

MUNICIPAL STANDARDS

SPECIFICATIONS

PART 4 - STORMWATER AND SEWER RETICULATION

| | | |
|--------|--|---|
| 4.1 | SCOPE OF WORK..... | 1 |
| 4.2 | STANDARDS..... | 1 |
| 4.3 | MATERIALS..... | 2 |
| 4.3.1 | Pipes and Fittings..... | 2 |
| 4.3.2 | Storage and Handling. | 2 |
| 4.3.3 | Bedding and Haunching. | 2 |
| 4.3.4 | Backfill..... | 3 |
| 4.3.5 | Concrete..... | 3 |
| 4.3.6 | Access Chamber Sections. | 3 |
| 4.4 | EXCAVATION..... | 3 |
| 4.4.1 | General..... | 3 |
| 4.4.2 | Surface excavation..... | 3 |
| 4.4.3 | Trenching..... | 3 |
| 4.4.4 | Storage and disposal of material..... | 4 |
| 4.5 | LOCATION OF PIPES, PITS, ACCESS CHAMBERS AND ENDWALLS..... | 4 |
| 4.6 | CONNECTION TO EXISTING FACILITIES..... | 4 |
| 4.7 | DEWATERING..... | 4 |
| 4.8 | PIPE LAYING, JOINTING AND BACKFILLING..... | 4 |
| 4.8.1 | Trench foundation..... | 4 |
| 4.8.2 | Bedding..... | 4 |
| 4.8.3 | Laying..... | 4 |
| 4.8.4 | Jointing..... | 4 |
| 4.8.5 | Haunching..... | 5 |
| 4.8.6 | Backfilling..... | 5 |
| 4.8.7 | Cutting of pipes..... | 5 |
| 4.8.8 | Property connections..... | 5 |
| 4.9 | STRUCTURES..... | 5 |
| 4.9.1 | Access Chambers..... | 5 |
| 4.9.2 | Stormwater and side entry pits..... | 6 |
| 4.9.3 | Endwalls..... | 6 |
| 4.9.4 | Anchor Blocks..... | 6 |
| 4.10 | INSPECTIONS..... | 6 |
| 4.11 | TESTING..... | 7 |
| 4.11.1 | Cost of testing..... | 7 |
| 4.11.2 | Testing of Bedding, Haunching and Backfill Material..... | 7 |
| 4.11.3 | Pipeline Inspection and Testing..... | 7 |
| 4.11.4 | Access Chamber Testing..... | 7 |
| 4.11.5 | Concrete Testing..... | 8 |

MUNICIPAL STANDARDS

SPECIFICATIONS

PART 4 - STORMWATER AND SEWER RETICULATION

4.1 SCOPE OF WORK

This section includes the supply of materials, equipment, labour and services necessary for the construction of stormwater and sewer reticulation.

4.2 STANDARDS

The following Australian Standards and Standard Drawings are referred to:

Australian Standards

- AS 3725 Loads on Buried Concrete Pipes
- AS 3600 Concrete Structures
- AS 1726 Geotechnical Site Investigations
- AS 2280 D.I.C.L. Pressure Pipes and Fittings
- AS 1477 PVC Pipes and Fittings for Pressure Applications
- AS 1379 Specification and Supply of Concrete
- AS 4058 Precast Concrete Pipes (pressure and non-pressure)
- AS 1289 Methods of Testing Soils for Engineering Purposes
- AS 1260 PVCU Pipes and Fittings for drain, waste and vent applications
- AS 1254 PVC Pipes and Fittings for Storm and Surface Water Applications
- AS 1012 Methods of Testing Concrete

