
B

Appendix B

Technical specifications

B.1 Technical specifications for TNR 4 (AFC issue)

B.2 Technical specifications for TNR 6 (AFC issue)

B.3 Technical specifications for TNR 5 (AFC issue)

B

Appendix B

B.1 Technical specifications for TNR 4 (AFC issue)

- QA Specification R178 Vegetation, January 2018
- QA Specification R179 Landscape Planting, May 2019

B.2 Technical specifications for TNR 6 (AFC issue)

- QA Specification R178 Vegetation, April 2019
- QA Specification R179 Landscape Planting, February 2019

B.3 Technical specifications for TNR 5 (AFC issue)

- QA Specification R178 Vegetation, September 2018
- QA Specification R179 Landscape Planting, September 2018



VEGETATION

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VERSION FOR: *MR154 –The Northern
Road Upgrade Stage 5 between Littlefields
Road and Glenmore Parkway*
DATE: *September 2018*

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FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been revised from RMS Specification R178 Edition 5 Revision 3.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes have been indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

RMS QA SPECIFICATION R178

VEGETATION

1 GENERAL

1.1 SCOPE

This Specification sets out the requirements for the vegetation of cut and fill batters, median areas, open drains and other areas within the site.

Vegetation includes *subsoil and topsoil testing, subsoil and topsoil amelioration*, initial surface preparation, topsoiling, fertilising, sowing of seed, *pneumatic or hydraulically applied mulches*, and watering, *maintenance and monitoring*.

1.2 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

1.2.1 Details of Work

Details of work are shown in Annexure R178/A.

1.2.2 Measurement and Payment

The method of measurement and payment and the acceptance of materials and work must comply with Annexure R178/B.

1.2.3 Schedules of HOLD POINTS, WITNESS POINTS and Identified Records

The schedules in Annexure R178/C list the **HOLD POINTS** and **WITNESS POINTS** that must be observed. Refer to Specification RMS Q for the definitions of **HOLD POINTS** and **WITNESS POINTS**.

The records listed in Annexure R178/C are Identified Records for the purposes of RMS Q Annexure Q/E.

1.2.4 Referenced Documents

Unless otherwise specified or is specifically supplied by the Principal, the applicable issue of a referenced document is the issue current at the date one week before the closing date for tenders or, where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 1289). For convenience, the full titles are given in Annexure R178/M.

1.3 DEFINITIONS

The terms “you” and “your” mean “the Contractor” and “the Contractor’s” respectively.

The following definitions apply to terms used in this Specification:

Compost Blanket

The application of a mix of high quality compost (to AS 4454), organic tackifiers (Guar), biological stimulants (bacteria and fungi foods), wetting agents, soil ameliorants and seed mix (refer to Drawings) using a purpose built pneumatic blower.

Weed contaminated topsoil

Weed contaminated topsoil is that material which contains or is likely to contain a significant proportion of potentially invasive weed species which are known to spread by residual seed or propagules contained in the soil.

Weed species include, but are not necessarily limited to, those listed by the relevant local government authority as noxious categories W1, W2, W3 or W4 under the Noxious Weeds Act 1993. Also included under this definition are agricultural and horticultural weed species and in particular invasive grasses such as *Chloris gayana* (Rhodes grass), *Phalaris* spp., *Eragrostis curvula* (African lovegrass), *Andropogon virginicus* (Whisky grass) and *Nassella trichotoma* (Serrated tussock) **and** *Lycium ferocissimum* (**African boxthorn**).

Where necessary, advice must be sought from a qualified Landscape Officer in order to determine whether the type and/or proportion of weed cover is significant for the purposes of this definition.

Hydromulching

Application of seed, fertiliser and cellulose fibre mulch by spraying a mixture of these ingredients with water and a binder.

Hydroseeding

The sowing of seed by spraying a seed/water mixture. The mixture normally includes fertiliser and a wetting agent.

Straw mulching

Placing a straw mulch using a blower. A binder is incorporated into the air stream or sprayed over the mulch as a separate operation.

Residual bitumen

Bitumen that remains after emulsion has broken and water has evaporated.

Initial watering

Initial watering is the first watering of turf immediately after installation.

All slopes stated in this specification are in the ratio of horizontal to vertical distance.

1.4 TIMING OF WORK

Complete work progressively within the following time frames:

- (a) **Vegetation of Areas with Slopes 5 4 to 1 or Flatter:** where earthworks requiring vegetation have been completed over an area exceeding one hectare, carry out vegetation within 14 days.
- (b) **Vegetation of Areas with Slopes steeper than 5 4 to 1:** where earthworks requiring vegetation have been completed over an area exceeding one hectare, carry out vegetation within 7 days.
- (c) **Open Drains:** complete vegetation within 7 days of excavation.

Soil erosion and sediment control measures for any area must remain in place and be maintained at least until the new vegetation provides sufficient protection to keep erosion to a similar level to that of typical local natural bushland, *as agreed with the Principal*.

Seeding should be undertaken typically during autumn or spring to maximise strike. If seeding is to occur outside the above, maintain soil moisture levels to ensure a satisfactory strike and growth.

1.5 PERSONNEL

You must engage a Soil Scientist with:

- (a) *education qualifications relating to soil science, agricultural science, soil survey and mapping, sodicity, acidity and salinity, disturbed land rehabilitation and erosion mitigation; and*
- (b) *at least five years relevant experience in soil assessment and management.*

2 MATERIALS FOR VEGETATION

2.1 TOPSOIL

Topsoil is defined for the purposes of Earthworks construction in RMS R44.

Topsoil for the use in Vegetation and/ or Landscape Planting must comply with the requirements of RMS R178 Clause 2.1.3.

2.1.1 Topsoil from Site

Stockpile on site material identified by the Principal for stripping and re-use as topsoil.

Carry out tests on the stockpiled topsoil using a NATA accredited testing laboratory to ascertain its suitability for use in revegetation works. Where the stockpiled topsoil is sourced from different locations within the work site, soil tests will be required for topsoil sourced from each location.

The soil test certificate must contain the date of testing and details of the types of test undertaken and their results, including cation analysis, pH values, salt content, particle analysis and any recommendations on the use of the topsoil *including fertilizer recommendations*.

Assess the topsoil areas to be stripped, confirm the required amelioration specific to the RMS R178 or R179 application (including fertilising applications) for which it will be used, make recommendations on reuse of the topsoil and maintain a Topsoil Register. The Topsoil Register must record the collection area, stockpile site, final location of topsoil, details of each sample tested

(including soil test certificates issued from laboratory testing), noting the prescribed soil tests and any amelioration undertaken. Maintain the Topsoil Register until Completion.

Incorporate Gypsum at a rate of 7kg/m³ and Lime at 1kg/m³ into topsoil won from Site.

For seed mix Types 1 and 2 shown on the landscape Drawings incorporate organic mulch into the topsoil in a 40/60 ratio by volume (organic mulch: topsoil) and include two applications each of 200g/m³ of urea into the topsoil.

If the soil test certificate indicates any stockpiled topsoil to be unsuitable for use in revegetation works, the Principal may direct you to carry out the measures recommended in the soil test certificate to improve the stockpiled topsoil. Any **further** improvement measures directed by the Principal, **excluding the incorporation of Gypsum, Lime, organic mulch and/ or urea nominated above into topsoil won from Site**, will be dealt with as a variation.

Use only stockpiled topsoil suitable for use in revegetation works as topsoil unless directed otherwise by the Principal.

Before use for ~~vegetation~~, screen or sort the topsoil to remove **materials toxic to plants, rubbish, sticks**, stumps, roots, clay lumps or stones greater than 50mm in size.

2.1.2 Weed Contaminated Topsoil

Do not use weed contaminated topsoil in the Works.

Dispose of weed contaminated topsoil located in stockpiles in accordance with the requirements for spoiling in Specification RMS R44.

