENT AND PAYMENT

Quantities in the Bill of Quantities have been computed on the following basis:

- Kerb, kerb and channel - per plan linear metre including vehicle crossings and access ramps (unless itemised separately).
- Stormwater line - per plan linear metre along the axis of the pipe or culvert between centre line of the manholes and gullies and up to the sealed or open end of the line.
- Other items of drainage works have been measured in the units indicated in the text of the item in the Bill, and based on the dimensions as shown on the drawings or specified elsewhere.

The cost of all work required by this specification including testing, supply of all materials, plant, tools, labour and all expenses necessary for the satisfactory completion of the works, shall be deemed to be included in the relevant Bill Items (if part of the Contract) and/or the Lump Sum of the Contract generally.

3.10.21STANDARDS AND CODES

This specification makes reference to the following Australian Standards:

- AS1141 Methods of sampling and testing aggregates
- AS1254 Unplasticized PVC (uPVC) Pipes and Fittings for Storm and Surface Water Applications
- AS1289 Method of Testing Soils for Engineering Purposes
- AS1303 Steel Reinforcing Bars for Concrete
- AS1379 The specification and Manufacture of Concrete
- AS1597 Small Precast Reinforced
- (Part 1) Concrete Box Culverts
- AS1597 Large Precast Reinforced
- (Part 2) Concrete Box Culverts
- AS1646 Elastomeric Seals for Waterworks purposes
- AS1650 Hot-dipped Galvanised Coatings on Ferrous Articles
- AS1830 Iron Castings - Grey Cast Iron
- AS2187 Explosives - storage, transport and use
- AS2758 Aggregates and rock for engineering purposes
- AS3600 Concrete Structures
- AS3678 Structural Steel - Hot-rolled Plates, Floor-plates and Slabs
- AS3996 Metal Access Covers, Road Grates and Frames
- AS4058 Precast Concrete Pipes
- AS4139 Fibre Reinforced Concrete Pipes and Fittings

In this specification Australian Standards are referred to only by their allocated AS number. The latest available edition at the date of close of Tenders shall be deemed to apply.

3.11 LANDSCAPING

3.11.1 GENERAL

The construction of landscaping works on existing public land (road or park reserve) will require the issuing of a Works Permit.

The construction of landscaping works within a subdivision may require the issuing of a Works Permit, if the landscaping contractor is not a subcontractor to the civil contractor.

The on-going maintenance of public lands (after the end of the construction maintenance period) is normally undertaken by Council.

In some instances such maintenance is the responsibility of the Developer for a defined or agreed time period and in such case the Landscaping Maintenance Contractor shall be nominated by the Developer and a Works Permit will be required by the Maintenance Contractor for the duration of his contract with the Developer.

The Developer shall be responsible for advising Council of the engagement of any Landscaping Contractor other than on the Works Permit unless indicated otherwise by the Director.

It is not necessary to complete the Notification and Payment Form (Portable Long Service Leave/Workplace Health and Safety) for any maintenance works (or landscaping construction works if the cost of the works is less than $150,000.00).

The Consultant supervising the construction of landscaping works shall be either:

- a Landscaping Architect holding A.I.L.A. (Australian Institute of Landscaping Architects) Corporate Membership, or a person eligible for membership
- or upon review by Council an experienced landscaper with demonstrated competent in landscaping works, and contract administration.

The intent of this specification is to define the minimum construction and performance standards for landscaping works in the Scenic Rim Region. Council's minimum re-vegetation requirement is 80% aerial coverage of grass to all disturbed earth surfaces.

Where projects involve only minor landscape works, a full specification may not be necessary. Construction and performance notes and supporting detail drawings, presented on the landscaping drawings may suffice.

It is the responsibility of the Consultant to determine the extent of information required to clearly communicate the design intent.

The Consultant is to conform to the hard and softscape performance and construction criteria contained in the Landscape Specification.

Variations to these criteria will be considered by Council, upon request by the Consultant.

This Specification is to be read in conjunction with the Engineering Specifications.

3.11.2 MATERIALS AND WORKMANSHIP

3.11.2.1 GENERAL

Materials and products used for landscape works shall be of suitable quality.

All workmanship shall be of an acceptable standard and undertaken by suitably experienced contractors.

All contractors shall hold current licenses and insurances for the approved scope of works.

All manufactured items shall be used in accordance with the manufacturer's specification.

Upon request provide samples to Council prior to construction.

3.11.2.2 STANDARD

The contractor shall comply, where applicable with materials and workmanship with the relevant standards of the Standards Association. Compliance shall be required for garden soils, timber preservation, paving, irrigation and plumbing works, chemical application etc.

3.11.2.3 ENVIRONMENTAL PROTECTION MEASURES

Where the site or neighbouring properties are exposed to environmental damage due to the altered site conditions, the Consultant shall ensure appropriate environmental protection measures are taken to minimise damage.

Of primary importance is the control of water erosion and silt contamination on exposed site areas, particularly when devoid of covering vegetation. In these circumstances gully velocity dissipaters, silt dams, nutrient traps and silt fences are required.

Soil Erosion and Sediment Control - Engineering Guidelines for Queensland 1996 is to be adhered to for all situations relating to Environmental issues.

Where existing vegetation is damaged or requires remedial action due to site works the plants or trees involved shall be pruned or maintained by an experienced arborist promptly to encourage regrowth and facilitate survival.

3.11.2.4 LANDSCAPING, PARKS AND ENVIRONMENTALLY SIGNIFICANT AREAS

In cases where the land subject to development or part thereof, or adjacent land, is a park or bush land reserve or proposed future park or conservation, the general precautions shall be mandatory:

- Compliance with the approved parkland management plan.
- The area(s) shall be clearly pegged, flagged (and fenced if ordered by Council) inspected and approved by Council Officers prior to the pre-start meeting.
- The approved design for tree clearing shall have identified any unavoidable intrusion into areas and nominated work practises such as maximum widths of disturbance, nominated access routes, methods and timing of rehabilitation, which shall be strictly adhered to.

Rehabilitation of such damaged or disturbance shall be to the satisfaction of Council.

A current copy of the approved plans is to be kept on site at all times during construction. Council may order construction to halt where there is evidence, or warranted uncertainty, that in Council's requirements and approvals are not being adhered to. During disputes the Applicant will be

required to secure and protect the site. Council accepts no responsibility for delays and associated costs incurred during disputes where the applicant has been at fault, or Council had due concerns.

3.11.3 MINOR LANDSCAPING WORKS

3.11.3.1 MINOR EARTHWORKS

The following requirements are for minor earthworks including trench works.

Fill, other than topsoil and garden soils shall be generally free of:

- excessive organic material
- waste and toxic materials
- site rubble and large rocks

Sit rubble and large rocks shall be generally be removed from site, however may be buried where:

- minimum 600mm cover provided
- compacted to remove voids
- no structures are to be built over burial sites

All fill areas including trench works shall be compacted so as not to create subsidence problems.

Final grades shall be surveyed to ensure crossfall is achieved - see Table 3.11A. Subsoil drains will be required where surface drainage is impracticable or inadequate. Subsoil drainage shall be in accordance with SRRC Standard Drawings **R-18,R-19 & R-20.**

All excavated or filled areas shall be trimmed with minimum topsoil or garden soil as required. Trimming shall be:

- free of clods and rocks > 25mm and comply with soil specifications
- even grades free of low points
- feather edges to adjoining grades

Cultivation may be required to break up any hard pans and prepare ground suitable to promote a growing environment.

Table 3.11A

Landscape Item	Min Required Crossfall
stone mulched area	1:100
grassed areas	1:50
garden areas	1:25
paved areas	1:100
drainage pipe/trench base	1:100

3.11.3.2 TOPSOIL AND GARDEN SOIL

It is in general preferred that on site topsoils be used. Such topsoils may however require blending or conditioning to attain required specifications.

Soil stockpiles shall be maintained to control weeds routinely and guard against dispersion by wind or water. Stockpiles shall be limited to a height of two (2) metres and may require covering or retaining. Stockpiles are not permitted in close proximity to residential properties.

