

**DEVELOPMENT
CONSTRUCTION
SPECIFICATION**

C273

LANDSCAPING



SPECIFICATION C273 - LANDSCAPING

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SPECIFICATION C273 : LANDSCAPING

GENERAL

C273.01 SCOPE

1. The work to be executed under this Specification consists of:
 - (a) The vegetation of cut and fill batters, median areas, open drains, footways and other areas within the site. Vegetation includes the initial surface preparation, topsoiling, fertilising, sowing of seed and may include surface protection works, hydroseeding, hydromulching, straw mulching and turfing.
 - (b) The supply of plants, planting at locations as shown on the Drawings, fertilising, mulching, staking, watering and maintenance of plants.

C273.02 REFERENCE DOCUMENTS

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**

(a) Council Specifications

- | | | |
|------|---|---------------------------------------|
| C211 | - | Control of Erosion and Sedimentation. |
| C213 | - | Earthworks. |

(b) Australian Standards

- | | | |
|---------------|---|---|
| AS 1160 | - | Bitumen emulsion for construction and maintenance of pavements. |
| AS 2507 | - | The storage and handling of pesticides. |
| AS 4419 (Int) | - | Soils for landscaping and garden use. |
| AS 4454 | - | Composts, soil conditioners and mulches. |

VEGETATION OF SLOPES AND DRAINS

C273.03 EXECUTION AND TIMING OF WORK

1. In association with the work to be executed under this Specification, the Contractor shall implement effective erosion and sedimentation control measures in accordance with Specification C211 - CONTROL OF EROSION AND SEDIMENTATION.

**Contractor's
Responsibility**

2. The work to be executed under this Vegetation of Slopes and Drains includes the vegetation of cut and fill batters, footpaths, median areas, open drains and other areas within the site. Vegetation includes the initial surface preparation, topsoiling, fertilising and either sowing of seed or turfing as shown on the Drawings.

Vegetation

3. Exposed ground shall be vegetated as quickly as possible, but in any case before the area exceeds one hectare.

**Exposed
Ground**

C273.04 MATERIALS

(a) Topsoil

1. The Contractor shall use topsoil stockpiled on site under Specification C213 -

Quality

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EARTHWORKS. Where imported topsoil is required it shall comply with AS 4419 (Int) and shall: -

- be of a friable, porous nature;
- be free of weeds and weed seeds, bulbs, corms and vegetable propagules;
- contain no refuse or materials toxic to plant growth;
- contain no stumps, roots, clay lumps or stones larger than 50mm in size;
- have an organic content of at least 3 per cent by mass;
- have a pH neither less than 5.5 nor more than 7.5;
- have a soluble salt content not exceeding 0.06 per cent by mass.

(b) Herbicide

1. Herbicide used shall be a glyphosate-based herbicide such as 'Roundup'. Council's Development Engineer may approve other glyphosate-based herbicides provided that an equivalent concentration of the active ingredient glyphosate is applied.

(c) Seed

Seed Type and Supplier

1. All seed used shall be of the species and varieties listed in Annexure C273A and shall be sown at the application rates shown therein.

2. The Contractor's attention is drawn to the lead-time that may be required to procure some native seed species. The native seed shall be delivered to the site in separate lots for each species and variety, clearly labelled to show species, variety and weight.

Lead Time for Native Seed

3. A "Certificate of Authenticity" must accompany all seed, which shall be furnished to Council's Development Engineer upon request at any stage of the work.

Certification

4. The Contractor shall not take possession of the seed more than seven days before sowing is to occur. The seed shall be stored in clean, airtight containers and kept away from direct sunlight. It shall not be exposed to the elements at any stage during storage.

Storage

(d) Turf

1. Turf shall consist of 25mm depth of dense, well rooted, vigorous grass growth with 25mm depth of topsoil. The type of grass turf to be used will be indicated on the Drawings. Kikuyu grass shall not be used. Turf shall be free of weeds, soil pests and diseases. The turf shall be supplied as rolls in long lengths of uniform width of not less than 300mm, and shall be in sound unbroken condition. Turf shall be obtained from a local supplier.

(e) Fertiliser

1. Fertiliser used shall be an organic type such as 'Dynamic Lifter-Nitro' with Nitrogen: Phosphorus: Potassium (N:P:K) ratios of 8:3.6:2 or an equivalent fertiliser.

Type

(f) Vegetable Mulch

1. Vegetable mulch used in hydromulching shall consist of straw, chaff, wood fibre, paper pulp or similar material all finely shredded to a maximum dimension of 10 mm. Meadow hay or weeds shall not be used and paper pulp if used shall not exceed 50 per cent by mass of the total mulch.

