



SUBSOIL & FOUNDATION DRAINS 03J

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INFRASTRUCTURE
TECHNICAL
SPECIFICATION
03 - UNDERGROUND SERVICES

Transport Canberra and
City Services

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1 SUBSOIL AND FOUNDATION DRAINS

1.1 General

1.1.1 Responsibilities

1.1.1.1 General

Requirement: Provide subsurface drainage, as documented.

1.1.2 Cross references

General: The following documents are related to this Specification.

1.1.2.1 ACT Legislation

Road Transport (General) Act

Public Roads Act

Scaffolding and Lifts Act

Scaffolding and Lifts Regulation

Work Health and Safety Act

1.1.2.2 Specifications

Requirement: Conform to the following:

MITS 00	Preliminaries
MITS 01	Traffic Management
MITS 02	Earthworks
MITS 04	Flexible pavement construction
MITS 06	Concrete kerbs, footpaths and minor works
MITS 08	Incidental works
MITS 09	Landscape
MITS 10	Concrete works
MITS 16	WSUD Features

1.1.3 Referenced documents

1.1.3.1 Standards

General: The following documents are incorporated into this Specification by reference:

Australian standards

AS 1289	Methods of testing soils for engineering purposes.
AS 1289.5.4.1	Soil compaction and density tests – Compaction control test – Dry density ratio, moisture variation and moisture ratio.
AS 1289.5.6.1	Soil compaction and density tests – Compaction control test – Density index method for a cohesionless material

Austroads

AGPT10	Guide to Pavement Technology Part 10– Subsurface drainage
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1.1.3.2 Other publications

Proprietary products: To *TCCS Products previously considered for use list*

1.1.4 Interpretation

General: For the purposes of this Specification the following abbreviations apply:

TCCS: Territory and Municipal Services, ACT Government, and its successors.

1.1.4.1 Definitions

General: For the purpose of this Specification, the definitions of terms used to define the components of the road reserve are in conformance with *AS 1348; Glossary of Austroads Terms* and *AGRD03*, the definitions given below also apply:

Foundation drains: For drainage of seepage, springs and wet areas within and adjacent to the foundations.

Selected Material Zone: The top part of the upper zone of formation in which material of a specified higher quality is required, refer to *MITS 02B Bulk earthworks*.

Subsoil drains: For drainage of ground water and/or the pavement in cuttings.

1.1.5 Witness points

1.1.5.1 Notice

General: Give notice so that the documented inspection and submissions may be made to the **Witness point table**.

Table 3J-1 Hold point table

Item	Clause title	Requirement	Notice for inspection	Release by
Execution				
3J.1	Subsoil drains - Excavation	Confirm design when groundwater conditions change during excavation	3 working days before next activity	Authorised Person

Table 3J-2 Witness point table

Item	Clause title	Requirement	Notice for inspection
Execution			
3J.1	Subsoil drains - Excavation	Inspect trench excavation, line and level	1 working day prior to filling
3J.2	Subsoil drains - Backfilling	Backfilling to documented level and relative compaction	1 working days before covering with pavement course
3J.3	Foundation drains - Excavation	Inspect trench excavation, line and level	1 working day prior to filling
3J.4	Foundation drains - Backfilling	Backfilling to documented level and relative compaction	1 working days before covering with geotextile
3J.5	Geotextile – Installation	Placement of fabric conformance	1 working day before filling
3J.6	Cleanouts – Field testing	Perform flushing test	3 working days from completion

1.2 Materials

1.2.1 General

1.2.1.1 Filter material

Description: Type A or Type B filter material to *MIT S 03I Subsurface drainage* capable of placing and compaction in the specific location and as shown on the drawings.

This is a **WITNESS POINT**.

1.2.1.2 Geotextiles and pipes

Conform to: *MIT S 03I Subsurface drainage*.

1.3 Execution

1.3.1 Provision for traffic

1.3.1.1 General

Requirement: Conform to *MIT S 01 Traffic Management*.

1.3.2 Site establishment

1.3.2.1 Survey

Requirement: Confirm site surface and benchmarks. Conform to *MIT S 00 Preliminaries*.

