DEPARTMENT *of* INFRASTRUCTURE, ENERGY *and* RESOURCES, TASMANIA

ROADWORKS SPECIFICATION

R92 - UNDERGROUND SERVICE FACILITIES **June 2004**

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R92.1 SCOPE

This Specification sets out the requirements for the installation of the following service facilities:

- Electrical and Telecommunication conduits and cables.
- Water Supply Pipelines.
- Stormwater and Sewer Mains.
- Gas Pipelines

R92.2 GENERAL

All road crossings by any cable or water supply pipeline less than 225mm nominal diameter shall be installed in a conduit.

Drainage culverts shall not be used to accommodate a service crossing.

For minimum surround clearances between the service and conduits see table below.

TABLE R92.1 SURROUND CLEARANCES

PIPE AND CABLE DIAMETER	SURROUND CLEARANCE INSIDE CONDUIT
≤ 100mm	20mm
> 100mm	50mm

R92.3 ELECTRICAL AND TELECOMMUNICATION CONDUITS AND CABLES

R92.3.1 Materials

Conduits for underground cables shall be orange heavy duty UPVC electrical conduit with a minimum nominal diameter of 50 mm.

Joints in conduits shall be made and sealed in accordance with the manufacturer's instructions.

Each conduit shall have with a 2 mm galvanised steel draw wire and have both ends plugged to prevent entry of backfill material.

The conduit shall extend from a pit beyond the invert of the table drain or to the toe of the embankment whichever is appropriate.

All cables including conduits shall have protection covers and marker tape. The type and placement of covers and marker tape shall be in accordance with the owner's specifications.

R92.3.2 Conformance Requirements

TABLE 92.2

ITEM	STANDARD
Orange heavy duty UPVC electrical conduit	AS2053
Precast concrete slab (minimum class 15)	AS3600
Orange marker tape	AS2648

R92.4 WATER SUPPLY PIPELINES

R92.4.1 General

All materials shall be as specified by the pipeline owner.

R92.4.2 Materials

Pipes shall be of the material and classes shown on the drawing or in the project specification.

Fittings for pipework shall be rated to the class of pipe specified.

Conduits shall be UPVC pipe of at least class 9 with a minimum diameter of 100 mm or a reinforced concrete pipe class 3 with a nominal diameter of 300 mm.

R92.4.3 Conformance Requirements

TABLE 92.3

ITEM	STANDARD
Arc Welded Steel Pipes	AS 1579
Cement Mortar Lining of Steel Pipes and Fittings.	AS 1281
Ductile Iron Pressure Pipes & Fittings.	AS 2280
Grey Iron Pressure Fittings.	AS 2544
Precast Concrete Pressure Pipes	AS 4058
PVC Pipes and fittings for Pressure Applications.	AS 1477
Polyethylene Pipe for Pressure Applications.	AS 4130
Water Supply Copper Alloy Fittings	AS 3688
Elastomeric Seals for Waterworks Purposes	AS 1646
Gate Valves for Waterworks Purposes	AS 2638
Water Supply - Metallic Gate, Globe & Non-Return Valves	AS 1628
Water Supply - Spring Hydrant Valves for Waterworks Purposes	AS 3952
Fire Hydrant Installations	AS 2419
Water Supply -Copper Alloy Screw down pattern Taps	AS 1718
Copper tube for Plumbing	AS 1432
Concrete and Concrete Materials	AS 3600
National Plumbing & Drainage Code	AS 3500
Code of Practice for Installation of UPVC pipe Systems	AS 2032

Water mains shall be pressure tested. Successful testing shall constitute a holdpoint prior to placing in service.

R92.5 STORMWATER AND SEWER MAINS

R92.5.1 Materials

TABLE 92.4

PIPES	CLASS
RCP - Stormwater	2
RCP - Sewerage	2
UPVC	SH
Poly Ethylene	SN8
Ductile Iron	K9

R92.5.2 Conformance Requirements

TABLE 92.5

ITEM	STANDARD
Precast Concrete Pressure Pipes	AS 4058
PVC Pipe and Fittings for Drainage Applications	AS 1260
PVC Pipe and Fittings for Storm Applications	AS 1254
Buried flexible pipelines	AS 2566
Ductile Iron Pressure Pipes and Fittings	AS 2280
Elastomeric Seals for Waterworks Purposes	AS 1646
National Plumbing & Drainage Code	AS 3500
Specification & Supply of Concrete	AS 1379
Anchor Blocks	DIER Std.Drg. 3402-2/P34
Access Pits	DIER Std.Drg. 3402-9/P23

R92.5.3 Connections to Existing Access Pits

Connections to sewer access pits shall be made so that the soffit level of the inlet pipe is not below the soffit of the outgoing sewer and the fall in level is taken up by a ramp in the benching. Desirably the grade of the incoming sewer should extend to the centre of the access pit and any change of grade smoothed with the benching.

Where the invert of the connection is more than 600 mm above the invert of the outgoing sewer, a drop connection shall be provided.