Composition

(g) Water

1. Water used shall be potable.

Quality

(h) Binder

1. The binder used in hydromulching and strawmulching shall be Grade ASS, slow setting anionic bitumen emulsion, complying with AS 1160. *Type*

(i) Wetting Agent

1. The soil wetting agent added in hydromulching or hydroseeding shall be 'Aquasoil' applied at a rate of one litre per 1,000 litres of mix water or an equivalent soil wetting agent. *Application Rate*

(j) Pesticide

1. Pesticide used shall be Lorsban 500EC or Lorsban 250W or an equivalent pesticide approved by Council's Development Engineer. The storage and handling of pesticides shall be in accordance with AS 2507. *Type*

C273.05 VEGETATION OF SLOPES 3 TO 1 OR FLATTER

(a) Preparation of Surface

1. Slopes shall be sprayed with the glyphosate based herbicide 'Roundup' applied at a rate of 9 litres of Roundup diluted in 200 litres of water per hectare of surface sprayed to kill weed infestation. Sprayed areas shall remain undisturbed for two weeks. *Herbicide Treatment*

2. The surface shall then be tined to a depth of 200 mm to produce a loose surface and all large stones, rubbish and other materials that may hinder germination shall be removed before topsoiling. *Preparation*

(b) Topsoiling

1. Topsoil shall be uniformly applied to provide an average compacted thickness of 50mm with a minimum compacted thickness of 30mm at any location. The topsoiled area shall be cultivated to a depth of 50mm to provide a roughened surface with soil lumps not exceeding 50mm dimension. *Application*

(c) Mixing of Seed

1. Seed shall be sown on the day of mixing with insecticide.

(d) Incorporation of Pesticide

1. Immediately before sowing, all grass and native seed shall be treated with pesticide. The pesticide shall be thoroughly mixed as a dry powder with the seed at a rate of 10 kilograms of insecticide to the equivalent mass of seed to be spread on 1 hectare of the surface in accordance with Annexure C273A. *Application Rate*

(e) Sowing

1. Sowing shall be carried out with an appropriate mechanical seeder. Where practicable, passes shall follow finished surface contours. Seed shall be sown at a depth of 5mm or shall be raked or harrowed to provide 5mm cover. *Seeder*

2. Seed and fertiliser shall be evenly distributed over the areas to be sown at the rates specified in Annexure C273A. Fertiliser shall be applied concurrently with the seeding operation. *Sowing Rate*

(f) Turfing

1. Turf shall be placed on the prepared topsoiled surface. Runs of turf shall butt hard against each other and be placed perpendicular to the direction of water flow. Turf seams shall then be topdressed with topsoil. *Placing*

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2. Four to six weeks after placement, the turf shall be lightly topdressed with loam to correct any undulations or unevenness in the established turf. **Topdressing**

(g) Watering

1. The Contractor shall water areas to be sown to a moist condition and shall rewater areas to a moist condition without surface runoff on a daily basis for a minimum of 15 days after sowing, or as otherwise directed by Council's Development Engineer, to promote and maintain growth.

C273.06 VEGETATION OF SLOPES STEEPER THAN 3 TO 1

(a) General

1. Where shown on the Drawings or directed by Council's Development Engineer, slopes shall be vegetated by one of the following methods: **Method**

- (i) Topsoiling and hydromulching;
- (ii) Topsoiling, hydroseeding and straw mulching;
- (iii) Hydroseeding;
- (iv) Turfing.

(b) Preparation of Surface

1. Weeds shall be killed by spraying with herbicide as specified under Clause C273.05 **Herbicide Treatment**
2. No more than seven days before seeding, all loose material shall be removed from fill batters and cut batters, which are not stepped, by dragging a heavy steel chain of minimum weight of 30 kilograms per metre of length or by other methods approved by Council's Development Engineer. **Preparation**

(c) Topsoiling

1. Where batters have been stepped, the steps shall be loosely filled with topsoil. Elsewhere, topsoil shall be uniformly applied to provide an average thickness of 50mm with a minimum compacted thickness of 40mm at any location. **Application Rate**

(d) Hydromulching or Hydroseeding

1. The hydromulch or hydroseed shall comprise the materials shown in Table C273.1. The materials shall be applied at the application rates shown in Table C273.1. **Application Rate**
2. Dry surfaces shall be watered by a fine spray of water before the application of the hydromulch. **Watering**
3. The mixing and treatment of seed shall be carried out in accordance with Clause C273.05(c). **Treatment of Seed**
4. During preparation of the hydromulch or hydroseed slurry, 'Lorsban 500EC' insecticide shall be added to the storage tank, to facilitate surface application, at a rate of 5 litres of insecticide to the equivalent volume of hydromulch or hydroseed slurry to be spread on 1 hectare of surface in accordance with Table C273.1. **Insecticide**
5. Storage tanks, containers and equipment to be used in hydromulching or hydroseeding of slopes shall be clean and free of contamination from previous operations. **Equipment**

