MIDCOAST
council

AUS-SPEC

Infrastructure Specifications

1352 Pipe Drainage

1352 PIPE DRAINAGE

IMPORTANT: This document has been adapted from the NATSPEC suite of specification templates for use in the MidCoast Council area by both Council and industry. NATSPEC regularly updates the base templates (currently in April and October each year), and Council may incorporate changes into its version of AUS-SPEC from time to time. To assist in highlighting any changes made by Council to the NATSPEC templates, the following conventions are used.

- See ANNEXURE M at the end of this document which contains (where practical) MidCoast Council customisations (also known as 'office master' text). References to the Annexure are to also be inserted at relevant clauses in the main body of the document.
- Where content is added to the main body of the document, it is to be shown in brown text like this.
- Where content is deleted or excluded from the main body of the document, it is to be shown ~~struck through like this~~. Such clauses are to have no effect.

Where there is a conflict between main body text and MidCoast Council specific clauses, Council's specific clauses shall prevail.

1 GENERAL

1.1 RESPONSIBILITIES

General

Requirement: Provide the pipework for the drainage system, as documented.

1.2 CROSS REFERENCES

General

Requirement: This worksection is not a self-contained specification. In addition to the requirements of this worksection, conform to the following:

- *0136 General requirements (Construction)*.
- *0152 Schedule of rates (Construction)*.
- *0161 Quality management (Construction)*.
- *0319 Auxiliary concrete works*
- *1101 Traffic management*.
- *1171 Subsurface drainage.*
- *1351 Stormwater drainage (Construction)*.
- *1354 Drainage structures*.
- *1392 Trenchless conduit installation*.

1.3 INTERPRETATIONS

Definitions

General: For the purposes of this worksection the following definitions apply:

- Effective pipe length: The centre-line length dimension specified by the manufacturer and subject to permissible tolerances.

1.4 SUBMISSIONS

Execution

Invert protection to steel pipes: If treatment is documented, submit cement slurry application procedure.

Products and materials

Minimum design life for manufacture and installation of pipe drainage system: 100 years unless otherwise required by DA consent conditions or REF recommendations.

Product conformity: Submit manufacturer's certificate of conformance to the relevant standard for each batch of pipes before dispatch to site. Identify the item, source and record the inspection and test records that verify conformity.

Manufacturer's data and installation recommendations: Submit in conformance with AS/NZS 2041.4 Appendix A and AS/NZS 2041.6 Appendix A, AS/NZS 4058 Appendix B and AS 4139 Appendix A, as appropriate.

Samples

Components: Submit pipes and fittings.

Pre-treatment: If necessary to represent the condition and grading when compacted and in service, pre-treat samples.

Tests

Other tests: Submit results, as follows:

- Concrete pipes joint tests.

1.5 INSPECTIONS

Notice

General: Give notice so that inspection may be made of the following:

- Additional protective coatings: Field cut and repairs to steel pipes.
- Damage: Repairs to damaged pipeline components.
- Joints for concrete pipes: Joint testing.
- Pipework installation: Each section of the installed and jointed pipework before commencement of trench backfilling.

2 MATERIALS

2.1 CONCRETE PIPES

Precast reinforced concrete pipes

Requirement: Provide precast reinforced non-pressure concrete pipes to AS/NZS 4058 and the following:

- Pipe class and size, as documented.
- Pipe jacking: As documented.
- Load classes: As documented.
- Jointing type: Provide as follows:
  - Spigot and socket joints: Flexible elastomeric seals to AS 1646.
  - Flush or butt joints: Use only for the first pipe if extending existing pipes.
- Clear cover to reinforcement: For normal environments to AS/NZS 4058 Table 3.1.

Marking: To AS/NZS 4058 clause 1.5.

Supply of precast reinforced concrete pipes: To Austroads ATS 2210.

Durability: Maximum concentration limit for chlorides, sulfates, aggressive CO2, and pH levels to AS/NZS 4058 Appendix E.

Protective treatment: As required by any DA consent conditions or REF recommendations, and as documented.

Fibre reinforced concrete pipes

Restriction: Fibre reinforced concrete pipes are not to be used in public roads in the MidCoast Council area, or for the conveyance of public stormwater.