Bury the weed contaminated topsoil away from any pavement, structure, watercourse or drainage path and with a cover of inert fill of a minimum 500 mm compacted thickness. The inert fill must:

- (a) be from the specified earthworks, or when authorised by the Principal, from borrow;
- (b) be free of any material with a particle size exceeding 75 mm;
- (b) have a Plasticity Index between 10 and 20 when tested in accordance with Test Method RMS T109; and
- (c) be placed and compacted in accordance with the requirements for embankments in RMS R44.

Spread uncontaminated topsoil over the burial area and revegetate within 7 days.

2.1.3 Imported ~~General Purpose~~ Topsoil

Do not use imported organic topsoil in the Works until all Site won topsoil of suitable quality (refer Clause 2.1.1) has been placed, or has been allocated to be placed, in the Works under this Contract.

~~Where imported general purpose topsoil is required, it~~ ***The imported topsoil*** must be a blend of sand, natural soil and organic materials, and be suitable for the culture of all plant material ***proposed for the site***. ~~And in particular exotic and native grasses.~~ It must:

- (a) be of a friable porous nature;
- (b) contain no refuse or materials toxic to plant growth;
- (c) contain no stumps, roots, clay lumps or stones larger than 50 mm in size;

- (d) have an organic content of at least 5% by mass as determined by the method specified in AS 1289 ~~4.1.1~~ Part D;
- (e) have a pH in the range of 5.5 to 6.8 ~~6.5~~ when tested in accordance with RTA T123;
- (f) have a soluble salt content not exceeding 0.06% by mass;
- (g) be suitable for phosphorus sensitive plants - *available Phosphorus (P) (Bray) must be in the range 20 – 50mg / kg when tested in accordance with AS4419 App D;*
- (h) *have Electrical conductivity (dS/m) 1:2 <1.0 when tested in accordance with AS 4419 Appendix D;*
- (i) *have Exchangeable sodium > 10 when tested in accordance with AS 1289.3.8.2 (Emerson dispersion test);*
- (j) *be classified by texture to AS 4419 Appendix I as;*
 - *Fine: Clay loam, fine sandy loam, sandy clay loam, silty loam, loam.*
 - *Medium: Sandy loam, fine sandy loam, or*
 - *Coarse: Sand, loamy sand;*and
- (k) be free of weed and weed refuse material

HOLD POINT

Process Held: Delivery of imported ~~general purpose~~ topsoil.

Submission Details: At least 7 days prior to delivery, a statement signed by you verifying that the topsoil complies with specified requirements. The statement must quote test results and must certify that the topsoil is not contaminated topsoil.

Release of Hold Point: The Principal will consider the submitted documents and may inspect the test records prior to authorising the release of the Hold Point.

2.1.4 Topsoil for Defence Establishment Orchard Hills (DEOH)

Topsoil material generated within the DEOH site may be used as soil, fill or component of soil or fill within 30 metres of the final boundary. Topsoil material generated outside the current DEOH site may not be used as soil, fill, or a component of soil or fill, within the final boundaries of DEOH site or within 30 metres of the final boundary, unless:

- a. *The contractor can ensure the topsoil material is free from contamination that would adversely affect the environment; and*
- b. *The topsoil material is sourced from a location that demonstrates it is free of weed propagules and/or Phytophthora cinnamomi using appropriate testing methods. Details of the topsoil material source and testing undertaken must be provided to the Principle before the material is taken onto the DEOH site. The Principal may write to the contractor at any time and advise that the Principal is not satisfied with the testing undertaken. If the Principal provides such advice, the contractor must not source any further topsoil material from that site without the Principal's written agreement.*

2.2 HERBICIDE

Herbicides used must be currently registered for the treatment of weeds by the Australian Pesticides and Veterinary Medicines Authority (APVMA). Use herbicides in accordance with the

manufacturer's directions supplied with the product. Herbicides must be glyphosate based unless otherwise required by the relevant local government authority.

Information on registered herbicides may be obtained from the APVMA Internet site www.apvma.gov.au.

2.3 SEED

All seed used must be of the species and varieties listed in Annexure R178/A.

Supply all seeds required, unless stated otherwise in Annexure R178/A that locally collected native seed will be supplied by the Principal.

Note that there may be a lead time of up to two years for procurement of some native seed species.

Include in the PROJECT QUALITY PLAN the name/s of the proposed seed supplier/s. This information may be advised to the Principal as an addendum if it is not available when the Project Quality Plan is submitted. This addendum must be submitted prior to any seeding application.

The native seed must be delivered to the site in separate lots for each species and variety, clearly labelled to show species, variety and weight. Each seed species must be accompanied with a species identification certificate. Grass and clover seed must be pre-packed commercially with an accompanying certificate of germination as well as a certificate of authenticity. Where site conditions are not suitable for the pre-treatment and mixing of seed, this may be done off site and an accompanying certificate showing the species, variety, weight and place of treatment submitted to the Principal prior to seeding application.

Advise the Principal of the unavailability of any of the specified seed species at least six weeks in advance of sowing *and obtain approval from the Principal to substitute species*.

~~Locally collected native seed supplied by the Principal will be delivered to the site at no cost to the Contractor. Where this is the case, notify the Principal, in writing, at least five days prior to commencing vegetation of an area, so that the Principal can arrange supply of the locally collected native seed. This notification must indicate the location and area to be treated and the quantity of native seed required.~~

2.4 FERTILISER

~~Fertiliser used must be of an organic type, such as pelletised poultry manure, having an N:P:K analysis (stated in elemental form) within the following range:-~~

- ~~(a) N: 5.0% to 9.0%~~
- ~~(b) P: 1.0% to 4.0%~~
- ~~(c) K: 2.0% to 4.0%~~

Use fertiliser in accordance with recommendations of the soil testing, in accordance with Clause 2.1.1. Recommend for the Principal's approval, specialist fertilizers to be used in waterway areas.

Additional applications of fertiliser may be required in accordance with RMS QA Specification R179 Landscape Planting Clause 2.1.

Fertiliser must be delivered to the site in unopened standard bags or containers bearing the manufacturer's details and analysis and quantity of its constituents. ***Obtain certification of the manufacturer's description, analysis of constituents and quantity of fertiliser delivered to site.***

WITNESS POINT

Process Witnessed:	Application of fertiliser
Submission Details:	Notify Principal, not less than 2 clear working days prior to the intended time of applying fertiliser, that the unopened bags or containers of fertiliser are available for inspection on site.

2.5 STRAW

Straw to be used in mulching operations must be derived from cereal crops comprising wheat, oats or rice. Meadow hay must not be used. Straw must be certified as free of weeds.

2.6 CELLULOSE FIBRE MULCH

Cellulose fibre mulch must be produced from finely chopped sugarcane mulch, shredded recycled paper or wood fibre from plantation timber such as *Pinus radiata*. Unless shown on the Drawings or specified otherwise, the mulch must be dyed green using a non-toxic biodegradable dye.

Preference is to be given to locally produced products. Imported products are to be declared for approval, nominating the source and country of origin.

2.7 WATER

Water used must be potable or obtained from a source which contains no toxins or pollutants or any substance which would adversely affect the growth of any of the plants to be sown.

When the use of non-potable water is proposed, test the source and prior to sowing, provide the Principal with verification that the water is free of toxins or pollutants or substances which would adversely affect the growth of plants to be sown.

2.8 BINDER

The binder used in vegetation work must be a slow setting anionic bitumen emulsion complying with Specification RMS 3254 or a non-toxic biodegradable polymer binder manufactured for the intended use, such as "Guar gum".

2.9 VEGETABLE DYE

Dye used in herbicide spraying, hydroseeding and hydromulching applications must be a biodegradable, red or green coloured vegetable dye, as applicable.