6. A slurry mixture shall be produced by addition of the specified materials in the tank and agitated to maintain a uniform consistency during application. It shall be applied uniformly over the whole surface. **Uniform Mix**

7. Hydromulch or hydroseed shall not be applied under the following weather conditions at the site: **Weather Conditions**

- when temperature is higher than 35°C
- when winds exceed 15 km/hr;
- where, in the opinion of Council's Development Engineer, the surface is too wet or
- during rain periods or when rain appears imminent.

8. Application rates shall be in accordance with Table C273.1

Material	Application Rate per Hectare	
	Hydro-Mulching	Hydro-Seeding
i. Vegetable Mulch (kg)	2,500	Nil
ii. Water (l)	35,000	20,000
iii. Binder (l)	700	Nil
iv. Fertiliser	See Annexure C273A	
v. Seed	See Annexure C273A	
vi. Wetting Agent (l)	35	20
vii. Insecticide (l)	5	5

Table C273.1 - MATERIALS AND APPLICATION RATES

(e) Straw Mulching

1. The mulch to be applied after hydroseeding shall comprise a matrix of straw and an anionic slow setting bitumen emulsion binder. Meadow hay shall not be used. The straw mulch shall be uniformly applied by a suitable blower unit at a rate of 250 bales (each of 20 kilograms) of straw per hectare of surface. The bitumen emulsion shall be incorporated as a spray into the air stream of the mulch blower at a rate of not less than 2,500 litres of bitumen emulsion per hectare of surface. The finished straw mat shall have a minimum thickness of 20 mm at any location. **Method**

(f) Turfing

Turf shall be as specified under Clause C273.04 (d). **Quality**

Runs of turf shall butt hard against each other and be placed perpendicular to the direction of water flow in the drain, and pinned into position at 500mm centres. **Placing**

Seams of turf shall be topdressed with topsoil. **Topdressing**

C273.07 VEGETATION OF OPEN DRAINS

(a) Preparation of Surface

1. The Contractor shall so execute the work that the excavation of open drains to the specified profiles is followed within seven days by the vegetation of the surface as specified in this Clause. Topsoil shall be spread to provide an average compacted thickness of 100 mm with a minimum compacted thickness of 80 mm at any location.

Profile and Topsoil

(b) Sowing

1. Before sowing, the surface shall be watered. Seed and fertiliser shall then be applied uniformly at the rates specified in Annexure C273A by one of the following procedures as directed by Council's Development Engineer:

Procedure

- (i) Mechanical sowing.
- (ii) Hydromulching or hydroseeding.
- (iii) By hand.

(c) Surface Protection

1. Where shown on the Drawings or directed by Council's Development Engineer, one of the following protective treatments shall be applied immediately to all or part of the sown surface.

Methods

- (i) Spraying with Bitumen Emulsion

An anionic slow setting bitumen emulsion, conforming with Grade ASS of AS 1160, shall be sprayed over the surface at a rate of 1 litre of bitumen emulsion per square metre of surface.

Application Rate

- (ii) Lining with Organic Fibre Mat

The channel surface shall be lined with an organic fibre mat such as 'Sta-Firma (light grade)' or an equivalent organic fibre mat approved by Council's Development Engineer. The runs of matting shall be laid along the direction of water flow. The matting shall be laid loosely on the soil surface and not stretched.

Laying

The upstream end of the matting shall be slotted into a trench 150 mm wide by 150 mm deep and pinned to the base of the trench at 200 mm centres. The trench shall be backfilled with soil and compacted by foot.

Anchorage

The pins shall be 'U' shaped, 4 mm gauge wire, 50 mm wide and 150 mm long legs.

Pins

Adjacent runs of matting shall be overlapped 100 mm with the higher run lapped over the lower run. The matting shall be pinned along the sides of each run at 500 mm centres and along the middle of each run at 1-metre centres. End overlaps shall be 150 mm wide with the higher run end lapped over the start of the lower run and pinned at 200 mm centres.

Lapping

- (iii) Turfing

Turf shall be as specified under Clause C273.04 (d).

Quality

Runs of turf shall butt hard against each other and be placed perpendicular to the direction of water flow in the drain, and pinned into position at 500mm centres.