Generally soil to be used shall comply with the following specification:

- friable and free draining
- good texture and structure for selected use
- acceptable conductivity and pH levels intended plant species groups to be planted
- minimum depths
    - topsoil (turf and grass areas) 100mm
    - garden soils (all other planted areas) 200mm

Composition to AS 2223:

- sand 25-85%
- silt 0-50%
- clay 5-25%
- organic matter >2%
- salinity (EC) <500 microsiemens / cm
- pH 5.5 to 7.0

Tested by an agronomist or laboratory to recommend fertiliser, treatment or cultural requirements for selected land use.

Heavier soils may require application of gypsum, typically at a rate of between 2,000 and 2500 kg per hectare.

Topdressing where required shall be predominantly a graded sandy loam, screeded over turf areas.

3.11.3.3 FERTILISERS

An established and routine fertiliser regime shall form an integrated component of the;

- construction programme
- maintenance programme

The Consultant shall specify a fertiliser programme for all planted areas, based on agronomic and vegetative analysis required. That is;

- promotes vigorous growth throughout establishment
- is applied and repeated at intervals based on fertiliser longevity and plant requirements, in accordance with agronomists or manufacturers recommendations.

The fertiliser schedule shown in Table 3.11B.

Table 3.11B

Plant Group Classification	Fertiliser Type	Typical Application Rates (Method)	Application Frequency
Turf & Seeded Areas	Dynamic Lifter "Turf Lifter"	100kg/Ha Broadcast 10kg/100m2	Seasonal (3-4 months)
Garden Beds & Revegetation Areas	"Osmocote - Plus,Grey" or "Sierrablen, Grey"	5kg/m3 (incorporated) or 6kg/m2 (top-dressed)	8-9 months
Individual Small Container Stock	"Agriform 10 gram" Tablet	1-3 tab/plant (implant beside & surround of root ball)	12 months
Individual Advanced Container Stock	"Agriform 21 gram" Tablet	2 - 6 tab/plant (implant beside & surround of root ball)	12 months

Note:

- Ensure fertilisers specified are compatible with plant species selected (e.g. grevilleas are phosphorus sensitive).
- Product names are indicative, equivalent products may be used. Generally 'fertiliser types' will require further specification to indicate N.P.K. ratio and trace elements.

3.11.3.4 MULCHES

It is desirable that mulches be made and stored on site where suitable material is available.

Generally loose particle mulches shall comply with the following requirements:

- particle size range 5mm to 50mm
- minimum depth:
  - garden beds, 75mm
  - revegetation areas, 50mm
- final mulch grade 25mm below edge treatments
- free of weeds, soil, sticks and rocks
- binding qualities to minimise dispersion by the elements or slope
- durable - minimum 12 months effective longevity
- remains pervious

The following mulch composition or origins are not acceptable;

- sawdust
- non-organic
- treated or painted timbers
- noxious or undesirable weedsand
- not composted or stored sufficiently
- not bind excessively so as to shed water

All garden beds and revegetation are required to be mulched.

Organic mulch matting may be required as a substitute for loose particle mulches on steep or unstable slopes.

Organic mulch matting shall comply with the following requirements:

- Natramat TM, 3mm coir fibre mat with latex bonding, or approved equivalent.
- biodegradable
- durable - effective longevity minimum requirement, 12 months (Maintenance period).
- stake to secure effectively
- overlap edges, layer with the direction of flow to prevent lifting
- cut holes to locate containerised plant stock
- repair accidental cuts by staked patches

The following mulch matting products are not acceptable:

- non-organic
- nylon meshes or wire net binding

Refer LCD-3 for typical revegetation mulches, LCD-4 for typical garden bed mulches.

3.11.3.5 SEEDINGS

Seeding may be carried out by:

- reliable broadcast method
- scarifier or direct drill
- purpose built hydroseed/mulch mixer & pump

All seeding methods shall ensure that the following requirements are met:

- selected seed is viable and not environmentally harmful
- application rates are adequate to provide full cover.

Minimum germination and cover requirements are:

- 75% germination after 2 months.
- 80% aerial coverage is to be achieved and maintained for a minimum period of 6 months before acceptance Off Maintenance.
- method of coverage is even and reliable.
- ground preparation is consistent with seeding method.
- soil moisture levels are maintained prior and after seeding to promote strong germination and establishment.
- weed competition is eliminated or sufficiently maintained.

All traffic to be kept off seeded areas during establishment.

Failed seeded areas shall be resowed promptly to ensure that adequate germination levels are likely to be attained.

3.11.3.6 TURFING

Turfed areas may be specifically required in:

- high traffic areas.
- slopes or overland flows.
- cleared areas prone to erosion and siltation problems.
- to frame or border the edge of treatments.

Turf shall be supplied and installed in compliance with the following requirements:

- minimum quality 'B' grade, 85% dominance of specified grass.
- minimum 25mm turf sod, delivered moist and laid within 24 hours of cutting on farm.
- ensure appropriate ground preparation is carried out.
- final turf grade 25mm below top-grade edge treatment.
- free of undesirable or noxious weeds.
- irrigated and rolled promptly after laying.
- top dress and screed where required to level and fill gaps after first mow.
- maintain to avoid setback.

3.11.3.7 PLANTING

Plant material shall comply with quality requirements set out in Section 2.8.

Generally **containerised plant stock** shall be installed in compliance with the following requirements:

- minor root or canopy prune where required.
- excavate sufficient size planting holes, and backfill with suitable soil, whilst allowing for normal long term root development.
- position plant to ensure upon settlement top of root ball is level with final grade.
- stake plants as specified or where required - allow for removal prior to completion of maintenance period.
- fertilise and maintain so as to promote vigorous growth.

Street trees shall generally conform with the following specifications:

- minimum container size - 25 litre bag
- minimum single trunk clearance - 1m (streets), 1.7m (roundabouts)
- minimum trunk calliper - 20mm
- minimum overall height - 1.5m
- minimum canopy - 0.6m (balance and well formed)

Transplanting exground stock may be carried out with the following provisions:

- plant material is authorised for removal under statutory requirements
- staged root and canopy pruning is carried out to minimise setback
- specimen may require repeat treatments of rooting hormones and/or anti-evapotranspirant to stabilise plant and stimulate regrowth
- root ball is wrapped and adequately protected to prevent disturbance throughout procedure
- standard maintenance program is upgraded to accommodate for careful monitoring throughout establishment.

Plant size and substitution requirements:

- not be substituted with other species, varieties or container sizes without Consultant's approval
- Consultant shall select substitute plant material that is consistent with the design intent and comparative in container size.

3.11.4 LANDSCAPING STRUCTURES

3.11.4.1 EDGE TREATMENTS

Edge treatments shall generally comply with the following requirements:

- edge treatments be wide and mountable for ease of mowing and maintenance.
- turf or mulch should be 25mm below top grade of adjoining edge.
- minimum curvature radius at 3m.
- minimum access between edges and other treatments shall be 3m.
- avoid restricting access into narrow corners.

Materials acceptable to Council for edge treatments are:

- pavers (clay/concrete)
  - minimum 60mm depth
  - minimum 110mm width (230 preferred)
  - motar base and exposed edges 20mPa
  - ensure no cracking
- timber
  - minimum 150mm radius log (winged) or 200mm x 80mm sleeper.
  - suitably treated for direct burial.
  - finish ends and joints neatly.
  - securely pin and fix.
- continuous concrete
  - minimum width 150mm.
  - minimum depth 100mm.
  - minimum 20mPa concrete.
  - maybe coloured or patterned.
  - finish end neatly and flush.
  - bolster cut control joints where required.
  - R12 re-bar centrally located
  - ensure no cracking.

3.11.4.2 PAVING AND CONCRETE

Construction details shall clearly specify, and reference, particulars of paving and concrete works. Notations shall indicate:

- colours.
- patterns.
- paver material, where applicable.
- exposed aggregate (size, colour, and surface texture).
- widths, thickness, strength, and reinforcement.
- base preparation.

3.11.4.3 RETAINING WALLS

Retaining walls included in landscape works less than 1.0m shall be constructed of:

- Splitface blocks
- Rendered concrete blocks
- Concrete sleepers (Plain or Timber look and colour)

Retaining structures exceeding this height require Engineering design and certification.

3.11.4.4 FENCES AND BARRIERS

Acoustic fences may be required by Council along frontages to major roads. Such fences shall be constructed in accordance with the acoustic Consultant's specification. For typical landscape treatments of acoustic fences refer figure 2.8G.