Standard Drawings

- SD-2001 - Precast Manhole (With Taper Top)
- SD-2002 - Precast Manhole (With Offset Cover)
- SD-2003 - Cast Insitu Manhole (With Taper Top)
- SD-2004 - Cast Insitu Manhole (With Offset Cover)
- SD-2010 - Single Side Entry Pit
- SD-2011 - Double Side Entry Pit
- SD-2020 - Single Grated Pit
- SD-2021 - Grated Deflector Pit
- SD-2022 - Double Grated Pit
- SD-2023 - Type 'T' Grate and Seat Details
- SD-2024 - Type '2' Grate and Seat Details
- SD-2030 - Grated Sump
- SD-2031 - Grated Vee Pit
- SD-2040 - Junction Pit (Type A & B)
- SD-2050 - Subsoil Drain Details
- SD-2060 - Precast Concrete Endwall (300 to 750 Dia)
- SD-2061 - Plain Concrete Endwall (300 to 750 Dia)
- SD-2062 - Mass Concrete Endwall (300 to 525 Dia)
- SD-2063 - Plain Concrete Endwall (300 to 525 Dia)
- SD-2064 - Grouted Stone Endwall (300 to 450 Dia)
- SD-2070 - Lot Connections
- SD-2071 - Lot Connections
- SD-2080 - Grated Pit (Unit and Residential Developments)
- SD-2081 - Grated Sump (Unit and Residential Developments)
- SD-3001 - Precast Manhole (With Taper Top)
- SD-3002 - Precast Manhole (With Offset Cover)
- SD-3003 - Cast Insitu Manhole (With Taper Top)
- SD-3004 - Cast Insitu Manhole (With Offset Cover)

MUNICIPAL STANDARDS

SPECIFICATIONS

PART 4 - STORMWATER AND SEWER RETICULATION

SD-3010 - Lot Connections
SD-3011 - Lot Connections and Dead Ends
SD-5001 - Typical Pipe Trench Details

4.3 MATERIALS

4.3.1 Pipes and Fittings

Pipes and fittings shall comply with the relevant Australian Standards. Type of pipes used in the Contract shall be as shown on the Drawings unless otherwise approved by the Superintendent.

4.3.2 Storage and Handling

Materials shall be stored and handled in such a manner necessary to prevent their damage and deterioration. The Contractor shall employ adequate means to safely handle pipes, access chambers and other materials.

4.3.3 Bedding and Haunching

Pipe bedding and haunching material will depend on the type of pipe installed as shown in the Standard Drawings SD-5001. It shall be clean sand, gravel or crushed rock, free from organic matter and clay lumps and conform with the grading given in Table 4.3.1.

Pipe bedding material shall also have a sand equivalent of at least 60.

Table 4.3.1

| AS Sieve (mm) | Percentage Passing By Mass |
|------------------|-------------------------------|
| 9.5 | 100 |
| 2.36 | 25 - 100 |
| 0.425 | 0 - 60 |
| 0.075 | 0 - 10 |

Where referred to on the Standard Drawings alternative bedding material may be fine crushed rock in accordance with Clause 4.3.4 c).

MUNICIPAL STANDARDS

SPECIFICATIONS

PART 4 - STORMWATER AND SEWER RETICULATION

4.3.4 Backfill

a) Select Fill.

Shall comply with the requirements of AS 3725, Section 4, generally being sands or gravels or sand and gravel mixtures with fines of low plasticity obtained from excavation of the pipe trench or elsewhere with a particle size not greater than 75 mm.

b) Ordinary Fill.

Shall comply with the requirements of AS 3725, Section 4, being material obtained from excavation of the pipe trench or elsewhere and containing

c) not more than 20 per cent by mass of stones with a size between 75 mm and 150 mm and none larger than 150 mm.

d) Fine Crushed Rock

Shall be material complying with the requirements of aggregate used for basecourse construction and in accordance with the Municipal Standards Specifications Part 6, Material and Pavement Construction.

4.3.5 Concrete

Concrete for pits, access chambers, headwalls and culverts shall be of grade N20 unless otherwise shown on the Drawings.

4.3.6 Access chamber Sections

Precast access chamber risers, tapers and other precast units shall be of a type approved by the Superintendent.

4.4 EXCAVATION

4.4.1 General

Prior to excavation the Contractor shall note all existing surface features and locate all underground services.

4.4.2 Surface excavation

Surface material shall be carefully stripped and set aside. Where the material is to be re-used it is to be stacked separately.

4.4.3 Trenching

Trenches shall be excavated to the lines and levels shown on the Drawings with allowance being made for bedding. The dimensions of the trench shall comply with the relevant Standard Drawing. The base of the excavated trench shall be trimmed neat and uniform for its full length. Boulders, roots and any other hard objects in the bottom of the trench shall be removed; soft areas in the bottom of the trench shall be taken out and filled to grade level with approved bedding material and compacted.

The Contractor will maintain all trenches in a safe condition for protection of people and property and will notify the Department of Infrastructure, Energy and Resources – Workplace Standards Tasmania of any excavation over 1.5m deep and be responsible for carrying out the instructions of its officers.