2.10 ORGANIC FIBRE MESH AND FIXING PINS

Unless otherwise specified, organic fibre mesh used must ***consist of coconut fibre mesh with a minimum fibre density of 700g/m². Polymer reinforcing materials are not permitted.*** ~~be Soil Saver Jute Mesh.~~

Fixing pins must be ~~“U” shaped made from 4 mm to 6 mm diameter plain steel wire~~ **biodegradable plastic pins** with 150 mm long legs 50 mm apart.

2.11 BITUMEN EMULSION

Bitumen emulsion used for the protection of open drains must be a slow setting anionic bitumen emulsion complying with RMS 3254.

~~2.12 TURF AND FIXING PINS~~

~~Turf must be *Zoysia* ‘Empire’ or equivalent, dense with vigorous grass growth and be well rooted to at least 25 mm thick and be free of weeds, soil pests and diseases. Kikuyu grass must not be used.~~

~~Turf must be verdant and fresh when delivered, with the earth base lightly moist and the turf grass close mown. The turf must be freshly cut in long lengths of uniform width not less than 300 mm, and in sound unbroken condition. Turf must be supplied in rolls and when unrolled must hold together and not crumble.~~

~~Fixing pins must be “U” shaped made from 4 mm to 6 mm diameter plain steel wire with 150 mm long legs 100 mm apart.~~

2.13 COMPOST BLANKET

Provide specialist compost blanket applications as shown on the Drawings.

The compost blanket must consist of a mix of high quality compost, organic tackifiers, bacteria and fungi food, wetting agents and soil ameliorants. The compost must be derived from treated site tub-ground mulch complying with AS 4454. Compost derived from comingled waste must not be used.

HOLD POINT

Process Held: *Use of compost blanket.*

Submission Details: *At least 10 working days prior to application of the compost blanket, submit certification for compliance of the compost blanket, supplier’s written instructions for installation and details of the locations to be treated.*

Release of Hold Point: *The Principal will consider the submitted documents and may inspect the compost blanket material prior to authorising the release of the Hold Point.*

3 VEGETATION OF AREAS OTHER THAN OPEN DRAINS

3.1 PREPARATION OF SURFACE

3.1.1 Herbicide Spraying

Herbicide use must comply with the Pesticides Act 1999.

Before commencement of any herbicide spraying, comply with the requirements of Specification RMS G34M, G35 or G36 on public notification of pesticide use.

Where weed infestation is present:

- (a) for those species listed by the relevant local government authority as noxious categories W1, W2, W3 or W4 under the Noxious Weeds Act 1993, take action as required by the Act and the local government authority; and
- (b) for all other species, spray with the specified herbicide.

The Principal may direct that the area to be treated for weed infestation be extended beyond the area to be vegetated.

A biodegradable red dye is to be included with the herbicide spray. The dye content used must be sufficient to ensure that the treated areas can be identified.

All work required to control noxious weeds of categories W1, W2, W3 and W4, except spraying with the specified herbicide, is treated as a variation to the Contract or, if so directed by the Principal, may be undertaken by others.

Areas sprayed with herbicide must remain undisturbed for a minimum period of two weeks or such longer period as is recommended by the herbicide manufacturer. ***Following this two-week period, carry out a second spraying of the area with herbicide and leave the area undisturbed for a further two weeks before carrying out any landscape works.***

Do not spray herbicides in windy weather (wind speeds of 10 km/hr or greater) or within such distance of a watercourse which would permit the herbicide to enter the water. ***Ensure herbicides do not drift on to existing vegetation to be retained, or on to planting carried out as part of the landscape works.***

3.1.2 Slopes

Tyne slopes with gradients of ≤ 3 to 1 or flatter generally parallel to the surface contours to a depth of 150 mm to produce a loose surface and remove all stones larger than 100 mm in size, rubbish and other materials that may hinder germination before topsoiling.

Prepare batters steeper than ≤ 3 to 1 by three passes of a steel chain of minimum weight 25 kg/m to remove loose material, or by another method which produces a similar result, no earlier than 7 days before seeding. The treated surface must have all furrows aligned with the contours.

Where batters have been stepped, remove all loose stones larger than 50 mm and all rubbish.

Where shown on the Drawings or when directed by the Principal, line the batters with organic fibre mesh in accordance with Clause 4.1.1.

3.1.3 Paved Areas

Where areas of old road formation are shown on the Drawings to be vegetated, ***or where directed by the Principal***, rip up the areas through to the full thickness of the pavement. Likewise, for all temporary roads, stockpile areas and compound areas to be vegetated upon completion of the Works, rip to the greater of the full depth of the hardstand or pavement or a depth of 150 mm.

3.2 TOPSOILING

Topsoil any areas to be vegetated, which do not have a topsoil cover *except areas to be covered by a Compost Blanket*.

All uncontaminated topsoil stockpiled at the commencement of the earthworks must be used in the vegetation work. Imported topsoil may be used to make up for any shortfall in the quantity available from the site.

Spray any undesirable grass/weed growth occurring on topsoil stockpiles with an herbicide *in accordance with the requirements of Clause 3.1.1* before spreading the topsoil. More than one application of herbicide may be required. Apply the last application of herbicide not less than 2 weeks before spreading or such longer period as is recommended by the manufacturer.

Apply topsoil uniformly ~~at a rate of 1 cubic metre per 20 square metres of surface~~ to all areas which are to be topsoiled *to the depths shown on the Drawings. Do not compact the topsoil unless otherwise stated.* ~~except stepped batters. Where batters have been stepped, loosely cover the steps to provide a wedge of topsoil on each step which is 30 mm to 70 mm deep against the vertical face at the back of the step.~~

Apply topsoil to depths indicated in the Landscape Drawings (if no depths are shown on the Drawings then apply to a depth of 100mm) and in accordance with Clause 2.1. Do not smooth or compact the topsoil unless otherwise stated and agreed with the Principal.

~~On slopes which are 5 to 1 or flatter, cultivate the topsoiled area to a depth of 50 mm by a diamond harrow to provide a roughened surface with soil lumps not exceeding 50 mm dimension.~~

3.3 PREPARATION OF SEED

Where site conditions are not suitable for the pre-treatment and mixing of native and grass seed, this work may be done off site in conditions conducive for this purpose.

HOLD POINT

Process Held:	Use of seed pre-treated off site.
Submission Details:	At least 3 working days prior to delivery, submit the accompanying certificate showing the species, variety, weight and place of pre-treatment.
Release of Hold Point:	The Principal will consider the submitted documents and may inspect the seed prior to authorising the release of the Hold Point.

3.3.1 Pre-treatment to Assist Germination

Pre treat those seeds shown in Annexure R178/A as requiring pre-treatment to assist germination.

Where hot water is the specified pre-treatment, place the seed in a calico bag together with camphor granules as an insect repellent at the rate of 50 g per 10 litres of water. Immerse the bag in hot water with temperature of around 90°C for a minimum period of 60 minutes or the period specified in Annexure R178/A, whichever is the greater, and then remove from the water, drain and allow to dry. When dry, mix the treated seed with the remaining seed and broadcast when conditions are suitable.

Seed that has been pre-treated must be used within five days of pre-treatment.

Where proprietary products are used to assist germination, use as recommended by the manufacturer.

3.3.2 Preparation for Hydromulching, Hydroseeding and Straw Mulching

Storage tanks, containers and equipment to be used in hydromulching, hydroseeding and straw mulching must be clean and free of contamination from previous operations.

The hydromulch, hydroseed and straw mulch must comprise the relevant materials listed in Table R178.1 applied at the rates set out in Table R178.1.