Acoustic fences shall require testing and certification at practical completion before being accepted 'On Maintenance'.

Barrier fences shall be required to prevent vehicular trespass into parklands and other public open spaces.

3.11.4.5 PLAYGROUND EQUIPMENT

Playground equipment for public areas shall:

- have Standards Association of Australia certification.
- be constructed of powder coated aluminium and Engineering grade UV resistant plastic.
- be set out on an approved softfall pad.
- be durable, weather and vandal resistant.
- give due consideration to public health and safety.
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3.11.4.6 LANDSCAPE FURNITURE AND STRUCTURES

Landscape furniture and structures shall generally:

- comply with relevant SAA requirement.
- be durable, vandal resistant and low maintenance.
- have coatings and surfaces that are weather and graffiti resistant.
- comply with statutory building and services requirements.
- be located to maximise public benefit without vehicular or pedestrian traffic problems.
- give due consideration to public health and safety.

3.11.5 IRRIGATION

3.11.5.1 GENERAL

Automatic irrigation systems are to be provided to all garden beds constructed within road reserves, parks and open space as part of the development works. Where specifically required within the development conditions issued by Council, irrigation systems will also be required to be provided to grassed areas within parks and sporting fields. The irrigation systems are to comply with the requirements defined below and AS 3500.

Reticulated water is to be provided to irrigation systems via a water meter - See Queensland Urban Utilities for further information. The Developer will be responsible for the cost of all irrigation water used to establish plants and to maintain the planting during the maintenance period. Payment of all water used will be required to be made before Council will accept the Development 'Off Maintenance'.

3.11.5.2 LAYOUT

All irrigation systems are to be fully automatic pop-up spray, drip emitter or subsurface micro-porous flexible pipe. Spray sprinklers are to be located for head to head coverage and minimal over spray onto abutting hard finished surfaces.

Irrigation layout of parkland grassed areas is to include road verges along the parkland frontage with spray emitters located at the back of kerb. Appropriate filter screens are to be placed within the system adjacent to the connection to the water main. All irrigation emitters are to deliver sufficient precipitation for maximum soil absorption and water uptake by plants with minimum runoff. The design shall prioritise deep, less frequent watering.

3.11.5.3 WATER METERS

Water meters are to be installed at the Developers expense at all connections to the watermains. Water meters are to be located as near as practical to the irrigation system being served. Where multiple irrigation systems are to be served, distribution manifolds are to be provided to limit the minimum water meter spacings to 100m - See Queensland Urban Utilities for further information.

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3.11.5.4 CONTROLLERS

The controller shall be installed in a metal cabinet that is lockable, dust proof and rust proof. It shall be constructed so as to minimise the effects of vandalism. It shall be easily accessible for maintenance and inspection.

The controller shall be connected to a 240V power supply. The Developer shall obtain approvals from, and pay all fees to Energex associated with the electrical connection. The electrical system shall be installed in accordance with the requirements of the relevant Australian Standard.

As a minimum specification controllers are to provide the following features:

- an operating voltage of either 12 or 24 volts.
- to be capable of full automatic unattended operation.
- dual programming with multiply start times per day and a 7 day programming ability.
- allow at least 1 free station per system to allow for future system adjustments.
- provide a pump/master valve circuit.
- manual and semi-manual override provision.
- capable of operating any combination of valves.
- all manuals and documentations associated with the above.

3.11.5.5 WIRING

All control wiring shall not be less than 1.5 square millimetres and shall be contained in continuous light grey, solvent welded PVC conduits. Underground wiring is to have a minimum cover of

350mm. Wiring joints are to be Spears DS-400 prefilled dri-spliced connections or similar. 500mm of excess length of wire is to be provided looped in all valve boxes.

3.11.5.6 DOCUMENTATION

The following irrigation specific documentation is to be provided to Council before the development will be accepted on maintenance.

- a dedicated irrigation 'As Constructed' drawings showing the location of all irrigation components and the sizes of connecting pipework.
- a schedule of all equipment installed including brand names and model numbers.
- operation manuals for system controllers.
- warranty documentation applicable to the system component.
- proposed watering program for the irrigation system.

3.12 ON MAINTENANCE

3.12.1 GENERAL

The purpose of the "On Maintenance/Practical Completion" inspection is to ensure that the Development has been completed in accordance with the approved Engineering Drawings, the Development Conditions and Council's requirements.

The Consultant is responsible for ensuring that the approved works have been completed and is in accordance with the approved Engineering drawings, technical specifications and accepted engineering practices prior to requesting an 'On Maintenance' inspection.

3.12.2 ON MAINTENANCE/PRACTICAL COMPLETION INSPECTION

"On Maintenance/Practical Completion" inspections shall be undertaken jointly by Council and the Consultant with the Contractor and will generally include, but are not limited to, inspection of the following:-

(a) Earthworks and Roadworks:-
- Grades and profiles of roads, kerbing and footpaths
- Topsoiling and seeding to prescribed areas
- AC surfacing for texture and finish
- Street signs and line marking
- Final allotment pegging
- Sub-surface drains flushing points etc.
- Street tree planting (if required)
- Street furniture

(b) Stormwater Drainage:-
- Roads, pipes, structures, flowpaths clear of silt and debris
- No ponding of water on roads, in pipes, structures, kerbs or flowpaths
- Turfing to prescribed areas
- Pipes laid to line and level
- No damaged pipes or structures
- No reinforcing steel exposed to cut off pipes
- Pipe penetrations to manholes finished off
- Quality of concrete work

- Check for unsound render work
- Converter slabs mortar bedded
- Manhole lids
- Correct drops through manholes
- Gullies and grates
- Overland flowpaths to profile
- Inter-allotment drainage system
- Downstream culverts/pipes and water courses cleared of siltation
- Roofwater drainage kerb outlets if required
- Inter-allotment drainage pipes and manholes clean and dry
- Inter-allotment drainage pipes laid to line and level
- Correct manhole sizes, lids, locations
- Manhole lids finished to match finished surface levels and slopes

(c) General

- Site is clean, tidy, free of rubbish, rocks, sticks, unauthorised stockpiles, etc.
- Allotment earthworks to be free draining and generally in accordance with the approved design
- Water quality and sediment control measures
- Integrity of environmentally significant areas
- Maintenance security deposit lodged
- Evidence that Energex agreement is in place relevant to both reticulation supply and street lighting
- Eradication of noxious weeds

(d) Open Space Areas

- "On Maintenance/Practical Completion" inspections of dedicated Open Space Areas shall review conformance with Section 3.11.

3.12.3 MAINTENANCE PERIOD

The inspected works are to be placed "On Maintenance" for a minimum period of (12) twelve months from the date approved by Council in writing.

During this period, responsibility and liability for rectification of defects (and for any damage that may occur) lies with the Developer, not the Council (unless the work may be directly related to Council activities).

AC core tests and 28-day concrete cylinder tests not available at the "On Maintenance" inspection must be supplied during the Maintenance Period.

Any construction works that are deemed unsatisfactory will be itemised in a defects list. Minor works, to a total value under $10,000.00, may be attended to within 21 days and will not delay Council's acceptance of the works 'On Maintenance.' Works over $10,00.00 or works that are a public safety issue shall be rectified prior to Council accepting the work 'On Maintenance.' A re-inspection of the rectification works will be required.

Notwithstanding the above, the project will not be formally accepted "On Maintenance' until the Consultant has submitted a written request to Council for acceptance that the works be placed 'On Maintenance', all test results, as constructed information and all other associated documentation has been received and verified, and all conditions of development approval have been complied with. All documentation shall be submitted to Council prior to the On Maintenance/Practical Completion inspection. All test results and

plans must be submitted within 2 weeks of the inspection in order to place the development On Maintenance from the inspection date.

3.13 OFF MAINTENANCE

3.13.1 GENERAL

The purpose of the "Off Maintenance" inspection is to ensure that the constructed works have performed satisfactorily during the "Maintenance Period" and those omissions and defects have been rectified.

3.13.2 OFF MAINTENANCE INSPECTION

The Consultant is responsible for ensuring that the works are presented in accordance with the approved Engineering Drawings/ Specifications and accepted Engineering practice prior to requesting an "Off Maintenance" inspection.