MUNICIPAL STANDARDS

SPECIFICATIONS

PART 4 - STORMWATER AND SEWER RETICULATION

4.4.4 Storage and disposal of material

Excavated material is to be stored in a safe manner and in a location approved by the Superintendent. No excavated material will be placed against any fence or wall without the written consent of the owner and the approval of the Superintendent. Material will be placed a minimum of 1.0 m clear of the edge of the trench. Surplus material will be disposed of in locations approved by the Superintendent.

4.5 LOCATION OF PIPES, PITS, ACCESS CHAMBERS AND ENDWALLS

All pipes, pits, access chambers, and endwalls shall be located as shown on the Drawings unless otherwise approved by the Superintendent.

4.6 CONNECTION TO EXISTING FACILITIES

Connections to existing pipes and access chambers will be undertaken by the Local Authority at the Contractors cost unless otherwise noted on the Drawings. The Contractor shall be responsible for notifying the Superintendent of the requirements for the connection to the existing service fourteen (14) days prior to the need for that connection.

4.7 DEWATERING

During the progress of drainage works, the Contractor shall provide for effective diversion and disposal of surface water and shall be responsible for all damage to any portion of the works or surrounding properties due to inadequate drainage diversion or de-watering equipment.

4.8 PIPE LAYING, JOINTING AND BACKFILLING

4.8.1 Trench foundation

The trench foundation will be finished to the approval of the Superintendent prior to placing of the bedding material.

4.8.2 Bedding

Bedding shall be compacted bedding material complying with Clause 4.3.3 and placed in accordance with the relevant Standard Drawing. Compaction shall be to 95% of Standard Compaction in accordance with AS 1289.

4.8.3 Laying

All pipes shall be layed straight and shall be free from dirt and foreign matter and in good condition and layed with manufacturing marks visible. All pipes shall be bedded

for the full length of their barrel. Laying shall commence at the downstream end and proceed upstream with the socket ends of pipes placed upstream.

4.8.4 Jointing

Jointing of pipes shall be in accordance with the manufacturers specifications.

MUNICIPAL STANDARDS

SPECIFICATIONS

PART 4 - STORMWATER AND SEWER RETICULATION

4.8.5 Haunching

Haunching shall be material complying with Clause 4.3.3. placed in accordance with the relevant Standard Drawing. Material shall be well tamped to the satisfaction of the Superintendent.

4.8.6 Backfilling

Backfilling material shall be as shown on the relevant Standard Drawing and shall be placed in layers not exceeding 150 mm thick when compacted. The degree of compaction shall depend on the location of the trench.

For trenches clear of trafficked areas the layers shall be compacted to a minimum density of 95 per cent standard compaction in accordance with AS 1289. For trenches under trafficked areas the layers shall be compacted to comply with the pavement requirements as shown in Table 4.8.1.

Table 4.8.1

| Pavement Layer | Characteristic Density in accordance with AS1289 |
|----------------|--|
| Sub-grade | 95% standard compaction |
| Sub-base | 95% modified compaction |
| Base | 98% modified compaction |

The ground surface shall be reinstated to its original condition or as shown on the Drawings and to the satisfaction of the Superintendent.

4.8.7 Cutting of pipes

Where pipes are cut the ends shall be left neat and regular.

4.8.8 Property connections

Property connections shall be laid and located as shown on the Drawings.

4.9 STRUCTURES

4.9.1 Access Chambers

Access chambers shall be constructed of approved precast sections or grade N20 concrete.

Invert channels and benches shall be constructed as shown on the Standard Drawing and may be formed of grade N20 Concrete finished with a 20 mm thick layer of 2:1 sand/cement mortar smoothed down with a steel tool or alternatively channels may be formed by using half pipe sections embedded in concrete. The access chamber base shall be constructed before access chamber wall construction proceeds.

The entrance and outlet are to be fully smoothed and shaped to allow free passage for flow and be clear of any obstructions or irregularities.

Sewer access chambers shall be free of infiltration. Flexible joints for all PVC lines entering the access chamber are required.

For cast in-situ access chambers, inside and outside shutters shall be used. The walls shall be 150 mm thick and have a smooth internal finish.

MUNICIPAL STANDARDS

SPECIFICATIONS

PART 4 - STORMWATER AND SEWER RETICULATION

Where precast sections are used in access chambers, joints shall be made with mortar or an approved glue.

Drop connections shall be constructed as shown on the Standard Drawing and shall be constructed as close as possible to the inside of the access chamber.