Placing

Seams of turf shall be topdressed with topsoil.

Topdressing

(d) **Watering**

Water

1. The Contractor shall water treated areas in order to promote and maintain growth as specified under Clause C273.05 (g).

LANDSCAPE PLANTING

C273.08 EXECUTION AND TIMING OF WORK

1. The work to be executed includes the ground preparation, the supply of plants, planting as shown on the Drawings, fertilising, mulching, staking, watering and maintenance of plants.

Extent of Work

2. The Contractor shall give Council's Development Engineer a minimum of two days' notice of commencement of planting. Landscape planting shall not be carried out in extreme weather conditions (above 35°C or below 10°C).

Notice of Commencement

C273.09 MATERIALS

(a) **Topsoil**

1. Topsoil shall comply with the requirements of Clause C273.04(a).

(b) **Herbicide**

1. Herbicide shall comply with the requirements of Clause C273.04(b).

(c) **Fertiliser**

1. Fertiliser shall be a slow-release type in pellet form with a nine months' release period and having Nitrogen:Phosphorus:Potassium (N:P:K) ratios of 6.3:1.8:2.8. 'Kokei' fertiliser pellets or an equivalent fertiliser approved by Council's Development Engineer shall be used.

Quality

(d) **Mulch**

1. Mulch used for landscape planting shall comply with AS 4454 and the following requirements:

Quality

- (i) the material shall comprise hardwood chips;
 - (ii) fines shall not exceed 5 per cent by volume;
 - (iii) the average size of the woodchip shall be approximately 20 mm wide by 5 mm thick by 30 mm long and the maximum length of chip shall not exceed 50 mm; and
 - (iv) the material shall be free of soil, weeds, stones and other foreign material.
2. Composted organic mulch as approved by Council's Development Engineer may be used in lieu of woodchip mulch.

	Type or Stock				
	50mm Tube	Gro-Tube	Semi Advanced	Advanced Stock	Super Advanced
Plant Container: dia (mm) depth (mm)	50 75	75 100	150 150	200 200	300 300
Plant Height (mm) (leaf & stem)	200 min 300 max	300 min 400 max	300 min 400 max	300 min 500 max	500 min 750 max
Planting Holes: side (mm) depth (mm)	300 300	200 200	300 300	400 400	600 600
Number of Fertilizer Pellets	2	3	5	5	7

Table C273.2 - PLANT STOCK

(e) Plant Material

1. The Contractor shall obtain all plants from a nursery located in an area having a similar climate to the site of the Works.

Source

2. There shall be no substitution of any species without the approval of Council's Development Engineer. All plant material shall be true to species and sizes. Plants shall be healthy, of good form, not soft or forced and with large robust root systems. They shall not be rootbound and shall be free from disease and insect pests. All container soil mix shall contain between 20 per cent and 25 per cent clay by volume. Trees shall have a single leading shoot. For hardening off purposes, all plants shall be delivered to a site within the locality of the Subdivision at least four weeks before planting out. Plant root systems shall be maintained moist at all times with particular attention being paid to watering during the on-site period before and during planting. Plant stock shall be classified as indicated in Table C273.2, and planted in accordance with the Drawings.

Quality

(f) Stakes

1. All stakes shall be 25mm square by 1,500mm long hardwood and sharpened at one end.

Size

C273.10 PLANTING

(a) Mass Planting in Mulched Bed

1. The mulched area shall be sprayed with herbicide, as specified under Clause C273.05 (a), to kill weed infestation. Sprayed areas shall remain undisturbed for two weeks.

Herbicide Treatment

2. The surface shall be ripped at 500mm centres to a depth of 300mm and the top 200mm of the planting bed broken up by cultivation to a maximum size of 50mm. Mulch, 100mm thick, shall be spread over the planting bed. After removal of the localised mulch, planting holes shall be excavated to the square dimensions and depths as shown in Table C273.2 and the material removed.

Surface Preparation

3. The specified number of fertilizer pellets as shown in Table C273.2 shall be placed beside the rootball of each plant.

Fertilizer Pellets

4. The planting hole shall be backfilled with topsoil complying with Clause C273.04 (a) and compacted by foot up to surface level, care being taken to avoid mixing mulch with topsoil. A stake shall be driven 300mm deep and 200mm clear of each 'Advanced' and 'Super Advanced' size stock and the stock tied to it by a strip of 50mm wide hessian webbing.

Backfill and Staking

5. Each backfilled hole shall receive 10 litres of water before the mulch is respread over the disturbed area. The mulch shall be left just clear of the plant stem.