Table R178.1 – Application Rates for Materials

Material	Clause	Rate per Hectare
(a) Hydromulching		
(i) Water	2.7	35,000 litres <i>or as recommended by the supplier</i>
(ii) Organic fertiliser: pelletised poultry manure <i>Ameliorant</i>	2.4	250 kg <i>or as recommended by the supplier</i>
(iii) Seed	2.3	See Annexure R178/A
(iv) Cellulose fibre mulch: - Sugar cane mulch, mixed with 20% (by weight) of shredded paper or - Wood fibre mulch	2.6	3,500 kg 2,500 kg
(v) Binder: granulated 'Guar gum'	2.8	60 kg
(vi) Biodegradable green dye	2.9	As recommended
(b) Hydroseeding		
(i) Water	2.7	20,000 litres <i>or as recommended by the supplier</i>
(ii) Organic fertiliser: pelletised poultry manure <i>Ameliorant</i>	2.4	250 kg <i>or as recommended by the supplier</i>
(iii) Seed	2.3	See Annexure R178/A
(iv) Biodegradable green dye	2.9	As recommended
(c) Strawmulching		
(i) Straw	2.5	5,000 kg
(ii) Binder: - Undiluted residual bitumen emulsion or - Granulated 'Guar gum'	2.8	2,500 litres 100 kg

Produce hydromulch / hydroseed slurry mixtures by adding the specified materials into the tank and agitate until a homogenous blend is obtained. Refer to Annexure R178/D for the approximate number of loads required per hectare of spraying, for typical tank capacities, in order to achieve the specified rates in Table R178.1 and the minimum thickness of the sprayed layer specified in Clause 3.4.

3.4 SOWING

3.4.1 Sowing Methods

Unless otherwise shown on the Drawings, sow areas with slopes of 3 to 1 or flatter, using one of the following methods:

- (a) dry sowing, in accordance with Clause 3.4.2; or
- (b) for small areas only, by hand.

Unless otherwise shown on the Drawings, sow areas with slopes steeper than 3 to 1 in any direction, using one of the following methods:

- (i) hydroseeding and straw mulching; or
- (ii) hydromulching; or
- (iii) for rock face batters, hydroseeding; or
- (iv) for small areas only, by hand.

Stepped batters must be topsoiled as described in Clause 3.2 and hydroseeded or hydromulched.

WITNESS POINT

Process Witnessed: Sowing

Submission Details: Notify the Principal, not less than 5 clear working days prior to the intended time of sowing, giving details of the area to be sown.

3.4.2 Dry Sowing

Undertake dry sowing using either:

- (a) a tractor drawn seed drill to place seed at a depth of 5 mm; ~~or~~
- ~~(b) a spreader followed immediately by a single pass with an unweighted diamond harrow.~~

Where practicable, tractor passes with the seed drill or harrow must follow finished surface contours.

To those areas that it is impracticable to use a tractor, apply seed using a hand broadcast method and lightly rake over to achieve required seed cover.

Distribute seed and fertiliser evenly over the areas to be sown at the rates specified in Annexure R178/A. Apply fertiliser concurrently with the seeding operation.

Gauge the application rate of the seed mix to ensure an even distribution over the areas sown, in accordance with the rates nominated in Annexure R178/A. Maintain records of measurements and calculations to determine actual distribution rates for each lot.

3.4.3 Hydromulching and Hydroseeding

Carry out hydromulching / hydroseeding within 2 days of completion of soil preparation or, if delayed by the weather conditions listed in Clause 3.4.5, as soon as weather conditions permit.

Agitate continuously the slurry to maintain a uniform consistency during application. Apply it uniformly over the whole surface at the rate specified in Table R178.1.

The sprayed hydromulch layer within 48 hours of application must have a minimum thickness at any location of 5 mm when using sugar cane mulch (mixed with shredded paper), or 2 mm when using wood fibre.

3.4.4 Straw Mulching

The straw mulch must ~~comprise~~ **comply with** the materials and application rates set out in Table R178.1.

Apply the straw mulch uniformly using a purpose-made blower unit. Incorporate the emulsion as a spray into the air stream of the mulch blower or apply it in a separate operation within 12 hours from the application of straw mulch.

The straw mulch layer within 48 hours of application must have a minimum thickness at any location of 25 mm **within 48 hours of application**.

3.4.5 Weather Conditions for Hydroseeding, Hydromulching and Straw Mulching

Do not apply hydroseeding, hydromulching and straw mulching:

- (a) when winds exceed 15 km/hr;
- (b) when temperatures exceed 37°C,
- (c) where the surface is too wet; or
- (d) during rain periods or when rain appears imminent.

3.4.6 Compost Blanket

Supply and install the compost blanket at thicknesses of approximately 50 mm unless shown otherwise on the Drawings or in accordance with the supplier's written instructions.

Apply compost blanket within 5 days of completion of subsoil preparation.

Moisten the prepared surface with a solution of water and wetting agent. Apply compost blanket using a pneumatic blower, over the whole surface to achieve a smooth surface to a minimum of 30 mm thick for slopes 3 to 1 or flatter or minimum 50 mm thick for batters steeper than 3 to 1.

3.5 SIGNPOSTING

Supply and install information signs approximately 1,500 x 600 mm stating "NATIVE PLANT REGENERATION AREA—PLEASE KEEP OFF", including the requisite posts, brackets and fittings, where shown on the Drawings or as directed by the Principal. Support each sign at a height of 1.5 metres on two 75 mm diameter steel posts set in concrete 500 mm deep into the ground at a distance of 900 mm apart.

4 VEGETATION OF OPEN DRAINS & CREEKS

4.1 PREPARATION OF SURFACE

Treat weed infestation in accordance with Clause 3.1 but without using herbicides.

Where shown on the Drawings or directed by the Principal, apply the following protective treatment immediately to all or part of the surface ~~to be vegetated~~.

4.1.1 Lining with Organic Fibre Mesh

Lay the runs of the **800 gsm jute** mesh along the direction of water flow.

Slot the upstream end of the mesh into a trench 150 mm wide by 150 mm deep and pin the mesh to the base of the trench at 200 mm centres. Backfill the trench with soil and compact by foot.

Lay the mesh taut and evenly over the soil surface without any air pockets but do not stretch it.

Overlap adjacent runs of mesh by 100 mm with the higher run lapped over the lower.

Pin the mesh along the sides of each run at 500 mm centres and along the middle of each run at 1 m centres.

End overlaps must be 150 mm wide with the higher run end lapped over the start of the lower and pinned at 200 mm centres.

4.2 SOWING

Apply seed and fertiliser uniformly at the rates specified in Annexure R178/A by one of the following procedures, as shown on the Drawings or as directed by the Principal:

- (a) by hydroseeding or hydromulching **or compost blanket** (Clauses 3.3.2, ~~and 3.4.3~~ **and 3.4.6**); or
- (b) by hand.

4.3 SPRAYING WITH BITUMEN EMULSION

Spray a slow setting anionic bitumen emulsion over the sown surface at a rate of 1.0 litre of undiluted residual bitumen emulsion per square metre.

5 ~~TURFING FOR SLOPES AND OPEN DRAIN AREAS~~

~~Place turf on slopes and open drain areas where shown on the Drawings or where directed by the Principal.~~

~~Turfing for lawn areas as part of landscape planting must be in accordance with Specification RMS R179.~~

~~Keep the turf moist at all times during transport and site storage, and lay it in its final position as early as possible after delivery. Turf must be laid within 24 hours of delivery.~~

~~Prepare the surface areas to be turfed to the desired grades and levels. Surface levels (before turfing) for areas adjacent to kerbs must finish 35mm below the top of kerb to allow for turf thickness.~~

~~Remove loose rock and any extraneous material from these areas.~~

~~For slopes with gradient 5 to 1 or flatter, lightly tyne the existing ground surface to a depth of 50mm and then install 25mm of topsoil to act as turf underlay. Rake the soil to provide an even surface for the turf.~~

~~Unroll the turf and lay them in parallel strips abutting at all ends and edges of the rolls. Spread additional topsoil to fill all joints and hollows, and where necessary, lightly roll the surface of the newly laid turf.~~

~~For open drains areas and slopes with gradients steeper than 5 to 1, tyning of the ground surface is not required. Butt runs of turf hard against each other and place the turf perpendicular to the direction of water flow. Pin turf into position at 500 mm centres.~~

6 TEMPORARY VEGETATION

Vegetate stockpiles, stockpile sites, prepared batters, basins and other areas nominated by the Principal to control erosion and weed invasion with the following cover crop species:

- (a) Rye Corn (during the months of April to August) at a rate of ~~35~~ **20** kg per hectare.
- (b) Japanese Millet (during the months of September to March) at a rate of ~~35~~ **2**kg per hectare.
- (c) *Green Couch (all year) at a rate of 2 kg per hectare.*
- (d) *Eclipse/Crusader Rye (all year) at a rate of 15 kg per hectare.*
- (e) *Red Clover (all year) at a rate of 5 kg per hectare.*

Couch, Eclipse/Crusader Rye and Red Clover applied at a rate of 2, 15 and 5 kg per hectare respectively, must be incorporated into the mix all year round with either (a) or (b) to provide a semi-permanent cover.

