Part 7 Standard for Construction of Roadworks

Division 1 Standards

7.1.1 General

(1) All work is to be supervised by a Registered Professional Engineer (Qld) competent in roadworks and undertaken by a nominated Principal Contractor experienced in the construction of Public (Municipal) Works. The Local Government may request evidence of the Principal Contractor's competency.

On the completion of the works, a certificate is to be submitted to the Local Government from the supervising engineer certifying that the works have been completed in accordance with the approved plans and specifications.

Certification is to include the submission of "as constructed" information and copies of all relevant test results.

Works involving State Controlled Roads must be referred to the Department of Transport and Main Roads for approval.

(2) Road construction methods and practices accord with those specified in:

a. DTMR “Standard Specifications Roads”;
b. DTMR “Pavement Design Manual”;
c. DTMR “Urban Road Design Manual” Volumes 1 and 2;
d. DTMR “Manual of Uniform Traffic Control Devices”;
e. the Ipswich City Council “Standard Drawings”; and
f. the relevant Austroads Guides when dealing with construction methods and practices not covered in the manuals or Ipswich City Council Standard Drawings specified in paragraphs a – e.

(3) Where there is an inconsistency between the specified Manuals and the Ipswich City Council Standard Drawings, the Standard Drawings are to take precedence to the extent of the inconsistency.

Division 2 Rural Roadworks and Access

7.2.1 Physical Access

Physical access is defined as the entry from the lot onto a Local Government maintained road from the property boundary to the road shoulder.

(1) Access onto a gravel road requires:

a. a gravel invert crossing if situated on the crest of a road; or
b. the installation of a concrete stormwater pipe/s placed within the invert of the table drain with concrete headwalls, wingwalls and apron in accordance with Standard Drawing No. SR.16.

(2) A road base material with a minimum CBR 45 is to be used as cover pavement material and is to comply with those pavement material properties specified in this division.

7.2.2 Roadworks

(1) If a maintained gravel road finishes short of the proposed development, then roadworks across the full frontage of the lot and back to the existing Local Government road within the road reserve are to be carried out in accordance with Standard Drawings.

(2) The wearing course gravel pavement is to be a minimum depth of 100mm but may increase depending on the soil strength (CBR) of the subgrade material.

Where the subgrade material is unsatisfactory with respect to the soil strength (CBR) one of the following measures is to be undertaken:

a. replacement of the deficient pavement to a minimum depth of 300mm with a material of CBR 15 or higher;
b. use of geotextile;
c. stabilise the soil by use of a mixture of cement and/or lime; or
d. increase wearing course depth.

(3) The wearing course pavement material is to be well graded, gravel-sand mixtures with a small proportion of clayey fines with the following properties:

a. fines to sand ratio between 0.2 and 0.4;
b. Plasticity Index range between 4 to 15;
c. Linear Shrinkage range between 2 to 8; and
d. a minimum CBR 45 for the material.

(4) The Grading Limits for the wearing course pavement material are to be as outlined in Table 6.2.1.

Table 6.2.1 — Grading Limits

AS Sieve Size	37.5 mm	19.0 mm	9.50 mm	4.75 mm	2.36 mm	425 µm	75 µm
% by Mass Passing Sieve Designated	100	55-90	40-70	28-55	20-45	10-25	4-15

Note:
1. The Developer is to submit to the Local Government a certificate from a NATA registered laboratory indicating conformity with the pavement requirements.
2. The pavement material may be supplied ex-quarry or delivered to site and the supplier is to have in place a quality system ensuring the quality of the material.
3. A certificate indicating conformity with the pavement requirements is to accompany the pavement material.

7.2.3 Pre-Start Meeting/Inspections

1. Prior to any gravel road construction occurring, the Developer is to contact the Local Government for an on-site meeting to discuss the intended road construction process.
2. Prior to the Developer organising the meeting with the Local Government, the Developer is to have submitted the Certificate of material conformity and received confirmation from the Local Government that any material to be used in the construction process has been approved.
3. The following inspections/meetings are to be undertaken as a minimum by the Local Government;
   a. Pre-Start Meeting;
   b. Subgrade Inspection;
   c. Pavement Inspection;
   d. “Final Inspection”.
4. On completion of all roadworks a final inspection will be undertaken to determine whether the Local Government will accept the road into the gravel road maintenance program.