R92.6 GAS PIPELINES

R92.6.1 Materials

Gas pipelines shall be constructed using materials and workmanship as specified by the pipeline owner. Trench backfill under pavement is specified in R92.7.5.

R92.6.2 Laying ♦

Gas pipelines shall generally be installed under roads by boring. Cover under all parts of the road reserve shall be at least 1.2m. Gas pipeline warning markers shall be installed at each fenceline over the installed pipeline or at 100m intervals if the pipeline is laid in the road reserve.

Gas mains shall be pressure tested. Successful testing shall constitute a holdpoint prior to placing in service.

R92.7 TRENCHES

R92.7.1 Excavation of Trenches

The Contractor shall excavate and backfill the trenches at locations shown on the Drawings.

For conduits the width of the trench shall be sufficient to allow a minimum of 50 mm around and between conduits and to allow mechanical compaction.

The depth shall be sufficient to provide:

(i) 600-mm cover under footpaths and nature strips

(ii) 450-mm cover below the invert of side drains

(iii) 900-mm minimum cover under roadways.

Any excavation taken to a greater depth than necessary shall be refilled to the correct level with bedding material.

The contractor shall not open the trench more than 120 metres ahead of the pipe layers, and in unsound ground it shall not be opened further than approved by the Superintendent.

All other trenching details shall be in accordance with Specification R32.

R92.7.2 Bedding Placement

Bedding material shall be a clean, free draining, free from clay, stone, organic matter or other deleterious material and conforming with the table below.

TABLE 92.6

FLEXIBLE PIPES	RCPs	DUCTILE IRON PIPES
100% passing a 4.75mm sieve	As per Specification R32.	As per Specification R32.

R92.7.3 Pipe Jointing ♦

All joints (except solvent cement) shall be made in accordance with Specification R32.

Solvent Cement joints shall be made in accordance with manufacturer's instructions.

TABLE 92.7

PIPES	JOINTING
RCP - Stormwater ≤ 450mm > 450mm	Rubber Rings (Spigot & socket) Flush Jointed with external bands
RCP - Sewerage	Rubber Rings (Spigot & socket)
UPVC	Solvent Cement
Poly Ethylene	Rubber Rings
Ductile Iron	Rubber Rings

R92.7.4 Anchor Blocks

Anchor blocks shall be constructed where the grade of the pipe exceeds 12.5% (1 in 8) or as directed by the Superintendent.

R92.7.5 Trench Backfilling

R92.7.5.1 General ♦

Trenching and installation of underground services under new pavements shall be completed prior to pavement construction.

R92.7.5.2 Materials

TABLE 92.8

PIPE	OUTSIDE OF PAVEMENT	UNDER NEW PAVEMENTS	UNDER EXISTING PAVEMENTS
UPVC and PE	Earth material*	Subgrade material to formation level Pavement material to finished surface	Subgrade material to bottom of pavement or 500mm below existing road surface whichever is deeper.
RCP	As per Specification R32.	FCR (max. 19mm) to formation level	FCR to bottom of pavement or 500mm below existing road surface whichever is deeper.
DI	As per Specification R32.	FCR (max. 19mm) to formation level	FCR to bottom of pavement or 500mm below existing road surface whichever is deeper.

- Earth material shall be free of rocks or stones larger than 50mm, clay lumps and vegetable or other deleterious matter.

R92.7.5.3 Placement ♦

TABLE 92.9

PIPE	OUTSIDE OF PAVEMENT	UNDER NEW PAVEMENTS	UNDER EXISTING PAVEMENTS
UPVC and PE	Uniform layers ≤ 450mm. Minimum dry density ratio = 95%	Uniform layers ≤ 150mm. Minimum dry density ratio = 100%	Uniform layers ≤ 150mm. Minimum dry density ratio = 100%.
RCP	As per Specification R32.	As per Specification R32.	As per Specification R32.
DI	As per Specification R32.	As per Specification R32.	As per Specification R32.

Where pavement replacement is involved the new pavement shall consist of at least 450mm of Base Class A material compacted in layers no greater than 150 mm thick to a minimum of 98% modified density with a 50mm asphalt running surface.

R92.8 BORED INSTALLATION

Services may be installed under the road by bored installation that extends at least from side drain to side drain. Road bores shall have a minimum cover under the road of 1.2m. The bore shall not exceed the service pipe plus 100mm in diameter. Bores for services greater than 100mm diameter shall have a pumped backfill to complete installation.

R92.9 PAYMENT

Payment for the installation of services shall be per linear metre.

The rate shall include all works required including trenching and backfilling and the supply of all materials. The rate shall also include the installation of services and conduits where required.

Where services are in a common trench payment shall not be made per metre for each individual Service but shall be made per metre of trench irrespective of the number of services contained within the trench.

Payment for service relocation shall include the cost of removal of the existing service and reconnection.

R92.10 HOLD POINTS ♦

The following holdpoint has been identified in this specification.

- Pressure testing of pressure mains . (R92.4.3, 6.2)