Where directed by the Principal, include native seed in accordance with the species listed in Annexure R178/A.

Regularly revegetate the stockpiles to maintain a dense coverage of cover crop sufficient to minimise weed colonisation. Undertake for the period of the stockpiling. Where weed cover becomes greater than 5% of the stockpile surface, eradicate weeds in accordance with Clause 3.1.1, and then re-seed disturbed areas with cover crop.

7 AREAS DISTURBED BY THE CONTRACTOR

Restore areas outside the limits of the Works which are disturbed by you (such as areas for compounds, material storage, access and haul roads) with vegetation in accordance with the requirements of this Specification.

8 MAINTENANCE

Maintain all vegetated areas for ~~6~~ **12** months after all sowing is complete or until *the actual* Contract Completion *Date*, whichever occurs first.

Water areas where and when directed by the Principal. Water by means of a fine spray which causes minimal disturbance to seeded areas.

~~Water the turf immediately after laying until the underlay is moistened to its full depth. Continue watering every second day for the first 14 days, then at regular intervals to maintain a discernible~~

Vegetation

R178

~~level of soil moisture until the turf is established. Turf must not be allowed to dry out during the establishment period.~~

~~Turf that is deemed to have died through your neglect, must be replaced and all associated costs for re-establishment of the turf will be at your own expense.~~

Maintain areas of compost blanket in a weed free condition and reinstate the compost blanket as necessary.

Clear dead vegetation from areas showing poor growth or damage and replace all lost topsoil. Then recultivate and reseed the area. The Principal may issue directions for other remedial work to be undertaken in conjunction with the recultivation and reseeding.

Control weeds as described in Clause 3.1.1.

Mow areas within 2 metres of a road pavement when directed by the Principal. Cut the vegetation to a height of 50 mm unless otherwise directed.

ANNEXURE R178/A – GRASS AND NATIVE SEED MIXES

Seed mixes and application rates are as shown on the Landscape Drawings.

Organic Fertiliser: Pelletised poultry manure to be applied at a rate of **250 kg/hectare**.

~~*H = Pre treatment to assist germination by immersing seeds contained in bag in hot water (90°C) for 60 minutes:~~

NOTES

- (1) All native seed will be supplied by ~~you~~ the Principal. Only local native species are to be used.
- (2) *Eucalyptus* seed must not be sown:
 - on embankments of Sediment Control basins;
 - within 10 metres of the edge of pavement where no safety barrier is to be provided, or within 4 metres of the edge of pavement where a safety barrier is to be erected;
 - within 10 metres of powerlines.
- (3) *Triticale* species must not be used in revegetation mixes in the Tablelands, Central Slopes and Western Plains regions, in order to prevent the spread of “wheat rust” in wheat growing areas.
- (4) *White, Strawberry* and *Subterranean Clovers* (used as cover crops) must not be used in conjunction with native seeding, since their aggressive spreading growth may prevent germination of native seeds.
- (5) All future mowing will be limited to a 2.0 metre wide strip adjacent to both sides of the carriageway. The remaining road reserves must be left unmown to permit natural regeneration of native seed.

ANNEXURE R178/B – MEASUREMENT AND PAYMENT

Payment will be made for all costs associated with completing the work detailed in this Specification in accordance with the following Pay Items, *except that vegetation for property adjustments will be paid under RMS R204.*

Where no specific pay items are provided for a particular item of work, the costs associated with that item of work are deemed to be included in the rates and prices generally for the Work Under the Contract.

Unless specified otherwise, a lump sum price for any of these items will not be accepted.

The supply of the specified inert material to cover buried weed contaminated topsoil is allowed for in the rates for RMS R44. Measurement and payment for excavation of the contaminated topsoil and the excavation of the burial site is included in the pay item for general excavation in RMS R44.

Topsoil contaminated by your actions or omissions will not be measured. Measurement of topsoil imported to replace topsoil contaminated by your actions or omissions must be included under Pay Item R178P2 or R178P11, as appropriate, not R178P3 nor R178P12.

Work carried out in order to comply with Clause 7 is excluded from the measurements of all the Pay Items listed below; the cost is deemed to be included in the rates and prices generally for the Work Under the Contract.

Notwithstanding any general statements to the contrary that may be made elsewhere in this Specification, in the context of landscape works, all areas must be measured in the plane of the surface and thicknesses specified must apply perpendicular to the surface.

Pay Item R178P1 - Spraying Weeds with Herbicide

The unit of measurement is the square metre of surface treated.

The length and width must be determined from the actual face area of completed work.

Pay Item R178P2 - Topsoiling Using Site Material Including Surface Preparation and Screening and Testing of Topsoil Stockpiles.

The unit of measurement is the square metre of surface of topsoiling.

The length and width must be determined from the face area of completed work.

Separate prices must be provided for different classes of work as follows:

The schedule rate must cover all costs associated with supply, delivery and incorporation of Gypsum, Lime, organic mulch and/ or urea nominated in Clause 2.1.1 into topsoil won from Site.

R178P2.1 Areas with a slope of ≤ 4 to 1 or flatter.

R178P2.1.2 100mm thickness

R178P2.2 Areas steeper than ≤ 4 to 1 except stepped batters.

R178P2.2.2 100mm thickness

R178P2.3 — Stepped batters

Pay Item R178P3 - Topsoiling Using Imported Material Including Surface Preparation

The unit of measurement is the square metre of surface of topsoiling. *The schedule quantities are provisional quantities.*

The length and width must be determined from the face area of completed work.

Payment includes surface preparation and supply and placing of imported topsoil.

Separate prices must be provided for different classes of work as follows:

R178P3.1 Areas with a slope of $\frac{5}{4}$ to 1 or flatter.

R178P3.2 Areas steeper than $\frac{5}{4}$ to 1 except stepped batters.

~~**R178P3.3** Stepped batters.~~

Pay Item R178P4 - Dry Sowing

The unit of measurement is the square metre of surface treated.

The length and width must be determined from the face area of the completed work.

Pay Item R178P5 - Hand Sowing

The unit of measurement is the square metre of surface treated.

The length and width must be determined from the face area of the completed work.

Pay Item R178P6 - Preparation of Surface for Areas Not Requiring Topsoiling

The unit of measurement is the square metre of surface treated.

The length and width must be determined from the face area of completed work.

Pay Item R178P7 - Hydroseeding

The unit of measurement is the square metre of surface treated.

The length and width must be determined from the face area of completed work.

Pay Item R178P8 - Hydromulching

The unit of measurement is the square metre of surface treated.

The length and width must be determined from the face area of completed work.

Pay Item R178P9 - Straw Mulching

The unit of measurement is the square metre of surface treated.

Payment must include the costs of binder.

The length and width must be determined from the face area of completed work.

Pay Item R178P10 Supply and Erection of Information Signs

The unit of measurement is per "each" sign erected.

The schedule rate must cover all costs associated with supply and delivery of the sign at the site including the requisite posts, brackets and fittings; excavation of the two holes; the concreting of the two 75 mm posts therein; and the attachment of the sign.

