

TNZ F/6: 2003

**SPECIFICATION FOR GEOTEXTILE WRAPPED AGGREGATE SUBSOIL
DRAIN CONSTRUCTION**

1. SCOPE

This specification applies to the construction of subsoil drains which consist of geotextile lined trenches filled with drainage aggregate. Pipes may or may not be placed in this drainage aggregate.

Geotextile wrapped aggregate subsoil drains shall be constructed in accordance with this specification and in conformity with the lines, grades and cross-sections shown on the drawings. The work shall include: the construction of trenches; the supplying and laying of geotextile of the specified type and grading; the supplying and compacting of approved drainage and backfilling materials; the supply and construction of any connecting and outlet drains; the supply of all materials, labour, plant, tools and transport required for the proper completion of the contract.

2. MATERIALS

2.1 Geotextile

The geotextile's properties, testing, storage and installation shall comply with the requirements of TNZ F/7. The properties required for the geotextile are provided in Schedule A.

2.2 Drainage Aggregate

Drainage aggregate shall be open course graded clean (preferably washed) durable aggregate having a crushing resistance of not less than 100 kN when tested in accordance with NZS 4407:1991 Test 3.11.

When tested in accordance with NZS 4407:1991, Test 3.8.1, the drainage aggregate shall comply with the following grading unless specified otherwise:

<u>Test Sieve Aperture</u>	<u>Percentage Passing</u>
53 mm	100
13.2 mm	10 max

2.3 Pipe Types

If pipes are to be used, placed within the drainage aggregate or elsewhere, then their pipe type, bedding, laying and jointing are to be as specified in TNZ F/2, "Pipe Subsoil Drain Construction", or as specified in TNZ F/5, "Corrugated Plastic Pipe Subsoil Drain Construction".

Outlet and connecting pipes shall be unperforated.

Plastic pipes must be protected from exposure to direct sunlight over extended periods.

2.4 Securing Pins

Pins for securing the geotextile shall be of steel, a minimum of 5 mm in diameter, and at least 400 mm in length. Other equivalent securing devices may be substituted if recommended by the geotextile manufacturer.

3. EXCAVATION

Trenches shall be cut in such a manner as will ensure that the geotextile wrapped aggregate subsoil drains, and pipes if included, will be laid true to the depths, grades and lines shown on the drawings.

Unless otherwise specified trenches shall have: a minimum gradient of 1 in 100; vertical sides; and a minimum depth that will ensure that the invert level shall be not less than 1 metre below finished subgrade level.

Excavated material shall be stacked at least the excavated depth away from the edge of the excavation and the size of the spoil bank shall be limited to avoid any danger to stability of the trench or adjacent buried services.

All spoil shall be managed so as to avoid contamination of the clean drainage aggregate.

Surplus excavated material shall be disposed of as detailed in the job specification.

Trenches to be lined with geotextile shall be graded to obtain smooth side and bottom surfaces so that the geotextile will not bridge cavities in the soil or be damaged by projecting rock.

4. LAYING AND JOINTING GEOTEXTILE

The geotextile shall be placed in the trench so as to conform loosely to the shape of the trench. The geotextile shall be laid flat, but not stretched on the soil, and shall be anchored with securing pins.

Apart from the one longitudinal overlap no longitudinal joints shall be permitted.

Successive sheets shall be overlapped to form transverse field splices. The splices shall have a minimum overlap of 500 mm and shall be anchored with securing pins to ensure this required overlap is maintained. Alternatively sewn joints will be accepted subject to the approval of the engineer.

5. GEOTEXTILE/PIPE CONNECTIONS

Where outlet pipe passes through the geotextile, a separate piece of geotextile of sufficient size to be wrapped around the pipe and flared against the side of the geotextile wrapped aggregate drain shall be used.

6. BACKFILLING

The trench shall be backfilled in accordance with the cross-sections shown on the drawings.

Unless otherwise specified the trench shall be backfilled as follows:

Drainage aggregate, as specified in clause 2.2, shall be used to backfill the geotextile lined trench. The drainage aggregate being placed in an initial minimum layer thickness as specified in TNZ F/7 and thereafter in layers not exceeding 150 mm compacted depth, each layer being positively compacted with a vibratory compactor to provide support of not less than that of the adjacent material.

After compaction of the drainage aggregate the geotextile shall be folded over the top of the drainage aggregate to produce a minimum longitudinal overlap of 300 mm. These overlaps shall be anchored with securing pins.

The geotextile shall not be left exposed for more than two weeks without being covered by backfill. This applies to those geotextiles that are not subject to damage from sunlight as well as those that are.

Geotextile that becomes torn or otherwise damaged through any cause shall be removed and replaced with undamaged geotextile observing the 500 mm overlap requirement in all directions.

After geotextile closure the geotextile wrapped aggregate shall be capped by backfilling with a depth of selected material as indicated in the drawings; but in no case shall there be less than 300 mm cover between the geotextile and any vehicles.

This selected backfill shall be compacted to provide support of not less than that of the adjacent material.

7. OUTLETS

Outlets from subsoil drains shall be constructed to discharge clear of embankments, and there shall be sufficient slope to prevent silting.

8. MAINTENANCE

The Contractor shall ensure at all times that subsoil drainage installations are protected from inadvertent, or deliberate, use for temporary surface drainage.

The Contractor shall maintain the subsoil drains and outlets until the end of the maintenance period. He shall make good any subsidence which occurs in the earthworks above the subsoil drains.

9. BASIS OF PAYMENT

All miscellaneous items, board, supervision, contingencies, conveyance of plant, and incidental work, plus general overhead, and administration are incorporated in the unit rates listed in the schedule.

Payment will be made on the total number of metres of subsoil drains installed in accordance with the plans and specification, at the various depths as detailed in the schedule. The unit rate in each case shall be in full compensation for the supply of all materials, labour and plant, necessary to construct the drains as specified.

SCHEDULE A

**SPECIFIC CONTRACT REQUIREMENTS FOR GEOTEXTILES FOR
SUBSOIL DRAINS**

<p>1. TNZ F/7 Strength Class Requirement for Geotextile</p>	<p>Class A / B / C / D / E Delete those not applicable</p>
<p>2. Soil type for Filtration Class</p>	<p>Cohesive / Non Cohesive Delete that not applicable</p>
<p>3. TNZ F/7 Filtration Class requirement for Geotextile</p>	
<p>4. Specific Geotextile Requirements</p> <p>Where a standard filtration class is not applicable. The geotextile shall have:</p> <ul style="list-style-type: none"> • Flow rate Q_{100} greater than • Permittivity ψ greater than • EOS less than 	<p style="text-align: right;">$l/m^2/sec$</p> <p style="text-align: right;">sec^{-1}</p> <p style="text-align: right;">μm</p>