Failure to do so may result in cancellation of the inspection and/or the charging of a re-inspection fee.

"Off Maintenance" inspections shall be undertaken jointly by Council and the Consultant and will generally include, but are not limited to, inspection of the following:-

(a) Earthworks and Roadworks
- Concrete kerbs and walkways/bikeways
- Pavements and surfacing for deformation/damage (including load testing)
- 80% coverage of specified grass to prescribed areas
- Street signs and line marking
- Street tree planting (if required)

(b) Stormwater Drainage
- Roads, pipes, structure, flowpaths clear of silt and debris
- No ponding on roads, in pipes, structures, kerbs or flowpaths
- Turfing to prescribed areas
- Pipes for damage/movement
- Exposure or corrosion of reinforcing steel
- Overland flowpaths for profile
- Inter-allotment drainage system
- Downstream culverts/pipes and water courses cleared of siltation

(c) General
- Street lighting installed in accordance with the approved plans

(d) Open Space Areas
- "Off Maintenance" inspections of dedicated Open Space Areas shall review conformance with Section 3.11.

Following a satisfactory "Off Maintenance" inspection, the Consultant should submit a written request to Council for acceptance of the works "Off Maintenance", and release of the Maintenance Security Deposit.

3.14 WORKS PERMIT CONDITIONS FOR SUBDIVISION DEVELOPMENT AND COUNCIL CONTROLLED ROADS

3.14.1 PRIOR APPROVAL

No work within a Council controlled road reserve shall proceed without:

- Approval of engineering documentation issued by the Director Infrastructure Services.
- Payment of required Siltation and Erosion Performance bond, refer to Appendix K2.
- Payment of required Vegetation Clearing Performance bond, if required by the Director, refer to Appendix K3.
- A current Works Permit issued by the Council's Director or a delegated Council Officer.

Some of the above conditions may not apply where the Director deems the proposed construction is of a minor nature and where the value of works is estimated at less than $20 000.00. In such approved cases, minor works shall be constructed in accordance with the Conditions of Approval for Minor Works.

3.14.2 WORKS PERMIT

Subject to the satisfaction of Scenic Rim Regional Council requirements a Works Permit will be issued by the Council's Operational Works inspector at the pre-start meeting. The Works Permit contains the following data:

- Details the location of the works.
- Details the extent/type of works.
- States the hours of work.
- States the contractors estimated completion date (subject to agreement with the Operational Works inspector).
- States the policy number and liability insurance supplier.
- Witness of:
    - Security deposit paid or guaranteed.
    - Portable Long Service Leave / Appointment of Principal Contractor lodged and paid.
    - Engineering documentation approval.
    - Service connection fees paid
- States the name, number and address of the Supervising Registered Professional Engineer, Queensland (RPEQ)
- States any job specific requirements requested by the Council's Operational Works inspector.
- To be signed by the Council's Authorised Officer, the Principal Contractor's representative and the Supervising Engineer (or the authorised representative of the Supervising Engineering Company).

A Works Permit may be revoked at any time by notice from the Council's Director if the performance of the Contractor in relation to this approval is deemed to be unsatisfactory.

Upon the signing and receipt of the Works Permit, the Principal Contractor (and the Supervising Engineer as applicable) agrees/s to be bound to all conditions as stated herein together with any job specific requirements to Council's Operational Works inspector as outlined in the Works Permit or otherwise advised in writing.

A copy of the Works Permit is to be held on the job site at all times and the Works Permit must be produced if requested by any Officer of the Scenic Rim Regional Council.

3.14.3 CONTRACTOR

Works shall be carried out by a competent Contractor experienced in executing works of a similar nature to the works proposed and who is acceptable to Council.

3.14.4 SUPERVISION

All works within the Council-controlled road reserve shall be supervised by a Registered Professional Engineer of Queensland who is experienced in civil construction. Where the owner or developer does not have such a Professional Engineer in his employ, a Registered Consulting Professional Engineer shall be retained for the purpose of supervising the works. The name, address and RPEQ number of the Engineer must be forwarded to the Director before approval to proceed with the work will be given.

3.14.5 ENGINEERING DOCUMENTATION APPROVAL

All engineering plans and specifications shall be approved by the Director before a Works Permit will be issued. The preparation of engineering plans and specification shall be in accordance with Council's Design and Construction Manual.

The approval of engineering plans and specifications by Council's Operational Works Section does not warrant that such Plans and Specifications have been checked in detail. Scenic Rim Regional Council does not accept any responsibility for the accuracy of such plans and specifications as approved. It is assumed that the Developer's Engineer has executed sound engineering judgement when preparing the Plans and Specifications and that all site conditions and Council requirements have been taken into account. Any deficiencies, therefore, which come to the attention of the Council during construction shall be rectified at the cost of the Developer.

The Council approved plans and specification together with the Development Decision Notice for Operational Works and the Works Permit shall be retained on site at all times and must be sited by the Council Inspector at the pre-start meeting.

3.14.6 PROGRAM OF WORK

Any works affecting through traffic, i.e. on or adjacent to the through pavement shall be carried out strictly in accordance with a Traffic Management Plan and Construction Program, which must be submitted by the Contractor through the Supervising Engineer for approval by the Director, before any work can proceed.

The Contractor may be required to submit, through the Supervising Engineer, a Quality Plan and/or copy of the Quality Assurance system to be implemented for the duration of the works.

3.14.7 SCENIC RIM REGIONAL COUNCIL OPERATIONAL WORKS INSPECTOR

The Inspector representing the Council shall be as nominated in the Schedule attached.

3.14.8 PRE-START MEETING

It will be necessary for the Supervising Engineer to contact the Inspector, a minimum of two (2) working days prior to the proposed commencement of works, to arrange a pre-start meeting with the Principal Contractor and Supervising Engineer. No works shall commence within the road reserve prior to this meeting.

Minutes of the meeting will be recorded by the Supervising Engineer. A copy of the minutes shall be forwarded to all other parties within one week of the meeting and other parties shall have three (3) working days to advise of any desired corrections.

3.14.9 INSPECTION PROGRAM

At the pre-start meeting the Council Operational Works inspector shall confirm mandatory Inspection Hold Points.

The Contractor shall supply at his cost all equipment or labour as necessary for the inspection tests.

3.14.10 SPECIFICATIONS AND STANDARD DRAWINGS

Council's Design and Construction Manual stipulates the specifications and standard drawings which shall be adopted for the works.

3.14.11 SERVICE CONNECTIONS

All water connections and all sewerage connections to manholes shall be undertaken by Queensland Urban Utilities (QUU) at the Developers cost.

3.14.12 MATERIALS TESTING

The Contractor's Supervising Engineer must ensure all necessary testing in accordance with the Specifications and the Design and Construction Manual. Certified copies of the test results must be supplied to Council's Operational Works inspector when they come to hand. All tests shall be carried out by a N.A.T.A. certified laboratory to Queensland Transport and Main Roads test methods. The name of the testing company should be nominated to the Operational Works inspector at the pre-start meeting. The position of these results should be related to a pegged chainage if applicable. Council testing staff may carry out check testing is deemed necessary. The cost of this testing will be recoverable from the Owner or Developer.

3.14.13 SAFETY

The Contractor shall, in respect of the works to be constructed under this Permit, be responsible for the performance of the functions of the Principal Contractor within the meaning of the Work Health and Safety Act 2011 and any Regulations in force under the Act.

Upon the issuing of this Permit:

- the Council shall be deemed to have appointed the Contractor to be the Principal Contractor of the project,
- the Contractor shall be deemed to have accepted the appointment;

Where the value of construction works exceeds the non-notification limit of the Act/Regulation, within 14 days of the Date of this Permit, and prior to the commencement of works, the Contractor shall lodge the Portable Long Service Leave Levy/Appointment of Principal Contractor form with the Portable Long Service Leave Authority or its agents and pay any associated fees. A copy of the receipted form shall be provided to the Inspector prior to commencing works.

Appointment as the principal contractor under the Act shall be in force during the continuance of the Permit unless sooner revoked by the Council. The Council can revoke the appointment by the following means -

- revoking the Permit
- after giving the Contractor 21 days' notice in writing of its intention to revoke the appointment.