Pay Item R178P11 - Topsoiling Open Drains Using Site Material Including Surface Preparation and Screening of Topsoil Stockpiles

The unit of measurement is the square metre of surface of topsoiling.

The length and width will be determined from the actual face area of completed work.

Pay Item R178P11.1 – Thickness of Topsoil for Open Drains - 75mm

Pay Item R178P12 - Topsoiling Open Drains Using Imported Material Including Surface Preparation

The scheduled quantities are provisional. The unit of measurement is the square metre of surface of topsoiling.

The length and width must be determined from the face area of completed work.

Pay Item R178P12.1 – Thickness of Topsoil for Open Drains - 75mm

Pay Item R178P12.2 – Thickness of Topsoil for Open Drains - 100mm

Pay Item R178P13 - Hydroseeding of Open Drains

The unit of measurement is the square metre of surface treated.

The length and width must be determined for the face area of completed work.

Pay Item R178P14 - Hydromulching of Open Drains

The unit of measurement is the square metre of surface treated.

The length and width must be determined for the face area of completed work.

Pay Item R178P15 - Sowing Open Drains by Hand

The unit of measurement is the square metre.

The length and width must be determined from the face area of completed work.

Pay Item R178P16 - Spray Open Drains with Bitumen Emulsion

The unit of measurement is the square metre.

Measurement must only include those areas of open drains, where shown on the Drawings or directed by the Principal, to be protected by bitumen emulsion only.

The length and width must be determined from the face area of completed work.

Pay Item R178P17 - Lining ~~Open Drains~~ with Organic Fibre Mesh

The unit of measurement is the square metre.

Measurement must only include those areas of *lining* ~~open drains~~, where shown on the Drawings or directed by the Principal, ~~to be protected by bitumen emulsion and organic fibre mesh.~~

The length and width must be determined from the face area of completed work.

~~Pay Item R178P18 - Turfing for Slopes and Open Drain Areas~~

~~The unit of measurement is the square metre of turf laid and must include all items associated with installation of the turf and the initial watering.~~

~~The length and width must be determined from the face area of completed work.~~

~~Separate prices must be provided for different classes of work as follows:~~

~~**R178P18.1** Areas with gradient 5 to 1 or flatter.~~

~~**R178P18.2** Open drains and areas with gradient steeper than 5 to 1.~~

Pay Item R178P19 - Watering (Provisional)

The unit measurement is the kilolitre.

This work is to be carried out only upon the direction of the Principal.

The volume must be determined by calibrated dipstick readings or other approved method.

Pay Item R178P20 - Recultivating and Resowing

The unit of measurement is the square metre of surface treated. Areas recultivated and re-sowed as a result of actions or omissions by you must be at your cost and must not be included in the area measured.

The length and width must be determined from the face area of the completed work.

Pay Item R178P21 - Mowing

The schedule quantity is a provisional quantity.

The unit of measurement is the *square metre* ~~linear metre~~ of roadside strip mowed to a width of 2 metres.

Pay Item R178P22 - Compost Blanket – 50mm Thickness

The unit of measurement is the square metre of surface treated.

Payment includes for the costs of surface preparation, supply and blending of compost, organic tackifier, biological stimulants, wetting agents, soil ameliorants and seed mix, and pneumatic application of the compost blanket.

The length and width must be determined from the face area of completed work.

ANNEXURE R178/C – SCHEDULES OF HOLD AND WITNESS POINTS AND IDENTIFIED RECORDS

Refer to clause 1.2.3.

C1 SCHEDULE OF HOLD AND WITNESS POINTS

Clause	Type	Description
2.1.3	Hold	Delivery of imported topsoil
2.4	Witness	Application of fertiliser
2.13	Hold	<i>Use of compost blanket</i>
3.3	Hold	Use of off site pre-treated seed
3.4.1	Witness	Sowing

C2 SCHEDULE OF IDENTIFIED RECORDS

The records listed below are Identified Records for the purposes of RMS Q Annexure Q/E.

Clause	Description of the Identified Record
2.1	Verification of compliance of imported topsoil
2.1.1	<i>Topsoil Register</i>
2.3	Name/s of proposed seed supplier/s
2.4	<i>Certification of fertiliser delivered to site</i>
2.13	<i>Name/s of proposed compost blanket supplier/s</i>

ANNEXURE R178/D – REQUIRED NUMBER OF LOADS PER HECTARE FOR TYPICAL TANK CAPACITIES

The following tables give the approximate number of loads required per hectare of spraying, for typical tank capacities, in order to achieve the specified rates in Table R178.1 and the minimum thickness of the sprayed layer as specified in Clause 4.3.

D1 Hydromulching

(a) Using Chopped Sugar Cane Mulch

Specified application rate of chopped sugar cane mulch: 3,500 kg/ha

Finished minimum dry depth of mulch material on ground within 48 hours of application: 5 mm

Tank Capacity	Loads per Hectare
5,625 litres	9
7,500 litres	8
10,000 litres	7
14,100 litres	5
14,400 litres	5
15,800 litres	5

(b) Using Wood Fibre

Specified application rate of wood fibre: 2,500 kg/ha.

Finished minimum dry depth of mulch material on ground within 48 hours of application: 2 mm.

Tank Capacity	Loads per Hectare
5,625 litres	8
7,500 litres	7
10,000 litres	5
14,100 litres	3.5
14,400 litres	3.3
15,800 litres	3

D2 Hydroseeding

Tank Capacity	Loads per Hectare
5,625 litres	5
7,500 litres	4
10,000 litres	3
14,100 litres	2
14,400 litres	2
15,800 litres	2

D3 Strawmulching

Finished minimum depth of mulch material on ground, with residual undiluted bitumen emulsion, within 48 hours of application: 20 mm

Approximate loads per hectare is as for hydroseeding.

ANNEXURES R178/E TO R178/L – (NOT USED)

ANNEXURE R178/M – REFERENCED DOCUMENTS

Refer to Clause 1.2.4

RMS Specifications

RMS Q	Quality Management System
<i>RMS G36</i>	<i>Environmental Protection</i>
RMS R44	Earthworks
RMS R179	Landscape Planting
RMS 3254	Bitumen Emulsion

RMS Test Methods

RMS T109	Plastic Limit and Plasticity Index of Road Materials
RMS T119	Determination of Density of Road Materials in situ using the Sand Replacement Method
RMS T123	pH Value of Soil

Australian Standards

<i>AS 1289 3.8.2</i>	<i>Soil classification tests – Dispersion</i>
<i>AS 1289 D1.1</i>	<i>Methods of testing soil for engineering purposes – Soil chemical tests – Determination of the organic matter content of a soil (Standard method)</i>
AS 1289 4.1.1	Soil chemical test – Determination of the organic matter content of a soil
AS 4419	Soils for Landscaping and Garden Use
<i>AS 4454</i>	<i>Composts, soil conditioners and mulches</i>



LANDSCAPE PLANTING

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IC-QA-R179

VERSION FOR: *MR154 –The Northern
Road Upgrade Stage 5 between Littlefields
Road and Glenmore Parkway*
DATE: *September 2018*

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FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification RMS R179 Edition 1 Revision 0.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes are indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

RMS QA SPECIFICATION R179

LANDSCAPE PLANTING

1 GENERAL

1.1 SCOPE

This Specification sets out the requirements for landscape works including site preparation, supply and planting of containerised plant materials (including mulching, fertilising and staking), turfing, watering and maintenance after planting.

All turfing, whether for “Vegetation” or “Landscaping” is included in this Specification. All topsoiling whether for “Vegetation” or “Landscaping” is included under RMS R178.

1.2 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

1.2.1 Details of Work

Details of work are shown in Annexure R179/A.

1.2.2 Measurement and Payment

The method of measurement and payment must comply with Annexure R179/B.

