

DEVELOPMENT
CONSTRUCTION
SPECIFICATION

C231

**SUBSOIL AND
FOUNDATION DRAINS**

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SPECIFICATION C231 - SUBSOIL AND FOUNDATION DRAINS

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SPECIFICATION C231 : SUBSOIL AND FOUNDATION DRAINS

GENERAL

C231.01 SCOPE

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| 1. The work to be executed under this Specification covers the excavation, bedding, installation and backfilling of subsoil and foundation drains. | Scope |
| 2. Subsoil and foundation drains shall be constructed where and as shown on the Drawings or as directed by the Council's Development Engineer. | Location |
| 3. This Specification should be read in conjunction with Specification C230 - SUBSURFACE DRAINAGE - GENERAL. | Associated Specification |

C231.02 TERMINOLOGY

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| 1. Subsoil drains are intended for the drainage of ground water and/or the pavement in cuttings. | Subsoil Drains |
| 2. Foundation drains are required for the drainage of seepage, springs and wet areas within and adjacent to the foundations. | Foundation Drains |

C231.03 REFERENCE DOCUMENTS

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| 1. Documents referenced in this specification are listed in full below whilst being cited in the text in the abbreviated form or code indicated. | Documents Standards Test Methods |
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(a) Council Specifications

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|------|---|-------------------------------|
| C213 | - | Earthworks |
| C230 | - | Subsurface Drainage - General |

(b) RTA Test Method

- | | | |
|------|---|--------------------------------------|
| T166 | - | Determination of Relative Compaction |
|------|---|--------------------------------------|

C231.04 ORDER OF CONSTRUCTION

(a) Subsoil Drains

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| 1. Subsoil drains shall be constructed as soon as possible after necessary earthworks are completed in the area of the drain. Where stabilisation of the subgrade is required, subsoil drains shall be constructed after completion of stabilisation except that, where excessive ground water is encountered, they may be constructed prior to stabilisation of the subgrade. | Timing of Work |
| 2. Where a Selected Material Zone is specified and excessive ground water is encountered, subsoil drains may be installed in two stages as follows: | Two Stage Construction |
| Stage 1: Standard subsoil drains installed below the base of the cutting prior to placement of select material in the Selected Material Zone. | |

SUBSOIL AND FOUNDATION DRAINS

Stage 2: Extension of subsoil drain to top of the Selected Material Zone after placement of selected material.

(b) Foundation Drains

1. Foundation drains shall be constructed after completion of clearing and stripping operations, and preceding the commencement of embankment construction.

Timing of Construction

CONSTRUCTION

C231.05 SUBSOIL DRAINS

(a) Excavation

Associated Specification

1. Excavation shall be undertaken in accordance with the requirements of Specification C230 - SUBSURFACE DRAINAGE - GENERAL.

2. Trenches for subsoil and foundation drains shall be excavated to the line, grade, width and depth as shown on the Drawings or as directed by the Council's Development Engineer.

Dimensions and Grade

3. The bottom of the trench shall be excavated to the same grade as the design pavement surface in the direction of the trench except where the grade of the design pavement surface in the direction of the trench is less than 0.5 per cent. In which case the trench depth shall be increased to provide a minimum grade of fall in the trench of 0.5 per cent. The bottom of the trench shall be excavated so that no localised ponding of water occurs.

Minimum Grade

4. If at any location the trench is excavated below the specified floor level, the trench shall be backfilled with non-porous subgrade material so that when the subgrade material is compacted to a relative compaction, determined by Test Method T166, of at least 95 per cent, the bottom of the trench shall be at the specified floor level.

Over-excavation

5. Where a subsoil drain is constructed in two stages, the excavation for Stage 2 shall be carried out after placement and compaction of the selected material zone or the stabilised subgrade layer. The Stage 2 trench shall be excavated to the same line and width as the Stage 1 trench and to a depth to provide a clean, full contact with the filter material placed in Stage 1. All excavated material shall be disposed to waste or incorporated into fills.

Two Stage Construction

(b) Laying of Pipe

Bedding

1. The 100mm diameter corrugated slotted plastic piping, complying with Specification C230 - SUBSURFACE DRAINAGE - GENERAL, shall be laid on a bed of filter material 50mm in thickness and shall be laid to the required line and grade.