During the "On Maintenance" period, the Contractor's responsibilities as the Principal Contractor shall be limited to maintenance or repair works pursuant to section 3.14.18.

3.14.14 PROVISION FOR TRAFFIC

All measures necessary for the safety of traffic, the cost of complying with the requirements of Main Roads Specification "MRS 11.02 - Control of Vehicular Traffic at Roadworks" and the supply of signs in accordance with the "Manual of Uniform Traffic Control Devices", shall be the responsibility of the Contractor. If necessary, the Council may provide equipment and resources, at full cost to the Contractor.

Upon written notification by the Council to the Contractor of any failure to satisfy the safe provision of traffic management as outlined herein, the Contractor shall have the time period as nominated in Council's advice but not exceeding 24 hours to rectify such situation to the satisfaction of the Director or the Council may undertake any works as necessary to make the site safe and recover such costs from the Contractor.

Works Permits may be revoked and all work ceased within the Council controlled Road Reserve if there is a breach of the Provision for Traffic requirements.

3.14.15 OPERATIONS

The Contractor in his operation must not unnecessarily obstruct any side road access, break down any fences, obstruct any drain or water course or damage existing road construction. The Contractor must at once remove such obstructions, make adequate provision for traffic management and immediately repair any damages. The Director has the power to instigate any necessary work deemed to be required after giving the Contractor's Supervising Engineer notice of intentions to act and the whole of the cost of such work incurred by the Council will be recovered from the Contractor.

3.14.16 SITE ACCESS

Council Staff have the right to access at any time the works for the purpose of ensuring that the Council requirements are met.

3.14.17 RE-ESTABLISHMENT

All areas affected by the construction works shall be re-established to the standard condition observed prior to the commencement of construction and to the satisfaction of the Council Operational Works inspector.

3.14.18 ON MAINTENANCE/PRACTICAL COMPLETION

A final inspection meeting will be arranged by the Supervising Engineer when the Supervising Engineer is satisfied all works are completed.

The Supervising Engineer shall give the Council Operational Works inspector a minimum of two (2) working days' notice of the meeting.

A minimum of 14 business days before the date of the On Maintenance/Practical Completion inspection, the Supervising Engineer will supply the Council's Op Works inspector with the following details:

- Certified As Constructed Drawings
- Compliance test results

If the above details have been supplied and the Council Operational Works inspector is satisfied the works have been completed in accordance with the Engineering Documentation Approval or subsequent Council approved amendments, a Certificate of Completion will be issued advising the date the works are accepted "On Maintenance".

The Principal Contractor shall be responsible for the maintenance and repair of all works covered by this approval for the period of time specified in the Schedule from the date of notification that the works are accepted "On Maintenance".

The On Maintenance period shall be 365 days unless indicated otherwise.

If satisfactory maintenance is not carried out within this period then the Director may direct Council staff to carry out any necessary work and the whole of the cost of such work incurred will be recovered from the Security deposit.

The Principal Contractor shall hold Public Liability Insurance for the full on-maintenance period until such time as the works are accepted Off Maintenance.

3.14.19 OFF MAINTENANCE

At the end of the on-maintenance period, it shall be the responsibility of the Supervising Engineer to organise an Off Maintenance Inspection with the Council Operational Works inspector and the Principal Contractor.

The Supervising Engineer shall give the Council Operational Works inspector a minimum of two (2) business days' notice of the meeting.

Works will be accepted Off Maintenance and the balance securities/guarantees returned subject to the satisfaction of the Council Operational Works inspector.

3.14.20 COST

Council will not pay for any of the works unless otherwise agreed.

3.14.21 INDEMNITY

Clause 3.14.21.1 - Subject to the next paragraph of this Clause, the Principal Contractor shall indemnify and keep indemnified the Chief Executive Officer, Mayor, Scenic Rim Regional Council and all officers, employees and agents of the Council (hereinafter referred to as "The Council") against all loss of or damage to the property of The Council (including The Council-controlled road) and from and against any claim, demand, action, suit or proceeding that may be made or brought by any person against The Council.

The Council, or the servants or agents of the Scenic Rim Regional Council or any of them in respect of personal injury to or the death of any person whomsoever or loss of or damage to any property whatsoever arising out of or as a consequence of the construction or maintenance of the works by the Principal Contractor or their employees, agents or subcontractors and also from any costs and expense that may be incurred in connection with any such claim, demand, action, suit or proceeding.

The Principal Contractor shall not, under the preceding paragraph of this Clause be rendered liable for or in respect of personal injury to or the death of any person or loss of or damage to property resulting from any negligent act or omission of The Council, or for or in respect of any claims, demands, actions, suits or proceedings, costs and expenses whatsoever in respect thereof or in relation thereto.

Clause 3.14.21.2 - Before commencing work the Principal Contractor shall take out a Public Liability Policy of Insurance in the joint names of the Scenic Rim Regional Council, the Principal Contractor and all subcontractors employed from time to time in relation to the works to be carried out for their respective rights and interests to cover their liabilities to third parties including the liabilities as set out in Clause 3.14.21.1.

The Public Liability Policy of Insurance shall include a cross-liability Clause in which the insurer agrees to waive all rights of subrogation or action that he may have or acquire against all or any of the person comprising the insured and for the purpose of which the insurer accepts the term "insured" as applying to each of the person comprising the insured as if a separate policy of insurance had been issued to each of them (subject always to the overall sum insured not being increased thereby).

The Public Liability Policy of Insurance shall be for an amount not less than the sum stated in the Schedule attached and shall be affected with an insurer or insurers approved in writing by the Scenic Rim Regional Council and in terms approved in writing by the Scenic Rim Regional Council, which approvals shall not be unreasonably withheld. The policy shall be maintained until the Scenic Rim Regional Council has issued the final clearance in accordance with section 3.14.19.

Clause 3.14.21.3 - Before commencing work the Principal Contractor shall ensure that suitable insurance policies are taken out giving cover to the Principal Contractor and all subcontractors against any liability, loss, damage, claim, demand, action, suit or proceeding, costs and expenses whatsoever arising at Common Law or under any statute or other legislative provision, including any statute or such provision relating to worker's compensation, as a result of personal injury to or the death of any person employed by the Principal Contractor or by any subcontractor in or about the execution of the work.

Clause 3.14.21.4 - Before commencing work and whenever requested in writing from time to time thereafter to do so by the Scenic Rim Regional Council, the Principal Contractor shall provide evidence to the satisfaction of the Scenic Rim Regional Council of the insurances affected and maintained by the Principal Contractor and his subcontractors for the purpose of Clauses 3.14.21.2 and 3.14.21.3. If, after being requested in writing by the Scenic Rim Regional Council to do so, the Principal Contractor fails to provide evidence of compliance with its insurance obligations under Clauses 3.14.21.2 and 3.14.21.3 which is to the satisfaction and approval of the Scenic Rim Regional Council may effect and keep in force any such insurance and pay premiums as may be necessary for that purpose and the amount so paid shall be a debt due from the Principal Contractor and the Scenic Rim Regional Council.
The Principal Contractor shall ensure that each policy of insurance effected as required by Clauses 3.14.21.2 and 3.14.21.3 shall contain provisions acceptable to the Scenic Rim Regional Council that will:

- Require the insurer, whenever the insurer gives to or serves upon the Principal Contractor or a subcontractor a notice of cancellation or any other notice under or in relation to the policy, at the same time to inform the Scenic Rim Regional Council in writing that the notice has been given to or served upon the Principal Contractor or the subcontractor; and
- Provide that a notice of claim given to the insurer by the Scenic Rim Regional Council or the Company or a subcontractor shall be accepted by the insurer as a notice of claim given to the insurer by the Scenic Rim Regional Council and the subcontractor, as the case may require.

The Principal Contractor shall, as soon as practicable, inform the Scenic Rim Regional Council in writing of the occurrence of an event that may give rise to a claim under a policy of insurance effected as required by Clauses 3.14.21.2 and 3.14.21.3 and shall ensure that the Scenic Rim Regional Council is kept fully informed of subsequent action and developments concerning the

claim. The Principal Contractor shall take such steps as are necessary or appropriate to ensure that a subcontractor will, in respect of an event or claim of a like nature arising out of or relating to the operations or responsibilities of the subcontractor, take in relation to the Scenic Rim regional Council the like action to the which the Company is required to take under this paragraph.