Approved step rungs shall be installed into the access chamber walls as shown on the Standard Detail Drawing.

Unless otherwise directed by the Superintendent access chamber covers shall be set flush with and have the same crossfall as the existing surfaces of the road, footway or finished ground levels.

Capped branch drain connection pipe or starter pipes shall be built into access chambers as shown on the Drawings. Sewer connections shall not protrude inside the access chamber.

4.9.2 Stormwater and side entry pits

Stormwater pits and Side Entry pits shall be approved precast sections or constructed of grade N20 concrete and in accordance with the Standard Drawings and of the type shown on the Drawings.

The pit base shall be constructed before pit wall construction proceeds. Inside and outside shutters shall be used at all times unless otherwise authorised by the Superintendent.

Invert channels and benches shall be constructed as shown on the Standard Drawing and shall be formed of grade N20 concrete finished with a 20 mm thick layer of 2:1 sand/cement mortar smoothed with a steel tool. The entrance and outlets shall be smoothed and well shaped to allow free passage for flow and be clear of any obstructions and irregularities.

Allowance shall be made for connection of subsoil drains as shown on the Standard Drawings.

4.9.3 Endwalls

Approved precast sections shall be in accordance with the Standard Drawing and bedded on compacted bedding material complying with Clause 4.3.3 as required for concrete pipe.

In-situ endwalls shall be constructed as shown on the Drawings. All concrete work shall comply with Part 9 of this specification.

Where shown on the Drawings stone pitching of inlet and outlet channels shall consist of approved quarry stone that shall be dense, resistant to weathering, and of reasonably uniform size and appearance. Nominal stone size shall be 200 mm. The stone shall be bedded on grade N20 concrete, to a minimum depth of 150 mm.

4.9.4 Anchor Blocks

Anchor blocks and cut off walls shall be constructed as shown on the Contract Drawings.

4.10 INSPECTIONS

The Contractor shall ensure that inspections, by the Superintendent, of the various stages of work are requested. The Superintendent may require the following inspections:

MUNICIPAL STANDARDS

SPECIFICATIONS

PART 4 - STORMWATER AND SEWER RETICULATION

- a) Inspection of the site prior to commencing work.
- b) Completion of trench excavation prior to placement of bedding material.
- c) Completion of pipe laying prior to any backfilling.
- d) Stages of backfilling.
- e) Completion of excavation for access chamber bases.
- f) Completion of access chamber bases prior to rendering.
- g) Completion of access chambers.

Twenty-four (24) hours notice is required for any of the above inspections. Work shall not proceed unless each stage of work has been inspected and passed by the Superintendent.

4.11 TESTING

4.11.1 Cost of testing

All tests required by the Superintendent shall be at the Contractors cost.

4.11.2 Testing of Bedding, Haunching and Backfill Material

The Superintendent may request a sample of bedding or backfill material to be taken and tested by a registered N.A.T.A. testing laboratory in order to determine whether the material complies with this specification. Any material, which is found not to comply with the requirements, shall not be used for bedding or backfill.

4.11.3 Pipeline Inspection and Testing

- a) Pipeline Inspection.
The pipelines shall be visually inspected to ensure there are no obstructions in the barrel and to ensure that pipes are laid straight.
- b) Sewer pipeline testing.
Completed sewer pipelines shall be tested by the Contractor with an approved method
(i.e. hydraulic or air).
For water testing, all openings in the length of sewer shall be sealed with watertight plugs and the sewer then filled with water to give a hydrostatic head of two (2) metres on the highest point of the section under test. If any undue sweating at joints occurs or the pressure head drops, the sewer line is defective.
For air testing, all openings in the length of pipeline shall be sealed with airtight plugs with provision to alter the atmospheric pressure within the sewer via a clear tube connected to a plug. The meniscus shall be held at a constant level 100 mm below water surface level.

4.11.4 Access Chamber Testing

Access chamber leakage tests may be required by the Superintendent at the Contractors cost. The access chamber entries and outlets shall be temporarily sealed and the access chamber filled with water. Any visible leakage or leakage which exceeds five litres in 24 hours will not be accepted.

MUNICIPAL STANDARDS

SPECIFICATIONS

PART 4 - STORMWATER AND SEWER RETICULATION

4.11.5 Concrete Testing

Compressive strength and slump tests may be required at the Contractors cost. Tests shall be carried out in accordance with AS 1012.