~~Requirement: Provide fibre reinforced concrete pipes to AS 4139 and in conformance with the following:~~

- ~~Strength requirement: As documented.~~
- ~~Pipe class and sizes: As documented.~~
- ~~Load classes and installation conditions: As documented.~~
- ~~Jointing type: Provide as follows:~~
  - ~~Double V-ring joints: Flexible elastomeric seals to AS 1646.~~

- Other joints: Jointing compound comprising plasticised butyl rubber and inert fillers, conforming to the manufacturer's recommendations.
- Flush or butt joints: Use only for the first pipe if extending existing pipes.

Marking: To AS 4139 clause 12.

Durability: Maximum concentration limit for chlorides, sulfates, aggressive CO2, and pH levels to AS 4139 Appendix B.

Protective treatment: As required by any DA consent conditions or REF recommendations, and as documented.

2.2 CORRUGATED METAL PIPES AND STRUCTURES

Restriction: Corrugated metal pipes and structures are not to be used in public roads within the MidCoast Council area, or for the conveyance of public stormwater.

Helical formed sinusoidal pipes

Requirement: Provide helical formed sinusoidal pipe to AS/NZS 2041.4 with pipe corrugation designation, size and base material, as documented.

Bolted plate structures

Requirement: Provide bolted plate structures to AS/NZS 2041.6 with pipe corrugation designation, size and base material, as documented.

Durability

Dissimilar metals: Prevent direct contact of dissimilar metals.

Additional protective coatings

Coatings for pipes and bolted plate structures: Bituminous coating to AASHTO M190-04 or to manufacturer's recommendations

Field cuts and repairs: Wire brush cut ends to remove any scale and apply two coats of zinc-rich organic primer to AS/NZS 3750.9.

2.3 PLASTIC FLEXIBLE PIPES

Restriction: Plastic flexible pipes are not to be used in public roads in the MidCoast Council area, or for the conveyance of public stormwater.

General

Requirement: Provide flexible pipes including fitting to AS/NZS 2566.1 with pipe class and size as documented.

Pressure polyethylene (PE): To AS/NZS 4130.

Polyethylene (PE) and Polypropylene (PP): To AS/NZS 5065.

PVC-U pipes: To AS/NZS 1260.

Pressure PVC-U: To AS/NZS 1477.

Plastic flexible pipes: As documented.

Joint sealant and type: To AS/NZS 2566.2 Appendix F.

Rubber rings for pipe joints: To AS 1646.

Electrofusion jointing for PE pressure pipe: To PIPA POP001.

Butt fusion jointing for PE pipe: To PIPA POP003.

Solvent cement jointing for PVC-U pipe: To PIPA POP102 .

3 EXECUTION

3.1 ESTABLISHMENT

General

Excavation: To the *1351 Stormwater drainage (Construction)* worksection.

Excavation drainage: Dewater the excavation to permit the compaction of the foundation, the bedding and backfilling, as documented.

Tolerances dimensions: Provide culverts within 10 mm of the grade line and within 10 mm of the horizontal alignment, as documented.

Subsurface drain location: At the discharge end of culverts terminating at pits and headwalls, provide a 3 m length of 100 mm diameter subsurface drain, as follows:

- Position in the trench 100 mm above the invert level of the pipe.
- Discharge through the wall of the pit or headwall.
- Seal the subsurface drainage pipe at the upstream end and enclose in a seamless tubular filter fabric to the *1171 Subsurface drainage* worksection.

Damage

Pipeline components: Inspect all pipe line components for damage and flaws immediately before installation.

Damaged components: Repair damaged components in conformance with manufacturer's requirements. Replace units components, if unable to repair satisfactorily.

3.2 INSTALLATION

Concrete pipes

Standard: To AS/NZS 3725.

Positioning of pipes: Lay pipes as follows:

- Install with the socket end upstream.
- Install pipes with markings indicating the crown or invert in conformance with the markings.

Minimum pipe length: 1.2 m.

Stiffening of pipes: If required by the manufacturer, provide temporary stiffening struts to the interior before back filling.

Lifting holes: Before backfilling, seal lifting holes in all pipes with approved plastic preformed plugs or a 3:1 sand cement mortar.

Bulkhead locations: Construct bulkheads to the *1354 Drainage structures* worksection on all lines where the pipe gradient exceeds 5%.

Anchor blocks: Provide anchor blocks at a maximum spacing of 3 m and at bends or junctions for all stormwater pipes laid on a grade more than 20% and as documented.