1.3.3 Subsoil drains

1.3.3.1 Order of construction

Sequence: Construct subsoil drains as soon as possible after bulk earthworks are completed in the area of the drain. Subsoil drainage shall be constructed after completion of the subbase pavement layer and prior to construction of kerbs. Subsoil drains shall then be trenched through the subbase and extended to the underside of the base material.

Ground water: Where stabilisation of the subgrade is required, construct subsoil drains after completion of stabilisation except where excessive ground water is encountered, and construct drain prior to stabilisation of the subgrade.

Excessive groundwater: Where a selected material zone is documented and excessive ground water is encountered, install subsoil drains in two stages as follows:

- > Stage 1: Install standard subsoil drains below the base of the cutting prior to placement of select material in the selected material zone.
- > Stage 2: Extend subsoil drain to top of the selected material zone after placement of selected material.

Changes in groundwater: Where changes in groundwater conditions are experienced during excavation, confirm subsoil drainage design.

This is a **HOLD POINT**.

1.3.3.2 Excavation

General: To *MITS 031 Subsurface drainage* and this Specification.

Location: Unless otherwise specified, subsoil drains shall be aligned so that the pipe centreline is directly under the kerb or immediately in front of the kerb.

Specified level: The bottom of the trench shall not be more than 50mm below the specified level of the invert of the pipe.

Smooth: Ensure the bottom and sides of the excavation are smooth with no protrusions that will damage the geotextile fabric. Trenches for corrugated plastic pipe shall be minimum 200mm wide and 600mm deeper than the subgrade, unless noted otherwise.

Grade: Excavate the bottom of the trench to the same grade as the design pavement surface in the direction of the trench. Grade trenches to connect to the drainage structures.

Minimum grade: If required increase the trench depth to provide a minimum grade of fall in the trench of 1.0%.

Prevent ponding: Excavate the bottom of the trench to prevent localised ponding of water occurs.

Inspection: To ensure the excavation conforms to the shape, grade line, filling and compaction and removal of any protrusions.

This is a **WITNESS POINT**.

1.3.3.3 Pipes

Bedding: 50mm thick compacted filter material laid to the documented line and grade.

Pipe: Place centrally with one line of slots at the bottom within the trench on the crushed aggregate.

Joints: Minimise joints in the pipeline.

Joint construction: Proprietary external joint coupling. Fit the inlet end of the pipe with a proprietary PVC-U cap.

1.3.3.4 Backfilling

Filter material: Backfill the trench with filter material to the documented level.

Layers: Place and compact the filter material in layers with a maximum compacted thickness of 300mm. Tamp around and over the pipe to avoid damage or disturbance to the pipe.

Compaction: Compact cohesionless filter material to a Density Index of 70% determined by AS 1289.5.6.1 for the full depth of the backfill.

This is a **WITNESS POINT**.

1.3.3.5 Two stage construction plug

Protection: Protect the filter material placed at the top of Stage 1 from scour and/or contamination by covering with a 50mm thick plug of select fill material with a maximum particle size of 25mm.

Compaction: Compact the select fill material to a relative compaction of 95% as determined by AS 1289.5.4.1.

Remove and replace: Remove this plug, any contaminated filter material and any select material covering, replace with filter material and compact to 95% relative compaction.

1.3.4 Foundation drains

1.3.4.1 Order of construction

Sequence: Construct foundation drains after completion of clearing and stripping operations, and before the commencement of embankment construction.

1.3.4.2 Excavation

General: To *MITS 031 Subsurface drainage* and this Specification.

Specified level: The bottom of the trench shall not be more than 50mm below the specified level of the invert of the pipe.

Smooth: Ensure the bottom and sides of the excavation are smooth with no protrusions that will damage the geotextile fabric. Trenches for corrugated plastic pipe shall be minimum 200mm wide and 600mm deeper than the subgrade, unless noted otherwise.

Grade: Grade trenches to connect to the drainage structures.

Minimum grade: If required increase the trench depth to provide a minimum grade of fall in the trench of 1.0%.

Prevent ponding: Excavate the bottom of the trench to prevent localised ponding of water occurs.

Inspection: To ensure the excavation conforms to the shape, grade line, filling and compaction and removal of any protrusions.

This is a **WITNESS POINT**.

1.3.4.3 Pipes

Bedding: 50mm thick compacted filter material laid to the documented line and grade.