1.2.3 Schedules of HOLD POINTS and Identified Records

The schedules in Annexure R179/C list the **HOLD POINTS** that must be observed. Refer to Specification RMS Q for the definition of **HOLD POINTS**.

The records listed in Annexure R179/C are **Identified Records** for the purposes of RMS Q Annexure Q/E.

1.2.4 Referenced Documents

Unless specified otherwise, the applicable issue of a referenced document, other than an RMS Specification, must be the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 1289). For convenience, the full titles are given in Annexure R179/M.

1.3 DEFINITIONS

The following definitions apply to this Specification:

~~**Post-completion Maintenance Period:** The period commencing immediately upon completion of landscape planting, or when the Principal commences using or occupying the whole of the Works, and the landscape planting maintenance tasks post construction as described in this Specification are required.~~

Low shrub: A shrub whose mature height is unlikely to exceed 1.5 m.

Large shrub: A shrub which is likely to have a mature trunk diameter exceeding 50 mm.

Tree: A tall perennial woody plant having a main trunk and branches forming a distinct elevated crown; includes both gymnosperms and angiosperms.

Weed: Weed species include but are not necessarily limited to those listed by the relevant local government authority as noxious categories W1, W2, W3, or W4 under the Noxious Weeds Act 1993. Also included under this definition are agricultural and horticultural weed species and in particular:

- (a) Invasive grasses such as *Chloris gayana* (Rhodes Grass), *Phalaris* sps., *Eragrostis curvula* complex (African Lovegrass), *Andropogon virginicus* (Whisky Grass), *Nassella trichotoma* (Serrated Tussock), *Cortaderia selloana* (Pampas Grass) and *Sporobolus africanus* (Giant Parramatta Grass);
- (b) Annual and perennial weeds include *Biden pilosa* (Farmer's Friend), *Conyza albida* (Fleabane), *Ageratina adormophora* (Crofton Weed), *Sida rhombifolia* (Paddy's Lucerne), *Verbena bonariensis* (Purpletops), *Keinys communis* (Castor Oil Plant), *Cirsium vulgare* (Scotch Thistle), *Baccharis halimifolia* (Groundsel Bush), *Trifolium repens* (White Clover), *Trifolium fragiferum* (Strawberry Clover), *Ligustrum lucidum* (Large Leaf Privet), *Ligustrum sinesse* (Small Leaf Privet), *Cassia bicapsularis* (Butterfly Bush), *Taraxacum officinale* (Dandelion), *Lantana camara* (Latana), *Nothoscordum gracile* (Onion weed), *Foeniculum vulgare* (Fennel), *Chrysanthemoides monilifera* (Boneseed), *Datura stramonium* (Thornapple), *Polygonum aviculare* (Wire Weed), *Araujia hortaorum* (Mothvine), *Rubus fruticosus* (Blackberry), *Portulaca oleracea* (Pigweed), *Persicaria capitata* (Knotweed), *Euphorbia pepus* (Caustic Weed), *Cerastium glomeratum* (Chickweed), *Hypochoeris radicata* (Catsear), *Genista monspessulana* (Bloom) and *Gomphocarpus fruticosa* (Cotton Bush).

Where necessary, seek advice must be sought from the Principal's Landscape Asset Advisor to determine whether the type and/or proportion of weed cover is significant for the purposes of this definition.

Weeds may include environmental weeds.

Environmental Weed: Plant species including Australian native species which are outside their natural range or habitat such as *Acacia saligna*.

All slopes stated in this Specification are in the ratio of horizontal to vertical distance i.e. 2H:1V.

The terms "you" and "your" mean "the Contractor" and "the Contractor's" respectively.

1.4 TRADESPERSON AND PROJECT TRAINING *LANDSCAPING SUBCONTRACTS*

All work specified must be carried out by competent Landscape Tradesperson/s with experience in landscape construction and planting and supervised by your Landscape Supervisor, who must possess the NSW TAFE Landscape Trade Certificate or equivalent as minimum qualification.

Prior to commencement of the landscape planting operations, your Landscape Tradespersons and Landscape Labourers working on the Contract must attend a Training Day conducted by your Landscape Supervisor on site, to gain basic skills and the operational and safety standards required for the performance of this Specification in Landscape Planting.

Invite the RMS Landscape Asset Advisor to the Training Day.

Engage a specialist landscaper to carry out all landscape planting and maintenance subcontract work until Completion using competent Landscape Tradesperson/s who are experienced in planting techniques. The minimum educational requirement for landscaping personnel is NSW TAFE Landscape Trade Certificate or equivalent.

1.4.1 Subcontract Documents

You must submit to the Principal the proposed landscaping planting and maintenance (up to Completion) subcontract in accordance with General Conditions of Contract Clause 29. Include the proposed invitation to tender for the proposed subcontract, the proposed subcontract schedule of rates and list the specifications and drawings to be attached to the proposed invitation. The proposed subcontract schedule of rates must include the full scope of landscape planting and maintenance (up to Completion) work.

You must show in the proposed invitation to tender the place and time nominated by the Principal for submitting the tenders.

HOLD POINT

Process Held:	<i>Inviting tenders for landscape planting and maintenance (up to Completion) subcontract.</i>
Submission Details:	<i>Proposed subcontract documents and proposed invitation to tender including the schedule of rates and the list of tenderers to be invited and a list of supplementary information that will be provided to the tenderers. Submit the procedure required by RMS Q Clause 7.4 for the management of the subcontract work.</i>
Release of Hold Point:	<i>The Principal will consider the submitted documents prior to authorising the release of the Hold Point.</i>

1.4.2 Inviting Tenders

You must invite tenders using the documents and list of tenderers submitted to the Principal.

The tender process must be agreed between you and the Principal. The Principal and you will open the tenders together.

The Principal will also provide tender documents for a separate contract to maintain the landscape planting works after Completion. Concurrently with your invitation of tenders for the landscaping planting and maintenance (up to Completion) subcontract you must invite tenders for this post-Completion maintenance contract, as the Principal's agent. Tenderers must be advised that the

landscaping planting and maintenance (up to Completion) subcontract and the post-Completion maintenance contract with the RMS will be awarded to a single successful tenderer.

You must examine and analyse the tenders in accordance with the submitted procedure for the management of the subcontract work. You must not communicate with the tenderers prior to the award of a subcontract unless with the prior approval and in the presence of the Principal. Analyse the tenders and submit your recommendation to the Principal. If there are tenders priced lower than the recommended tender, provide in the assessment the reason for not recommending these lower priced tenders.

HOLD POINT

Process Held: *Accepting tenders for the landscape planting and maintenance (up to Completion) work until Completion subcontract.*

Submission Details: *The final subcontract documents, including the tenders received, the assessment and recommendation with reasons for recommending the tenderer, at least 7 days prior to the proposed acceptance of the subcontract. Submit any changes to the procedure required by RMS Q Clause 7.4 for the management of the subcontract work.*

Release of Hold Point: *The Principal will consider the submitted documents prior to authorising the release of the Hold Point or the Principal may object to the acceptance of the recommended tender.*

Any proposed changes to the subcontract must only be accepted with the prior agreement of the Principal.

The Principal will award a separate contract to maintain the landscape planting works after Completion.

1.5 WORK HEALTH AND SAFETY

Carry out all work in accordance with Specification RMS G22 and the NSW Work Health and Safety Act, 2011 and its Regulations and Codes of Practice. In particular, comply with the requirements of the Work Health and Safety Regulation 2011 and the *latest Safe Work Australia Code of Practice Managing Risks of Hazardous Chemicals in the Workplace* ~~for the Safe Use and Storage of Chemicals (including Pesticides and Herbicides) in Agriculture 2006.~~

Prepare and implement a Hazardous Substances Plan that includes:

- (a) a hazardous substance register which contains Safety Data Sheets (SDS), risk assessment forms, records of pesticide/herbicide usage and details of the controls which are used;
- (b) health surveillance measures for all personnel using pesticides and herbicides;
- (c) procedures for safe storage and disposal of pesticides and herbicides; and
- (d) training of all personnel using pesticides and herbicides to implement the measures prescribed in the *latest Safe Work Australia Code of Practice Managing Risks of Hazardous Chemicals in the Workplace* ~~for the Safe Use and Storage of Chemicals (including Pesticides and Herbicides) in Agriculture 2006~~ before using these substances.