Joints for concrete pipes

Joint testing: Test joints, as follows:

- Precast concrete pipes: To AS/NZS 4058 Appendix H.

~~- Fibre reinforced concrete pipes: To AS 4139 Appendix L.~~

Skid rings: To the manufacturer's recommendations, including the use of lubricants, if wedge shaped 'skid' rubber rings are required.

Flush or butt joints: Use only for the first pipe if required to extend existing pipes, and seal the joints with proprietary rubber sleeves to the manufacturer's recommendations.

Other joints: Provide direct side connections to other pipes (for single property junctions only) using proprietary fittings, as documented. Public stormwater branch lines serving multiple properties shall only be connected to the main line at suitably designed stormwater pits.

~~**Flexible plastic pipes**~~

~~Standard: To AS/NZS 2566.2.~~

~~Positioning of pipes: Install pipes with markings indicating the crown or invert, or the direction of flow in conformance with the markings.~~

~~Bulkheads: If required, provide bulkheads or trenchstops to AS/NZS 2566.2 Table 5.7 or as documented.~~

~~Flotation prevention: To AS/NZS 2566.2 clause 5.5.3.~~

~~**Corrugated metal pipes and structures**~~

~~Standard: To AS/NZS 2041.2.~~

~~Joints to helically formed sinusoidal pipes: Provide as follows:~~

~~- Re-roll both ends with 4 annular corrugations of pitch 68 mm.~~

~~- Semi-corrugated coupling bands~~

~~- Rubber ring joint seals, as documented.~~

~~Joint protection: Provide non-woven geotextile material to prevent loss of sand backfill or bedding into the pipe to the requirements for geotextiles in the *1171 Subsurface drainage* worksection and as follows:~~

- ~~Extent: All joints or lap joints, except rubber ring joint coupling bands.~~
- ~~Geotextile material: Minimum 250 mm wide and minimum 270 grams/m^2.~~

~~Bedding: Provide non-erodible poured concrete bedding to the bottom third of the pipe circumference to provide external protection of corrugations, as documented.~~

~~**Invert protection for steel pipes**~~

~~Surface preparation: Remove any foreign material and if corrosion has occurred, remove all loose scale.~~

~~Extent: Place sprayed concrete to a minimum thickness of 100 mm over the crest of the corrugations to cover the bottom third of the pipe circumference symmetrically about the invert centreline of the pipe, as documented.~~

~~Sprayed concrete: To the *0319 Auxiliary concrete works* worksection.~~

~~Reinforcement: Fabric of hard drawn steel wire 4 mm diameter with 200 mm square mesh, securely supported at a central location within the sprayed concrete by non-metallic supports on the pipe side of the fabric and as follows:~~

- ~~Laps in fabric: 300 mm.~~
- ~~Cover to the fabric: 50 mm.~~

~~Cement slurry application: Immediately after placement of the sprayed concrete, remove all free water and coat the surface with cement slurry.~~

~~Water flow: Prevent the flow of water over the surface of the sprayed concrete for 24 hours after the placement of sprayed concrete.~~

~~Bedding: Provide non-erodible poured concrete bedding to the bottom third of the pipe circumference to provide external protection of corrugations, as documented.~~

3.3 COMPLETION

Pipework installation

Progressive inspections: Inspect each section of installed and jointed pipework before commencement of trench backfilling.

4 ANNEXURE

4.1 ANNEXURE – SUMMARY OF HOLD AND WITNESS POINTS

For private developments, certain Hold and Witness Points where specifically noted below require representatives of both the Superintendent and the Principal Certifier (e.g. Council) to authorise release.

Clause and description	Type*	Submission/Inspection details	Submission/Notice times	Process held
SUBMISSIONS Products and materials Product conformity	H	Certificate of conformance of all pipes and fittings	5 days before delivery	Delivery of pipes
SUBMISSIONS Samples Conformity of components	H	Samples of pipes and fittings	5 days before delivery	Delivery of pipes and fittings
INSPECTIONS, Notice Additional protective	W – Superintendent and Principal Certifier	Field cut and repairs to steel pipes Submit cement slurry procedures	3 days	Execution

Clause and description	Type*	Submission/Inspection details	Submission/Notice times	Process held
coatings				
INSPECTIONS, Notice Damage	W – Superintendent and Principal Certifier	Repairs to damaged pipeline components	3 days	Inspection and notices
INSPECTIONS Notice Joints for concrete pipes	W	Joint testing Elastomeric Check V ring joints	3 days	Precast concrete pipes jointing
INSPECTIONS Notice Pipework installation	W – Superintendent and Principal Certifier	Each section of the installed and jointed pipework before commencement of trench backfilling	Progressive	Execution and installation
*H = Hold point W = Witness point				

4.2 ANNEXURE - PAY ITEMS

This Annexure applies to Council projects. For private development works use of this schedule is optional, at the Superintendent's discretion.