7.2.4 Setting Out and Compaction of Subgrade

(1) The subgrade is to be set out and formed so that the centre line or crown of the road is centrally aligned within the road reserve.

(2) The longitudinal gradient of the formation is to be no greater than 10 % although limited sections not exceeding 100m, may have a maximum gradient of 20%.

(3) Where grades exceed 10%, sections are to be bitumen sealed.

(4) The subgrade is to be trimmed to the same crossfall tolerances as specified for the wearing course pavement so that any depth deficiencies are not made up of pavement material.

(5) The subgrade is to be compacted generally in layers no deeper than 150mm, where filling is required, by a vibrating steel drum roller.

(6) The material is to be compacted at or close to Optimum Moisture Content (OMC) so that the workability of the material is increased to facilitate easier compaction and ultimately a higher dry density.

7.2.5 Placement and Compaction of Pavement Material

(1) Prior to the placement of pavement material the subgrade is to be trimmed to the required crossfalls, the formation centrally aligned within the road reserve, the in-situ moisture content uniform, and any suspect areas of poor material treated in accordance with those methods outlined in section 7.2.2.

Note:
1. The inspection of the subgrade by the Local Government will be limited to a visual test and proof rolling.
2. Proof rolling is required to check for any area of the subgrade which might show signs of deflection indicating a weakness in the sub-strata.
3. There is to be on site at the time of inspection the rolling equipment to undertake proof rolling.

4. Pavement materials are not to be used until the Local Government has received the Certificate of compliance for this material as indicated in section 7.2.2, and approval for its use has been given by the Local Government.

(2) Pavement materials are to be placed on the exposed subgrade at intervals sufficient to accommodate even spreading to achieve the approved pavement thickness (minimum 100mm).

(3) Pavement materials are to be compacted at OMC by either a vibrating or non-vibrating steel drum roller and is to be undertaken from the outside edge of the formation to the centre line or crown of the road.

Note:
1. A forward pass and reverse pass shall be made over the same section of pavement before moving to the adjacent section.
2. It is important to check that this is undertaken as close as possible to the edges of the pavement.
3. Any change in direction of the roller should be such that the roller is on the previously compacted section.
4. Each pass of the roller should overlap by up to 500mm of the previous pass to ensure complete coverage.

7.2.6 Table Drains

(1) As part of the road construction suitable table drains and cross road drainage are to be constructed.

(2) Table drains are to run parallel to the road surface and adjoining slopes.

(3) The drains are to be placed in cut sections and at grade sections.

(4) Table drains are to be constructed with either flat or angled beds and unlined unless there is a potential scouring problem in which case lining works are to be undertaken.

(5) Table drains on the low side of the road are to be diverted to side drains or cut off drains so that runoff does not pool near the road formation.

(6) Table drains on the high side of the road are to be diverted to cross road culverts.

7.2.7 Cross Road Drainage

(1) Cross road drainage is to be constructed in accordance with one of the pipe sizes outlined in Table 7.2.2 'Indicative Pipe Sizes for Rural Catchment Areas'.

Note: If the catchment contributing to the culvert is larger than 15 hectares, the Developer will be required to obtain a design from a Registered Professional Engineer (Qld) (RPEQ) indicating the required treatment to be undertaken.

(2) The cross road drainage is to be constructed with the obvert of the pipe culvert a minimum of 300mm below the finished road level, and the pipe is to have concrete or stone pitch concrete headwalls, wingwalls and aprons on both the inlet and outlet of the culvert.

(3) The minimum pipe size to be used for any cross road culvert is 375mm diameter.

(4) Culverts are to be laid with a minimum fall of 100mm across the width of the road.

(5) The inlet and outlets to the culverts are to be clear, flat and unobstructed for a distance of 1.5m.

(6) The grade of any earth batters leading into or out of the culvert are to have a maximum slope of 1 in 6.

(7) 2 timber or tubular steel delineator posts are to be installed on either side of the culvert structure on both sides of the road in accordance with DTMR Standard Drawing for Roadworks No. 1356.

(8) The delineator posts are to be installed with the inside face of the post in line with the shoulder of the road.

(9) Delineator posts are to be installed so that the red delineator is on the left side and the white delineator is on the right side of the road in both directions.