The effecting of insurance as required by Clauses 3.14.21.2 and 3.14.21.3 shall not in any way limit the liabilities or obligations of the Principal Contractor.

3.14.22 SECURITY DEPOSIT

The security deposit is for the purpose of ensuring the due and proper performance of the works associated with this Permit, refer to Appendix K4.

3.14.22.1 PROVISION OF SECURITY

Prior to the pre-start meeting and hence prior to the issuing of this Permit, the Contractor shall lodge with Scenic Rim Regional Council a security deposit of:

- Where the estimated value of works within the road reserve is up to $20,000.00 a flat fee of $3,000.00 security.
- Where the estimated value of works within the road reserve is between $20,000.00 to $50,000.00 - $5,000.00 security.
- Where the estimated value of works within the road reserve exceeds $50,000.00 - security of $5,000.00 plus 2.5% of the estimated amount exceeding $50,000.00.

The Supervising Engineer shall provide the Council Inspector an estimate of these works (in the form of a schedule of rates) prior to the lodgement of security for subsequent confirmation in writing of appropriate security.

The security deposit shall be any of the following:

- cash; or
- an unconditional irrevocable guarantee in the form attached herewith and from a financial institution approved by Council.

The costs of and incidental to providing the security (including, without limitation, all stamp duty and other taxes payable in respect of the security) shall be borne by the Contractor.
At the pre-start meeting, the Contractor shall supply evidence that the security has been provided. Viz.: A copy of the Council receipt, if a cash security or alternatively the completed Guarantee form as per Appendix K4.

3.14.22.2 CONVERSION OF SECURITY

The Council may convert into money at any time, such part of the Security Deposit that does not consist of money and the Council may do so whether or not it is entitled to exercise a right under these Conditions of Approval in respect of the security.

The Council shall not be liable in any way for any loss occasioned by the conversion of any security into money whether that conversion is done pursuant to Clause 3.14.21.2 or any other clause.

3.14.22.3 RECOURSE TO SECURITY MONEYS

The Council will have recourse to the Security Deposit subject to the provision of sections 3.14.12 and 3.14.13 of the Permit or the following other circumstances:

- failure to complete the works associated with this Permit within the nominated date in the Schedule or such other extensions as granted by the Director; or
- failure to rectify defects to the satisfaction of the Director for defects indicated at the On Maintenance or Off Maintenance inspection within the time period nominated in the notice of defects. Where no time period is nominated the Contractor shall have 30 days from the date of notice to rectify defects.

If the value of works undertaken by the Council pursuant to this clause exceeds the value of the security, such costs shall be recoverable form the Contractor.

3.14.22.4 RELEASE OF SECURITY

The Council will release the balance of the security deposit at the expiration of the Maintenance period as outlined in section 3.14.19.

3.14.22.5 INTEREST

Any interest payable on cash security shall belong to the Council.

3.14.22.6 ADDITIONAL SECURITY

The Council reserves the right to request additional security if any security monies are expended pursuant to clause 3.14.22.3.

3.14.23 SPECIAL CONDITIONS

3.14.23.1 WORKS BY SCENIC RIM REGIONAL COUNCIL

The Owner by agreement may contract the works to the Council with supervision by the Council appointed officer. (In this case section 3.14.3 and 3.14.4 do not apply).

3.14.23.2 JOINING UP TO EXISTING

The method of joining to the existing pavement shall be submitted to the Council's Operational Works inspector for their approval prior to placing of the new pavement.

3.14.23.3 SUBMISSION/CALCULATION OF PAVEMENT DESIGN AND TEST RESULTS

- Pavements shall be designed in accordance with Section 2.6 of the Manual.
- Pavement depths shall be subject to final approval by the Director after reviewing the test results of Pavement/Subgrade submitted by the Contractor.

3.14.24AS-CONSTRUCTED DRAWINGS

As-constructed A1 and A3 size drawings of the works shall be submitted to the Council prior to the works being accepted "On Maintenance". In general, the format and detail requirements of As Constructed Infrastructure Drawings are outlined in Council's Design and Construction Manual.

THE SCHEDULE

In accordance with Clause 3.14.8 of the Conditions, supervision shall be performed by the Scenic Rim Regional Council Operational Works Inspector.

The inspector can be contacted on (07) 5540 5111.

In accordance with Clause 3.14.21.2 the Public Liability Policy shall be for an amount not less than TEN MILLION DOLLARS ($10,000,000.00).

The period for which the Principal Contractor shall be responsible for maintenance of the works shall be not less than 365 days from the date of notification from Council that the works are accepted On Maintenance.

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4 AS CONSTRUCTED REQUIREMENTS

4.1 AS CONSTRUCTED REQUIREMENTS

All required "As Constructed" information shall be submitted to Council prior to any construction being accepted "on maintenance".

Unless directed otherwise by the Director, "As Constructed" information shall be submitted in the form of A1 and A3 prints and in electronic (.dwg & .pdf) format on MGA 94 in accordance with 4.1.1 to 4.1.8 inclusive of this Part.

Any amendments required by the Director shall be completed and the information resubmitted to the satisfaction of the Director within one calendar month of the beginning of the "on maintenance" period, otherwise, the maintenance period will begin when Council has received the amended information.

Unless otherwise directed, these requirements will not apply to minor land developments, which do not require roadworks and/or services.

4.1.1 PRESENTATION OF “AS CONSTRUCTED” INFORMATION ON PLANS

The "As Constructed" information to be shown on these plans shall include sewerage, roof and allotment drainage, surface levels and water reticulation.

The use of diagrams to clarify information shall be permitted when applicable.

Each "As Constructed" plan shall also show the following:

(a) The estate or development name and stage.
(b) The name and RPEQ number of the Consultant Engineer submitting the information.
(c) Council's development reference file number.
(d) Certification in accordance with the requirements of 4.1.9 of this Section.
(e) Property and easement boundaries as shown on the approved calculated lot layout.
(f) Lot and RP numbers as shown on the approved calculated lot layout.
(g) Approved road names.
(h) Level datum and the PSM with reduced level from which the datum was determined.
(i) The location, number and reduced level of all permanent survey marks located within the development.
(j) Council drawing numbers are to be shown on the drawings **BY** Council.
(k) Council has the right to request additional “As Constructed” plans were deemed necessary.

4.1.2 ROADWORKS

“As Constructed” information to be generally shown by amended approved design drawings.

“As Constructed” alterations made to the design drawings are to be highlighted by providing an easily recognisable asterisk (*) or cloud at areas of amendments.

The following "As Constructed" information shall be provided:

(a) Kerbs, Kerb & Channel
- type of kerb (refer SRRC Standard Drawings)
- location of kerb
- levels at sections along lip line

(b) Pavement Marking/ Signs
- type of sign
- location of pavement marking

(c) Construction Details
- surface treatment
- pavement types and depths
- location of service conduits
- location of side/ mitre drains and clean out points.
- construction levels

(d) Longitudinal Sections
- Longitudinal sections to show amend design levels where applicable and depths crossed out where applicable.
- As Constructed levels to be shown at 5.0m intervals at intersection vertical curves.
- As Constructed pavement details to be shown across longitudinal section for appropriate extents.

The location of signs, kerb and pavement marking may be determined from the approved design drawings provided no significant variation from the design occurred during construction.

Variations from the design which are considered significant by the Director, shall be located by survey and shall be submitted with the "As Constructed" information.

4.1.3 FINISHED SURFACE LEVELS

The following “As Constructed” information shall be provided:

(a) Surface contours at 0.5 metre contour interval extending from the kerb line of roads to the rear boundary of all drainage reserves and parks.
(b) Surface levels at inter allotment corners and at significant changes of grade on allotment boundaries, provided that no surface level is required where a surface level of a sewer access chamber is shown within 2.0 metres of a corner.
(c) The extent of fill areas and spot levels over the fill areas.
(d) The coverage of spot levels required over fill areas shall be sufficient to appropriately model the terrain.
(e) The surface contours shall be generated from levels obtained by survey.
(f) The extent of fill areas may be determined from the approved design drawings provided no significant variation from the design occurred during construction.
(g) Unless directed otherwise by the Director, variations of 3 metre in the horizontal extent of the fill shall be considered significant. The extent of fill shall include areas with more than 150mm of fill.
(h) Significant variations from the design shall be located and levelled by survey and submitted with the “As Constructed” information.
(i) No amendments are required if constructed within allowable tolerances.