Pay items	Unit of measurement	Schedule rate scope
1352.1 Supply and install pipe drainage culverts, pipes, structures.	Linear m of pipe drainage culvert: - Measured on centreline of each type, class and size of stormwater drainage pipe culvert. - The plan length between centres of gully pits or faces of headwalls.	The Schedule rate for this **Pay Item** to be a rate for each type, class and size of pipe culvert. All costs associated with all activities including: - Supply. - Survey and setting out. - Bedding. - Jointing (including connections). - Subsoil drains at pits and headwalls. - Temporary bracing and strutting. - Anchoring system including anchor blocks. - Bituminous painting. - Sprayed concrete lining and other protective measures. - Selected material backfilling. - Embankment material trench backfilling. - Reinforcing fabric. - Disposal of excesses of - Unsuitable material.
Traffic management	Lump sum.	To the *1101 Traffic management* worksection.
Sprayed concrete		To the *0319 Auxiliary concrete works* worksection

Pay items	Unit of measurement	Schedule rate scope
Excavation, bedding, support and backfill material		To the *1351 Stormwater drainage (Construction)* worksection
Bulkheads		To the *1354 Drainage structures* worksection

4.3 ANNEXURE - REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS/NZS 1260	2017	PVC-U pipes and fittings for drain, waste and vent application
AS/NZS 1477	2017	PVC pipes and fittings for pressure applications
AS 1646	2007	Elastomeric seals for waterworks purposes
AS/NZS 2041		Buried corrugated metal structures
AS/NZS 2041.2	2011	Installation
AS/NZS 2041.4	2010	Helically formed sinusoidal pipes
AS/NZS 2041.6	2010	Bolted plate structures
AS/NZS 2566		Buried flexible pipelines
AS/NZS 2566.1	1998	Structural design
AS/NZS 2566.2	2002	Installation
AS/NZS 3725	2007	Design for installation of buried concrete pipes
AS/NZS 3750		Paints for steel structures
AS/NZS 3750.9	2009	Organic zinc-rich primer
AS/NZS 4058	2007	Precast concrete pipes (pressure and non-pressure)
AS/NZS 4130	2018	Polyethylene (PE) pipes for pressure applications
AS 4139	2003	Fibre-reinforced concrete pipes and fittings
AS/NZS 5065	2005	Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications
Austroads ATS 2210	2020	Technical specification for the supply of steel reinforced precast concrete pipes
CPAA		PipeClass software and related specifications of the Concrete Pipe Association of Australasia
PIPA POP001	2019	Electrofusion jointing of PE pipe and fittings for pressure applications
PIPA POP003	2018	Butt fusion jointing of PE pipes and fittings - recommended parameters
PIPA POP102	2018	Solvent cement welding of PVC pipe
AASHTO M190-04	2017	Standard specification for bituminous-coated corrugated metal culvert pipe and pipe arches

5 ANNEXURE M – MIDCOAST COUNCIL SPECIFIC CLAUSES

M1.	Variations to or non-conformances with Council's AUS-SPEC are to be evaluated with reference to the procedure in Council's *Development Engineering Handbook*. Acceptance is to be obtained in writing from: a) an authorised representative of Council's Director of Infrastructure and Engineering Services, or b) an accredited certifier where they are the Principal Certifier and hold the relevant accreditation category for the type of work.	**Variation procedure**
M2.	This specification applies in addition to any development consent (DA) conditions. If there is any inconsistency, the conditions of consent shall prevail.	**DA conditions**
M3.	Refer to the MidCoast Council *Development Engineering Handbook* for final inspection, works-as-executed and handover requirements.	**Completion**

6 AMENDMENT HISTORY

0	14/12/2020	First Published