Watering and Mulching

(b) Individual Planting

1. A planting area 600 mm square shall be loosened to a depth of 400 mm. Planting holes shall be excavated to dimensions and depths as shown in Table C273.2 and the material spread evenly around each hole

Planting Holes

2. The specified number of fertiliser pellets, as shown in Table C273.2, shall be placed beside the rootball of each plant.

Fertilizer Pellets

3. The planting hole shall be backfilled with topsoil complying with Clause C273.04 (a) and compacted by foot up to surface level. A stake shall be driven 300mm deep and 200mm clear of each 'Advanced' and 'Super Advanced' size stock and the stock tied to it by a strip of 50mm wide hessian webbing.

Backfill and Staking

4. Each backfilled hole shall receive 10 litres of water.

Watering

5. Weed infestation for a distance of 800 mm surrounding each proposed planting shall be killed by spraying with herbicide as specified in Clause C273.05 (a). All due care shall be taken to avoid damage caused by contact between the herbicide and the plant by means of spray drift etc.

Herbicide Spray

6. Immediately after planting, mulch 100 mm thick, starting just clear of the plant stem, shall be spread over an area of 600 mm radius surrounding the plant.

Mulch

C273.11 CARE OF LANDSCAPE PLANTING

1. The Contractor shall water all plants, from the time of planting, at the rate of 10 litres per plant every third day for the first twelve weeks.

Watering

2. Missing or dead plants and plants nominated by Council's Development Engineer as unhealthy shall be replaced by the Contractor. Replacement plants shall be of similar size and quality and of identical species and variety to the plant being replaced. The cost of replacement shall be borne by the Contractor.

Replacement Plants Contractor's Cost

3. Weed and grass growth in mulched areas shall be killed by treatment with 'Roundup' or other herbicide approved by Council's Development Engineer, in accordance with the manufacturer's instructions at monthly intervals during the construction period and contract maintenance period. Contact of the herbicide with the new plants shall be avoided and any damage repaired or damaged plant material replaced by the Contractor.

Weed Control

LIMITS AND TOLERANCES

C273.17 SUMMARY OF TOLERANCES

Item	Activity	Tolerances	Spec Clause
1.	Topsoil		
	a) Organic Content	>3% by mass	C273.04(a)
	b) pH	>5.5 <7.5	C273.04(a)
	c) Soluble Salt	<0.06% by mass	C273.04(a)
2.	Turf	Widths >300 mm.	C273.04(d)
3.	Vegetable Mulch		
	a) Material	Maximum size < 10 mm	C273.04(f)
	b) Paper Pulp	<50% by mass of total mulch	C273.04(f)
4.	Topsoiling	Minimum compacted thickness at any location of 30 mm	C273.05(b) C273.06© C273.07(a)
5.	Straw Mulching		
	a) Straw Mat	Finished thickness >20 mm.	C273.06(e)
6.	Landscape Planting		
	a) Temperature	Planting not to be undertaken when temperatures >35°C or <10°C.	C273.08
7.	Mulch		
	a) Fines	Shall not exceed 5% by volume.	C273.09(d)
	b) Woodchip	Maximum size <50 mm.	C273.09(d)
8.	Plant Material		
	a) Container Soil Mix	Contain >20% and <25% by volume of clay.	C273.09(e)

Table C273.3 - SUMMARY OF LIMITS AND TOLERANCES

ANNEXURE C273.A

**GRASS AND NATIVE SEED MIXTURES
FOR SEEDING AND FERTILISING OF MEDIAN AND ROADSIDE AREAS**

		MINIMUM APPLICATION RATE (Kilograms or grams of seed or fertiliser per hectare of surface)
GRASS SEED	Rye Corn (April- August) or	60 kg/ha
	Japanese Millet (Sept-March)	60 kg/ha
	Hulled Couch	5 kg/ha
	Red Clover (Inoculated)	5 kg/ha
	White Clover (Inoculated)	5 kg/ha
	'Elka' Perennial Rye	5 kg/ha
NATIVE SEED	Acacia dealbata	4 kg/ha
	Acacia buxifolia	1 kg/ha
	Acacia decurrens	1 kg/ha
	Acacia pravissima	1 kg/ha
	Leptospermum lanigerum	1 kg/ha
	Hardenbergia violacea	500 g/ha
	Kennedia prostrata	500 g/ha
	Acacia implexa	200 g/ha
	Banksia marginata	200 g/ha
	Bursaria spinosa	200 g/ha
	Callistemon pallidus	200 g/ha
Dodonaea viscosa	200 g/ha	
ORGANIC FERTILISER	Dynamic Lifter 'Nitro' or Equivalent	1000 kg/ha