4.1.4 STORMWATER DRAINAGE

“As Constructed” information to be generally shown by an amended approved design drawing.

"As Constructed" alterations made to the design drawings are to be highlighted by providing an easily recognisable asterisk (*) or cloud at areas of amendments.

The following "As Constructed" information shall be provided:

- Access chambers
  - access chamber number
  - access chamber type (refer SRRC standard drawings)
  - access chamber surface level
- Catchpits
  - catchpit surface level at lip of kerb
  - catchpit type (refer SRRC standard drawings)
- Stormwater Lines
  - upstream invert level
  - downstream invert level
  - pipe diameter
  - pipe material
  - material class
- Field inlets
  - surface level
  - invert/outlet levels
- Open/Overland Channels
  - invert levels at 20 metre intervals

The location and levels of stormwater drainage features may be determined from the approved design drawing provided no significant variation from the design occurred during construction.

Significant variations from the design shall be located and levelled by survey and submitted with the "As Constructed" information.

Note:- Catchment Plans, Sediment Control Plans are generally not required to be submitted as “As Constructed” unless significant alterations were made during construction.

4.1.5 ROOF AND ALLOTMENT DRAINAGE

The following "As Constructed" information shall be provided:

- Drainage Pits
  - surface level of pit
  - invert level at inlets & outlets of pit
- Drainage Lines
  - pipe diameter
  - pipe material
- Connection points
  - dimensions from the point of connection to two (2) property boundaries or property corners
  - surface level
  - invert level at point of connection

All levels and dimensions required for "As Constructed" information of roof and allotment drainage shall be determined by survey.

4.1.6 LANDSCAPING AS CONSTRUCTED DRAWINGS

As Constructed drawings are required at practical completion stage prior to the project being accepted (i) for “on maintenance” subdivision works and (ii) for occupancy for building works. As Constructed drawings shall clearly identify any amendments or changes to the approved

landscape working drawings. Hardscape treatments and underground services, in particular, including paving, fences, walls, irrigation, lighting and other structures shall be accurately located for Council records.

Any structural elements e.g. retaining walls etc. will require certification by an R.P.E.Q.

4.1.7 CERTIFICATION

All plan work showing "As Constructed" information shall be certified "As Constructed" by a Registered Professional Engineer (Queensland).

When submitting "As Constructed" information for, roof and allotment drainage and finished surface levels, the "As Constructed" drawing should show information certified by a Licensed Surveyor to indicate that levels and dimensions shown thereon are a correct record of a survey performed in accordance with the accuracy standards prescribed herein. This may be in the form of a note on the plan, certified by a Licensed Surveyor, stating that the "As Constructed" survey work was carried out by a Licensed Surveyor.

The accuracy of surveyed "As Constructed" features shall be ±0.10 metres horizontally and ±0.02 metres vertically. Finished surface contours shall accurately represent the surface such that 90% of levels obtained by survey would fall within 0.25 of a metre of the level indicated by the contours. Spot levels over fill areas shall be accurate to ±0.05 metres unless specified otherwise by the Director.

A Licensed Surveyors certificate shall be provided to Council to certify that:

(a) Road construction provides minimum verge widths and pavement widths in accordance with the approved engineering drawings.
(b) Stormwater drainage pipes and access chambers are within easements and or drainage reserves provided in accordance with the development approval.
(c) Roofwater and inter allotment drainage construction are in correct relationship to property boundaries as required by Councils standard drawings and this manual.

4.1.8 OPERATION AND MAINTENANCE MANUAL

Operation and Maintenance Manuals for mechanical and electrical equipment shall conform to the requirements of Section 4.3, and shall be provided with the “As Constructed” details provided.

4.1.9 SUBDIVISION ASSET REGISTER

The developer is to provide Council with a Bill of Quantities and indicative rates for the subdivision works in accordance with Appendix M “Subdivision Asset Register”. The register is to be submitted at the completion of the subdivision works and forms part of the “As Constructed” information. The information is used in the compilation of Council Assets Register in accordance with Council’s Asset Management Plan.

4.1.10 "AS CONSTRUCTED" DOCUMENTATION

Development works will not be accepted "On Maintenance" or as practically complete until the following documentation has been submitted to Council.

(a) Inspection and testing certification (Appendix G)
(b) Consulting Engineer’s Certificate of Completion - Appendix I
(c) Asset Register (Appendix L)
(d) Certification of Foundation Conditions (where applicable)

(e) Certified As Constructed Drawings
(f) Operation and maintenance manuals (where applicable)
(g) Completed subdivision asset register

Copies of test results on:

(a) compaction of fill
(b) subgrade CBR
(c) CBR 15 material quality
(d) CBR 15 compaction
(e) subsoil drain filter media grading
(f) subbase course material quality
(g) subbase course compaction
(h) base course material quality including sulphate content
(i) base course compaction
(j) bituminous (chip) seal application rates
(k) prime or *primer seal spray and application rates
(l) AC core tests

NOTE: * if used

Should any of the above test results fail to meet Council's requirements, the Consulting Engineer shall include details of retesting/rectification carried out.

Test results and certifications shall be presented in a logically assembled and bound document including a table of contents confirming completeness.

4.2 SURVEY CONTROL

4.2.1 SURVEY INTEGRATION WITH MAP GRID OF AUSTRALIA & AUSTRALIAN HEIGHT DATUM

All subdivisions of 10 or more lots inclusive of all stages are to be surveyed in accordance with the following requirements:

- Surveys shall be on the Map Grid of Australia azimuth.
- Surveys shall be on the Australian Height Datum level.
- A minimum of 2 new permanent survey marks shall be established in each stage of 10 or more lots of a subdivision and in large subdivisions, Council may direct the installation of more permanent survey marks.
- If two or more permanent survey marks already exist in close proximity to the subdivision and are capable of fulfilling this requirement, then the establishment of additional marks is not required.
- All permanent survey marks should be cadastrally connected.
- Connections shall be made where practical to permanent survey marks with MGA94 co-ordinates. Computation of MGA co-ordinates shall be done in accordance with the GDA Technical Manual.
- GNSS equipment will be used by Council to establish MGA co-ordinates where there is no existing MGA control.
- Council reserves the right to impose subdivision conditions requiring Surveyors to introduce MGA control on large estates where no such control currently exists.
- On completion of the subdivision survey, a Drawing (DWG) or DXF file of the subdivision showing all connections shall be submitted to Council with the title documents. The

subdivision drawing file must be as true and correct a representation of the registered plan details as is possible.

Where the Surveyor is lodging title documents for sealing prior to the completion of construction works, the installation of new permanent survey marks may be delayed until works are completed. In such instances the Surveyor shall lodge a preliminary subdivision drawing file omitting the connections to control points and PSMs. The Surveyor must install the PSMs and lodge the final subdivision drawing file with all connections before the subdivision will be accepted on maintenance.

- A hard copy plot of the drawing file shall be submitted with a CD.
- The hard copy must be signed and certified by the Surveyor as being in accordance with the requirements of this Policy.
- The Survey Control Form shall be fully completed and returned with the CD.
- All CD's shall be labelled showing:
    - the estate name and stage
    - surveyor and date
    - file names
    - scales
- Scanned copies of Form 6 PSM sketch plans shall be submitted with the CD.