Pipe: Place centrally with one line of slots at the bottom within the trench on the crushed aggregate.

Joints: Minimise joints in the pipeline.

Joint construction: Proprietary external joint coupling. Fit the inlet end of the pipe with a proprietary PVC-U cap.

1.3.4.4 Backfilling

Filter material: Backfill the trench with filter material to the documented level.

Layers: Place and compact the filter material in layers with a maximum compacted thickness of 300 mm. Tamp around and over the pipe to avoid damage or disturbance to the pipe.

Compaction: Compact cohesionless filter material to a Density Index of 70% determined by AS 1289.5.6.1 for the full depth of the backfill.

This is a **WITNESS POINT**.

1.3.5 Geotextile

1.3.5.1 Installation

Location: Provide filter fabric sock on all slotted corrugated plastic drainage pipe unless noted otherwise.

This is a **WITNESS POINT**.

Program: Ensure the period between initial laying out and final cover of the geotextile with drainage backfill layer does not exceed 14 days. Where possible place geotextiles just ahead of construction works and cover with materials within 48 hours.

Damage: Take all reasonable care to ensure that the geotextile is not damaged during installation and backfilling operations.

1.3.6 Flushing points

1.3.6.1 General

Details: Flushing points shall be turned up and capped at the surface with a cast iron box with hinged lid set in concrete surround 300mm square by 150mm deep. Do not locate pits in unsealed shoulders, drain inverts or on batter faces.

Solid walled uPVC subsoil pipes: Provide subsoil pipes without slots and otherwise complying to MITS 03/ *Subsurface drainage* for connection to flushing points.

Standard Drawing: Refer to *ACTSD-0302*.

Location: At the commencement of each run of subsoil drain line and at maximum intervals of 150m. Where the drain is under a pavement the cleanout shall be diverted to the closest shoulder or behind the closest kerb.

Mark: Mark cleanouts on all subsoil drains by stencilling SS in letters 50mm high.

1.4 Completion

1.4.1.1 Field testing

Method: After the completion of all underground services including street lighting, pump clean water into the cleanout at the commencement of each run until only clean water discharges at the outlet.

This is a **WITNESS POINT**.

1.4.1.2 Submissions

Work as Executed Records: To *MITS 00B Quality Requirements*.

2 MEASUREMENT AND PAYMENT

2.1 Measurement

2.1.1.1 General

Payments made to the Bill of Quantities: To *MIT 00A General requirements*, this Specification, the drawings and **Pay items**.

2.1.1.2 Methodology

The following methodology will be applied for measurement and payment:

- > Allow for all work, materials, testing and quality assurance requirements in each Pay Item.
- > Temporary erosion and sedimentation control measures: To *MIT 00C Control of erosion and sedimentation*.
- > Subsoil and foundation drains for Wetlands and Bioretention systems: To *MIT 16 WSUD Features*.
- > Supply, placement and compaction of filter and capping material: To *MIT 03I Subsurface drainage*.
- > Outlet structures: To *MIT 03I Subsurface drainage*.
- > Concrete work for flushing points: Paid under this Specification and not *MIT 10 Concrete works*.

2.2 Pay items

Table 3J-3 Pay items table

Item No	Pay items	Unit of measurement	Schedule of rates scope
3J.1	Subsoil and foundation drains	Linear metre of pipe installed measured along the centreline	All activities associated with construction of subsoil drains including excavation of trenches in all types of material encountered including rock, over excavation for bedding, shoring, supply and laying of pipes and seamless tubular filter fabric sock, additional excavation at structures, bedding, jointing, markers, fittings and flushing. This pay item shall also include pipe cutting, connection to existing and/or new pipes. Separate pay items shall be included in the Contract for each pipe material, class of pipe and pipe diameter.
3J.2	Flushing points	Number	All activities associated with the construction of the flushing point including excavation in all types of material encountered including rock, supply and laying of pipes, concrete formwork, supply, placement, curing and finish of insitu concrete, supply and installation of precast surround and cast iron cover, connection to subsurface drainage and backfill.
3J.3	Remove and relocate existing flushing point	Number	All activities associated with removing and relocating an existing high end riser and pipe connections including excavation in all types of material encountered including rock, backfilling and making good of all works.



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