Table 7.2.2 — Indicative Pipe Sizes for Rural Catchment Areas

Rural Catchment Area (Ha)	Pipe Size Required (mm)	Discharge (m3/S)

1.5	300	0.15
2.0	375	0.20
3.0	450	0.30
5.0	525	0.45
7.0	600	0.60
9.0-11.0	2 x 525	0.80
12.0	2 x 600	1.00
15.0 to 100	RPEQ Engineer Design Required	RPEQ Engineer Design Required

Note: All proposed cross road drainage treatments are to be approved by the Local Government before any roadworks are undertaken by the Developer.

7.2.8 Conduits and Road Crossings for Services

(1) In all cases, services and accommodating conduits shall be placed across roads and the backfill thoroughly compacted no later than subgrade stage.

(2) Beam deflections and compaction testing of trenches greater than 300mm in width to confirm the stability of the trench are required at the subgrade stage.

Division 3 Urban Roadworks and Access

7.3.1 Vehicular Crossings

(1) Where applicable, all vehicular footpath crossings (together with any necessary adjustments to the kerb and channel) are to be constructed in accordance with Standard Drawing Nos. SR.12, SR.13 and SR.14.

7.3.2 Roadworks

(1) All urban roads are to be constructed with concrete kerb and channel and asphaltic concrete surfacing, together with associated works for the full length of all property frontages.

7.3.3 Traffic Islands

(1) Traffic islands are to be indicated by raised kerb islands.

(2) Islands may include channelling (or directional) islands, roundabouts, median islands, medians, separators, pedestrian refuge islands and are to be classified in accordance with the DTMR “Manual of Uniform Traffic Control Devices (Qld)”.

(3) Raised kerbed islands less than 12.0m² or less than 2.0 metres in width between kerb faces are to be constructed with a minimum 100mm thickness N25 reinforced concrete on a compacted sand base.

(4) The surface treatment for these islands is to be brushed or stencilled concrete.

(5) Raised kerb islands greater than 12.0 m² and wider than 2.0 metres are to be grassed or landscaped in accordance with the approved landscape drawings.

(6) A water service conduit is to be installed approximately every 80 metres, with a minimum of one service per median.

(7) Where the fall across an island is greater than 1 in 4, the island is to be surfaced with brushed or stencilled concrete.

(8) Sub-soil drainage (connected to an underground drainage system) is required in all islands where the surface treatment is other than concrete.

Note:
1. An irrigation system may be required if specified by the Local Government.
2. A minimum carriageway width of 3.2m shall be maintained through traffic calming devices.

7.3.4 Verges

(1) As a minimum requirement, verges are to be covered full width with topsoil to a depth of not less than 50mm lightly compacted and seeded with grass, or 100mm lightly compacted and turfed.

7.3.5 Line Marking

(1) All transverse markings (with the exception of chevron markings) are to be treated with an anti-skid material at application.

(2) Continuity lines and transverse markings across intersections (where required) are to be completed in a long life material such as thermoplastic materials.

(3) Roads up to collector status, where there is a bend at or greater than 30 degrees must be provided with centre linemarking.

Division 4 Pavement Construction

7.4.1 General

(1) Subgrade is to be trimmed to an even surface free from loose material and graded to be free-draining.

(2) Unsuitable material such as organic matter is to be removed.

(3) Subgrade affected by rainfall after final trimming is not to be accepted until appropriate drying out treatment has been affected.

(4) Unbound pavement course material is to be placed only on underlying layers maintained at the correct moisture content.

(5) Prepared subgrades and preceding layers of base course are to be moistened immediately prior to spreading the next course.

(6) Pavement materials are to be maintained at the specified moisture content prior to and during spreading.

(7) The leading edges of the pavement material are to be kept moist.

(8) Minimum compacted layer thickness is to be 100 millimetres with the maximum compacted thickness not exceeding 150mm

Note:

1. Each pavement course is not to be commenced until the previous course (i.e. subgrade, subbases, base or existing pavement) has been inspected and approved and certified by the consultant with respect to compaction, finished levels and texture of finish.
2. Compaction tests of each layer are required and consultants are to ensure that all tests are satisfactory before proceeding to the next layer.
3. All test results are to be provided to the Local Government prior to asphalt surfacing.