4.2.2 CAD SPECIFICATION FOR SUBDIVISION DRAWING LAYOUTS

The Subdivision Drawing File must be presented in the format outlined below:

1. Where it is practical to connect to Department of Environment and Resource Management (DERM) or Council MGA control marks, the drawing file of the subdivision shall be MGA co-ordinated.
2. Subdivisions without MGA connections shall be shown on a local co-ordinate system.
3. DWG format is preferred.
4. DWG drawings shall be at a scale of 1:1000.
5. The hard copy of the subdivision layout shall be at any reasonable standard scale to suit an A1 or A3 sheet.
6. Files should be supplied on CD.
7. Layer and drawing format information for the subdivision layout is outlined in Table 4.2A

DESCRIPTION	LAYER NAME	COLOUR	LINE TYPE	TEXT STYLE	TEXT FONT	TEXT HEIGHTS (mm)
Control Information	CTRL	White	- Small dash for connections - Solid donuts for PSMs	Standard	Simplex	2.5
Approved Street Names	RDNME	Green	Solid	"	Simplex	5
Lot Boundaries	LOTLN	White	Solid	"	-	-
Road Reserve Boundary	RDRES	Red	Solid	"	-	-
Easements Easement Text	LTEMT LTEMT	White White	Long Dashes Solid	" "	- Simplex	- 2.5
Existing road reserve boundaries, lot boundaries or lot text	EXIST	Cyan (Light Blue)	Solid	"	Simplex	As for text noted below
Lot Numbers *	LTNO1 LTNO2 LTNO3	Green Green Green	Solid Solid Solid	"	Simplex Simplex Simplex	5 5 5
Plan Numbers *	LTRP1 LTRP2 LTRP3	Yellow Yellow Yellow	Solid Solid Solid	"	Simplex Simplex Simplex	2.5 2.5 2.5
Lot Areas *	LTAR1 LTAR2 LTAR3	Yellow Yellow Yellow	Solid Solid Solid	"	Simplex Simplex Simplex	3.5 3.5 3.5

Table 4.2A. - Subdivision Drawing File - Layer and Format Information

* To suit layer control incorporated in Council's Land Information System, lot text, lot number, area, and RP number shall be on different layers depending on the area of the property.

For areas 0 - 5000m² inclusive use layer no. 1
For areas 5000 - 25000m² use layer no. 2
For areas >25000m² use layer no. 3

e.g. (i) For a land parcel of 3000m2 the layer name for the lot number shall be LTNO1.
(ii) For a land parcel of 6000m2 the layer name for the lot number shall be LTNO2.

8. Layer and format information for the title block of the drawing is outlined in Table 4.2B.

Description	Layer Name	Colour	Line Type	Text Style	Text Font	Text Height
Estate Name	TITLE	Green	Solid	Standar	Simple	7mm
Estate Stage	"	Red	"	d	x	5mm
Surveyor's Name	"	White	"	"	"	3.5mm
Scale of Drawing	"	White	"	"	"	2.5mm
Date	"	White	"	"	"	2.5mm
Coord System	"	White	"	"	"	2.5mm
Meridian of MGA	"	White	"	"	"	2.5mm
Distances - MGA or HORIZ	"	White	"	"	"	2.5mm

Table 4.2B - Title Block Information

9. In the layer named CTRL show:-
    - the co-ordinate correct position (MGA or local) of new permanent survey marks and Scenic Rim Regional Council or DERM MGA marks. (Where the control mark is well beyond the subdivision the calculated connection should be shown not to scale. Refer example).
    - connections between permanent survey marks and control marks.

10. Text style for all text should be STANDARD
    - Text font for all text should be SIMPLEX
    - Text characters should be upright

    If your CAD package does not have a SIMPLEX font an alternative font may be used providing:-
    - all text utilises the same font,
    - the font type, if not Simplex, is noted on the hard copy.

11. Easement descriptions (e.g. EMT A) shall be in the layer LTEMT.
12. Pathways shall be shown in the layer RDRES where the pathway area is defined on the Survey title plan as new road.
13. Pathways shall be shown in the layer LOTLN where the pathway area is defined on the survey title plan as part of new park.
14. If the subdivision contains an access limitation strip the road reserve boundary should be in the layer RDRES and the lot boundary line should be in the layer LOTLN.
15. If your office CAD package cannot create the solid donut PSM symbol (viz. ⦿) an alternative symbol (viz. ○) will suffice.
16. Where existing lot or road reserve boundaries or text of existing lots are included in the CAD subdivision layout, the existing information shall be shown on the layer named EXIST as indicated in Table 4.2A. In most instances there should be very little existing lot information on the CAD drawing. It should be noted that an existing lot boundary line which becomes a new road reserve boundary line should be shown in the layer RDRES.
17. All areas of lots shall be shown in square metres i.e. m^2 (refer CAD example).
18. Lot lines in the layer LOTLN are not required along road reserve boundaries.
19. The standard drawing A1-8728 shows the approved format for hard copies of subdivision layouts.

Scenic Rim Regional Council

SURVEY CONTROL FORM

1. Estate Name and Stage _____
2. General Location Map Reference _____
   _____
3. Surveying Company _____
4. Postal Address _____
   _____
5. Phone No. _____
   Fax No. _____
6. Contact Name _____
7. Version of AutoCAD/CAD _____
8. Date _____
9. All Relevant Council File Reference Nos. _____

OFFICE USE ONLY

4.3 MANUAL FOR MECHANICAL AND ELECTRICAL EQUIPMENT

4.3.1 SCOPE

Operation and maintenance manuals shall be provided covering the installation, commissioning, operation and maintenance of equipment supplied.

4.3.2 STANDARDS

Manuals shall comply with the current editions of all applicable Australian Standards, and in particular:

AS1000	The International System of Units (SI) and its Application.
AS1100	Drawing Practice
AS1101	Graphical Symbols for General Engineering
AS1102	Graphical Symbols for Electrotechnical Documentation

4.3.3 GENERAL REQUIREMENTS

4.3.3.1 MANUAL DETAIL

Manuals shall be sufficiently comprehensive to enable the water authority and / or Council's staff to operate and maintain the equipment in an efficient and workmanlike manner.

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

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

Such information shall relate specifically to the equipment as supplied. Any information which does not pertain to the equipment supplied shall be removed or deleted. Maintenance instructions shall be in sufficient detail to enable overhaul and replacement of all parts.

4.3.3.2 SUBMISSION

The Developer shall submit one (1) draft copy of the manual to Council for review and approval. Council will return a copy of this draft with appropriate comments.

This review by Council shall not relieve the Developer of the responsibility to provide a useful and professionally prepared document.

At such time when Council's comments confirm that the manual is acceptable, the Contractor shall prepare the final manual.

The Developer shall provide three (3) copies of the final manual to Council before the works will be accepted "on maintenance".

4.3.3.3 ADDENDA

Should it become necessary for the Developer to modify, or add to, the final manual at some later stage, e.g. to include "As Constructed" information, the Developer shall issue copies of the addenda to Council for inclusion within the existing manuals.
If, in the opinion of the Director, the addenda modify the existing manuals extensively, the Developer shall be instructed to re-issue the manuals completely.

4.3.4 TECHNICAL REQUIREMENTS

4.3.4.1 MANUAL CONSTRUCTION

(a) The document(s) shall be A4 size, bound in hard cover binders.
(b) An electronic copy shall be provided in .pdf format. All attached plans shall be in .dwg format as well.
(c) All units shall be SI units.
(d) All information shall be in English.
(e) All data sheets for proprietary equipment plant shall be clearly reproduced and shall indicate the appropriate information pertinent to the installation.
(f) The title and drawing number (issued by Council or the water authority) shall be displayed on the front cover and spine of the document to enable the manual to be included in the drawing register.

4.3.4.2 CONTENT

The document(s) shall contain the following - as a minimum:

(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, etc., 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 relubrication quantities and intervals.
(h) Tabulation of all consumables excluding lubricants (e.g. fuel type and quantity, electrical components, chemicals, etc.)
(i) Performance specification (including commissioning data).
(j) Certified test sheets for all tests required by Council
(k) Drawings (reduced to A3 or A4 size):
    - General arrangements
    - Component parts/detailed dimensioned drawings including exploded view and/or sectional drawings.
    - Flow diagrams
    - P and ID's
    - Electrical schematics with line diagrams
    - Circuit diagrams
    - Cabling, wiring and termination diagrams
    - All components capable of being dismantled shall be shown and identified in the drawings.
(l) Addresses, telephone and facsimile numbers of suppliers and local agents for all items of equipment.
(m) List of all parts, with every component cross-referenced to drawings, together with the necessary details for ordering these, including proprietary catalogue numbers and names.
(n) Software listing, if appropriate, and details of all software.
(o) Programming guide, if appropriate.

(p) Assembly and installation instructions.
(q) Trouble shooting guide.
(r) Recommended settings and calibration details of any protection or control device.
(s) A comprehensive index for each set of the specified manuals.