2. The type of filter material shall comply with Table C230.1.

Filter Material

3. Joints in the pipeline shall be kept to the minimum number and, where required, shall be made using a suitable external joint coupling. The inlet end of the pipe shall be fitted with a cap.

Joints and Capping

(c) Backfilling

Filter Material

1. The trench shall be backfilled with filter material to the level specified. The filter material shall be placed and compacted in layers with a maximum compacted thickness of 300mm. Tamping around and over the pipe shall be done in such a manner as to avoid damage or disturbance to the pipe.

2. The filter material shall be compacted for its full depth to a relative compaction of

Compaction of

not less than 100 per cent (standard compaction) as determined by Test Method T166.

Filter Material

3. The upper section of the trench, above the level specified for filter material backfill, shall be backfilled with selected backfill material, conforming to the requirements of Specification C213 - EARTHWORKS, compacted for its full depth to a relative compaction of not less than 100 per cent (standard compaction) as determined by Test Method T166.

Select Material

4. Where shown on the Drawings or as directed by the Council's Development Engineer, a geotextile conforming to the requirements of Specification C230 - SUBSURFACE DRAINAGE - GENERAL, shall be provided at the interface between the filter material and adjoining materials. Laps of 500mm shall be provided at joints in the fabric.

Geotextile

(d) Outlets

Pipes and Structures

1. Outlets are to be provided at maximum intervals of 80m. Where possible, subsoil drains shall discharge into gully pits and other stormwater drainage structures. Where not possible, an outlet shall be constructed of unslotted plastic pipe of the same diameter as the main run to discharge below the edge of the road shoulder. An outlet structure in accordance with the Drawings shall be constructed at the discharge end.

C231.06 FOUNDATION DRAINS

(a) Excavation

1. Excavation shall be undertaken in accordance with the requirements of Specification C230 - SUBSURFACE DRAINAGE - GENERAL and Clause C231.05 of this Specification.

Associated Specification

(b) Laying of Pipe

1. The 100mm diameter corrugated slotted plastic piping, complying with Specification C230 - SUBSURFACE DRAINAGE - GENERAL, shall be laid on a bed of filter material 50mm in thickness and shall be laid to the required line and grade.

Bedding

2. The type of filter material shall be as shown in Table C230.1.

Filter Material

3. Joints in the pipeline shall be kept to the minimum number and, where required, shall be made using a suitable external joint coupling. The inlet end of the pipe shall be fitted with a cap.

Jointing and Capping of Pipe

(c) Backfilling

1. The trench shall be backfilled with filter material in accordance with the provisions of Clause C231.05(c).

Filter Material

2. The upper section of the trench, above the level specified for filter material backfill, shall be backfilled with suitable earth backfill material, compacted for its full depth to a relative compaction of not less than 95 per cent (standard compaction) as determined by Test Method T166.

Earth Backfill and Compaction

3. Where shown on the Drawings or as directed by the Council's Development Engineer, a geotextile, conforming to the requirements of Specification C230 - SUBSURFACE DRAINAGE - GENERAL, shall be provided at the interface between the filter material and adjoining materials. Laps of 500mm shall be provided at joints in the fabric.

Geotextile

(d) Outlets

1. An outlet structure in accordance with the detail shown on the Drawings and Specification C230 - SUBSURFACE DRAINAGE - GENERAL shall be constructed at the

Construction Detail

SUBSOIL AND FOUNDATION DRAINS

discharge end. The outlet shall be located so that erosion of the adjacent area does not occur or shall be protected by the placement of selected stone in the splash zone of the outlet.

LIMITS AND TOLERANCES

C231.07 SUMMARY OF LIMITS AND TOLERANCES

1. The limits and tolerances applicable to the various clauses in this Specification are summarised in Table C231.1 below.

Item	Activity	Tolerances	Spec Clause
1.	Excavation		
	Trench Grade	≥0.5%	C231.05(a)
2.	Subsoil Drain Backfill		
(a)	Layer thickness	300mm max	C231.05(c)
(b)	Compaction (Relative) Filter and Backfill material	100% standard	C231.05(c)
3.	Outlet Spacing	80m max	C231.05(d)
4.	Foundation Drain Backfill		
(a)	Layer thickness	300mm max	C231.05(c)
(b)	Compaction (Relative) Filter material Backfill material	100% Standard >95% Standard	C231.05(c)

Table C231.1 - Table of Limits and Tolerances