7.4.2 Compaction Testing

(1) Determination of the compaction performance of the subgrade and pavement gravel materials (i.e. laboratory reference density, field density, optimum moisture content, field moisture content) is to be carried out in accordance with AS1289 Methods of Testing Soils for Engineering Purposes, in particular the E series tests.

(2) The laboratory reference density is to be as follows:
1. Natural Subgrade 100% Standard Maximum Dry Density (MDD); and
2. Pavement Materials 95% Modified Maximum Dry Density (MMDD).

(3) The minimum frequency of testing is to be as follows:
1. 1 per 200m^3;
2. 1 per layer per 1000m^2;
3. 1 per 200mm thickness per 1000m^2.

(4) A minimum of 3 tests per project are to be undertaken.

Note: A sketch plan showing the location of the tests is to be submitted to the Local Government with the test results.

(5) All tests are to be distributed reasonably evenly through the full depth and area of pavement.

(6) The testing frequencies are to be based on a "not one to fail" basis.

Note:
Failure of material quality tests will require removal of the material or further "insitu" testing.
Failure of compaction tests will require—
1. re-testing at the same depth and location if the failure is minor, e.g. localised single failure by 1% - 3%; or
2. removal of, or reworking of material, if the failure is significant or widespread.

(7) Subgrade and base courses are to be compacted to the following densities:
1. Natural Subgrade 100% MDD; and
2. Base Courses 95% MMDD.

Note:
1. Any failed test results on any layer together with the remedial treatment undertaken at the Consultant's directions are to be submitted with other test results prior to the preseal inspection.
2. Testing for material quality compliance and allowable tolerances for pavement construction are to be as set out in Part 9 "Compliance with Standards for Reconfigurations and Site Development Works, of this Planning Scheme Policy.

7.4.3 Pavement Depth Verification

(1) Pavement depths are to be verified by the provision of "as constructed" levels of the subgrade and top of asphalt surfacing at a frequency of 3 levels (RHS, centre and LHS) every 50 metres.

(2) The surveyed information is to be provided in a tabulated format and is to be certified by both the surveyor and consulting engineer.

(3) A copy of the certified results are to be submitted with the Engineer's certification of the works.

7.4.4 Construction Tolerances

(1) Pavement and compacted asphalt layers are to be constructed to the tolerances as outlined in Table 7.4.1.

Table 7.4.1 — Construction Tolerances

Pavement Layer	Construction Tolerance (mm)	Shape
Subgrade	+15mm to -15mm	Shows no sign of instability or deformation under proof rolling
Subbase	+10mm to -10mm	The surface of the subbase should not deviate from a 3m straight edge laid in any direction by more than 20mm
Basecourse	+10mm to -10mm	The surface of the base course should not deviate from a 3m straight edge laid in any direction by more than 15mm
Compacted Asphalt Pavement Surfacing/ Wearing Course	In accordance with DTMR Specification MRTS30 Table 12.3.3.2	The finished surface should not deviate from a 3m straight edge in any direction by more than 7mm. Additionally the finished surface must not be lower than the lip of kerb at all times

Division 5 Pavement Surfacing

7.5.1 Asphaltic Concrete Surfacing

(1) Asphaltic concrete surfacing of the road pavement is to be carried out to the width specified in the Standard Drawings for the appropriate road type and in accordance with the construction requirements outlined in the Department of Transport and Main Roads "Standard Specifications Roads".

Note:
1. Asphaltic concrete surfacing is not to be commenced until the Consultant and the Local Government have inspected the substrata (either as a base course or existing surface) and the Consultant certified that it is suitable for the laying of asphaltic concrete surfacing.

2. Before issuing the required certification, the Consultant is to consider the quality of the finished levels, compaction and texture finish.

(2) The surface of all asphaltic concrete is to be finished true to grade and profile with smooth joints and a neat finish around manholes and other road surface fittings.

(3) The finished compacted thickness of asphaltic concrete is to be as specified in Table 1.2.3: "Minimum Pavement Course Thickness" for the appropriate road type.

(4) Prime must be applied a minimum of 48 hours prior to asphalt being laid. Primer seals must be laid a minimum of three (3) months prior to asphalt being laid.

(5) The supplier must be on the TMR Transport Infrastructure Project Delivery System (TIPDS) Contractor Prequalification list (current at time of application) with a Minimum Prequalification Level of A3 or A4.

(6) The contractor enlisted to place the asphaltic concrete must be on the same list with A1 or higher (A2, 3 or 4) prequalification.

7.5.2 Spray Surfacing

(1) Bitumen surfacing is to be hot sprayed bitumen unless otherwise approved in writing by Council.

(2) Bitumen surfacing of the road pavement is to comprise the construction of a bitumen surface coat to the width specified in the Standard Drawings for the appropriate road type and in accordance with the construction requirements outlined in the Department of Transport and Main Roads "Standard Specifications Roads".

Note:
1. Bitumen surfacing is not to commence until the Local Government approves the proposed roadworks.
2. All necessary precautions are to be taken to prevent binder, aggregate, or other material used on the work from entering or adhering to kerb and channelling, gratings, hydrant or valve boxes, manhole covers, bridge or culvert decks or similar road fixtures.

Division 6 Traffic Control Devices and Provision for Traffic

7.6.1 General

(1) Street signs, road line-marking and road furniture shall be designed, located, constructed and erected in accordance with the Department of Transport and Main Roads "Manual of Uniform Traffic Control Devices" and the relevant Standard Drawings.

(2) All permanent signs in concrete paved areas are to be sleeved and bolted.

(3) Vandal proof bolts and fittings are to be used on all permanent signing.

(4) The Developer is to provide a list of at least three names (and name meanings) to the Local Government for each new road to be opened.

(5) The list of road names is to be submitted as early as practicable to allow the Local Government to approve the names in time for sign manufacture and erection prior to the opening of the new roads.

(6) For major subdivisions, a theme may be used for road names if this is considered appropriate.

7.6.2 Traffic Control Devices

(1) Traffic control devices (including temporary or construction signing and road marking) are to conform and be placed to the requirements of the DTMR "Manual of Uniform Traffic Control Devices".

Note:
1. All traffic control devices are to be maintained in an effective and clean condition whilst used at the roadworks.
2. Devices which are damaged or worn, or which do not conform to MUTCD are not to be used at the roadworks.

7.6.3 Detouring of Traffic

(1) If traffic is to be detoured away from the roadworks via existing roads, the Contractor is to liaise with and make all necessary arrangements with the Local Government.

The arrangements are to include making provision for the issuing of public notices in respect of the detour, any repair or upgrading work on the roads concerned which may be required prior to the detouring of traffic, maintenance of the roads concerned during the detour period, and any restoration work which may be necessary following cessation of the detour period.

The Consultant is to provide the Local Government with details of the arrangements made for detouring of traffic.

Such details are to be approved by the Local Government prior to commencement of detouring.

Should existing traffic flow be affected, all necessary arrangements to adequately control traffic affected by the works are to be provided.

7.6.4 Entrances to Private Properties

(1) Roadworks are to be carried out in a manner so that existing entrances to private properties affected by the roadworks operations are either:
a. maintained in a useable condition during the period of construction of the roadworks; or
b. alternative entrance arrangements are made with the property owners concerned.

Note: The Contractor is to make good any damage to entrances to private properties which result from the Contractor's operations during construction of the roadworks.

7.6.5 Dust Control

(1) The Contractor is to minimise any dust problems which may occur during the construction of the roadworks and which may affect the safety and general comfort of the travelling public and surrounding residences.

(2) As a minimum, the Contractor is to carry out regular applications of water or other palliative measures along the sections of the roadworks and side-tracks traversed by the travelling public.

7.6.6 Protection of Traffic and Pedestrians Adjacent to Works

(1) Works are not to be commenced without the prior approval of the Local Government and the procurement of a Road Opening Permit from the Local Government in accordance with the Local Government Act and a Permit from the Police in accordance with the Traffic Act.

(2) Prior to the commencement of construction, a traffic management plan, setting out the safety measures, signs and personnel involved in maintaining the protection of traffic and pedestrians for the duration of the works is to be supplied to the Local Government.

7.6.7 Urgent Repairs and Protective Works

(1) If by reason of any circumstances arising in connection with the work, any urgent remedial, protective, repair or other work is necessary to prevent damage to the work or to provide protection for pedestrians and traffic and the Contractor is unable or unwilling to do such work, the Local Government may do such remedial work.

(2) The Local Government is to determine the reasonable costs incurred in carrying out the works and the amount so determined is to be paid by the Contractor to the Local Government, no later than prior to acceptance of the works "on maintenance".

Division 7 Sub-Soil Drainage of Pavements

7.7.1 Location of Sub-Soil Drains

(1) Where kerb and channel has been or is to be constructed, the sub-soil drains are to be constructed immediately below the back of the kerb as outlined in Standard Drawing Nos. SR.20 and SR.21.

(2) Sub-soil drains shall be extended to interface and connect with existing sub-soil system and legal point of discharge.

(3) Where the road shoulders are unsealed, the sub-soil drains are to be placed as outlined in the approved Engineering Plans, except where kerb and channel is to be constructed in the future, in which case the sub-soil drain is to be located as outlined in sub-section (1) above.

7.7.2 Order of Construction

(1) Sub-soil drains are to be constructed after placement of the lower sub-base material (CBRI5) or after preparation of the pavement box on minimum depth pavements.

Note: The Local Government may, when conditions are suitable, approve the construction of the sub-soil drains prior to placement of subgrade replacement material or lower sub-base material subject to the bedding/filter material being brought to the underside of upper sub-base level.

7.7.3 Excavation of Drains

(1) Trenches for pipe drains are to be excavated to the required line to a depth of at least 900mm below the finished pavement surface level and to the gradients as outlined on the approved Engineering Plans (minimum 1%).

(2) Trenches are to be a minimum 100mm wider than the nominated pipe outside diameter.

7.7.4 Type of Pipe

(1) All sub-soil drainage pipes are to be Humes "Draincoil" or similar perforated plastic drainage pipe complying with AS 2439 - Part 1 1981 - Perforated Plastics Drainage Pipe and Fittings and -

a. perforations shall not exceed 0.7mm diameter or width;
b. joints are to be constructed in accordance with the manufacturer's recommendations;
c. where approved by the Local Government, strip drains may be used;
d. strip drains are to be a proprietary product comprising a regular patterned cusp-shaped plastic core of nominal thickness not less than 40mm encased by a non-woven geotextile; and
e. the plastic core is to permit the passage of high volume water flows and have a crush strength not less than 100 kPa.

7.7.5 Pipe Size

(1) The minimum pipe size is 100mm outside diameter.

7.7.6 Bedding and Filter Materials

(1) The pipe is to be bedded on a minimum of 50mm of graded filter material in accordance with Standard Drawing No. SR.20.

7.7.7 Pipe Laying

(1) All sub-soil drainage pipes are to be laid on a prepared filter or sand bed to ensure a uniform grade.

7.7.8 Outlets

(1) All sub-soil drainage pipes are to be connected to gully pits, as outlined in Standard Drawing No. SR.21 or open channels below the edge of the road shoulder or at the edge of an embankment.

(2) For outlets not connected into gully pits, a concrete headwall is to be provided to the outlet.

(3) The headwall is to be at least 100mm thick and is to extend for a minimum of 150mm on all sides of the pipe.

(4) The outlets to the pipes are to be fully enclosed by vermin proof flaps.

7.7.9 Clean Outs

(1) Clean-outs as outlined in Standard Drawing No. SR.21 are to be located at the head of the sub-soil drain and at subsequent spacings not exceeding 90 metres.

(2) Clean outs located at gully pits are to be constructed with caps or plugs as outlined in Standard Drawing No. SR.21.

(3) A marker is to be installed in the kerb adjacent to clean out points (refer Standard Drawings Nos. SR.21 and SR.24.

7.7.10 Joining

(1) Sub-soil drains are to be joined in accordance with the manufacturer's recommendations.

(2) Clean out pipes are to be joined to the sub-soil drains using oblique tee connections.

7.7.11 Flushing

(1) After the drains are constructed they are to be flushed out.

(2) Flushing is to continue until the outlet water is clean and flows consistently.

7.7.12 Treatment of Islands and Speed Control Devices

(1) For islands and speed control devices a mitre drain is to be constructed to drain sub-surface water from these structures into the nearest gully box or access chamber.

(2) Landscaped islands are to have perimeter sub-soil drainage discharging into the nearest gully box or access chamber.

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