1.6 TRAFFIC MANAGEMENT

For landscaping works in close proximity to road traffic, provide traffic management in accordance with Specification RMS G10.

2 MATERIALS

2.1 FERTILISER

Undertake soil testing to determine amelioration rates for fertiliser. Provide evidence to confirm ameliorants required.

Fertiliser must be a slow-release type in tablet form with an 8 to 9 months release period, ~~and having an N-P-K ratio (stated in elemental form) as follows:~~

- ~~(a) N: 20%~~
- ~~(b) P: 4%~~
- ~~(c) K: 8%~~

~~Where the N-P-K ratio cannot be met, provide details of an alternative fertiliser, including its N-P-K ratio, to the Principal for approval.~~

Fertiliser must be a complete fertiliser suitable for use with Phosphorous sensitive native plants. Fertiliser is to be specified and endorsed by your qualified horticulturalist prior to ordering. The horticulturalist must be made aware of the fertiliser provided within the topsoil, as per RMS Specification 178 – ‘Vegetation’ – clause 2.1.1. Payment for consultation with the horticulturalist and following their recommendations in relation to fertiliser will be included in your rates generally.

Fertiliser must be delivered to the Site in unopened bags or containers bearing the manufacturer's description, analysis and quantity of its constituents. Test the fertiliser for conformity of constituent elements prior to using the fertiliser in the work and submit the test certificate to the Principal.

2.2 ORGANIC MULCH

Read “Mulch” and “Woodchip Mulch” shown on the Drawings as “Organic Mulch”.

Organic mulch used in landscape planting must, to the extent possible, be derived from trees, shrubs and any other vegetative material that is approved by the Principal for use as mulch, removed during the clearing and grubbing works on the Site. If the mulch produced in this way is insufficient, make up the shortfall by using imported hardwood chip that complies with AS 4454.

Hardwood chip must comply with the following requirements:

- (a) Hardwood chip must only be derived from waste hardwood timber. Woodchip derived from trees which have been specifically harvested for that purpose will not be accepted under any circumstances;
- (b) The source of hardwood chips must be provided in writing to the Principal;
- (c) The material must comprise hardwood chips with not more than 5% fines by volume, and must not contain any bark;

- (d) The average size of the woodchip must be approximately 30 mm x 20 mm x 5 mm and the maximum length of chip must not exceed 50 mm;
- (e) Hardwood chip must be free of soil, weeds, stones, vermin, insects or other foreign material.

Prior to use, test the woodchip for conformity with these requirements and submit a sample to the Principal for approval.

Tub-ground mulch may be used with the written approval of the Principal.

2.3 PLANT MATERIALS

2.3.1 Principal Supplied Plant Materials

The Principal will not supply any plant materials.

~~Principal supplied plant materials, as listed in Annexure R179/A or as detailed elsewhere, will be supplied by a nursery nominated by the Principal.~~

~~Provide the nominated nursery with a program of works to ensure that Principal supplied plant materials are available and have been suitably “hardened off” at the time that they are required.~~

~~You are responsible for the collection and transportation of the plants to the Site.~~

2.3.2 Contractor Supplied Plant Materials

Contractor supplied plant materials must be grown by a nursery in a local area of similar climate to the Works.

The proposed nursery subcontractor must be approved by the Principal. The request for approval must include the location of the nursery, and the plant materials which will be supplied from the nursery. ***You must arrange for the Principal to access the nursery to inspect stock identified for the Works at any time requested by the Principal.***

Do not substitute any species without the Principal's approval. All plant materials must be true to species and sizes. They must be well grown, of good form, not soft or forced and with large healthy root systems. They must not be root bound and must be free from disease and insect pests. Trees must have a single leading shoot.

Plants must be “hardened off” four weeks prior to delivery to the Site.

2.3.3 Container Size and Plant Height

Plants supplied must be in the container sizes and within the approved plant heights specified in Table R179.1.

Table R179.1 – Container Size and Plant Height

Plant Size	Container Size	Approved Plant Height
“Viro-Tube”	50 mm x 50 mm x 90 mm deep	200 mm - 300 mm
“Forestry Tube”	50 mm x 50 mm x 125 mm deep	300 mm - 400 mm
“Semi Advanced”	150 mm x 150 mm x 150 mm deep	300 mm - 400 mm
“Advanced”	200 mm x 200 mm x 200 mm deep	400 mm - 500 mm
“Super Advanced”	25 L - 45 L container size	2 000 mm - 2 500 mm
“Semi Mature”	75 L - 100 L container size	2000 mm – 3000 mm

2.4 STAKES AND TIES

Timber stakes must be hardwood and sharpened to a point at one end. The size of timber stakes, and the number required per plant must be in accordance with Table R179.2.

Table R179.2 – Timber Stakes

Plant Size	Timber Stake Size	Number of Stakes
“Advanced”	25 mm x 25 mm x 1500 mm long	1
“Super Advanced”	38 mm x 38 mm x 1800 mm long	2
“Semi Mature”	50 mm x 50 mm x 2400 mm long	3

Bamboo stakes may be used in place of hardwood, and must be 15 mm in diameter and 750 mm long.

Ties must be 50 mm wide hessian webbing.

2.5 SOIL ADDITIVE FOR PLANT ESTABLISHMENT

Soil additive must be a dry granular mixture, comprising water absorbent polymers, organic and mineral fertilisers, trace elements, carrier material and growth stimulators and must be incorporated into the excavated planting hole during planting operations in accordance with the manufacturer’s recommendations.

Table R179.3 – Quantity of Soil Additive

Plant Size	Quantity
“Viro-Tube”	Nil 10 grams
“Forestry Tube”	20 grams
‘Semi Advanced’	40 grams
‘Advanced’	80 grams
‘Super Advanced’	400 grams
“Semi Mature”	One kilogram

2.6 WEEDMAT

~~Weedmat must be a 100% organic fibre type. Nominal thickness of the mat must be 6 mm with a density of between 600 and 650 grams per square metre.~~

~~For individual planting, the dimensions of the weedmat must be:~~

- ~~(a) Forestry and Semi Advanced: 370 mm x 370 mm square;~~
- ~~(b) Advanced (200 mm dia.): 600 mm x 600 mm square;~~
- ~~(c) Super Advanced (> 25 L): 1000 mm x 1000 mm square.~~

~~For mass planting in mulched beds, use whole rolls of weedmat and install them in accordance with the manufacturer's recommendations.~~

2.7 TREE GUARDS

~~Standard tree guards must be green plastic type tree guards 350 mm dia. x 450 mm long, and each tree guard must be secured with three bamboo stakes.~~

~~Bamboo stakes for "standard green" tree guards must be 750 mm long.~~

Supply and install tree guards shown as "tree Protection" on the landscape Drawings.

2.8 HERBICIDES AND PESTICIDES

Herbicides and pesticides must be currently registered for their intended use by the Australian Pesticides and Veterinary Medicines Authority (APVMA).

Information on registered herbicides and pesticides may be obtained from the APVMA Internet website: <http://apvma.gov.au/node/1061>.

2.9 WATER

Water applied to plants must be potable or obtained from a source which does not contain toxins, pollutants or any substance which would adversely affect the growth of any of the plants to be watered.

When the use of non-potable water is proposed, test the source and prior to its use for watering, provide the Principal with verification that the water is free of toxins or pollutants or substances which would adversely affect the growth of plants to be sown.

2.10 TURF FOR SPECIFIC LAWN AREAS ALONG MEDIANS AND ROADSIDES

~~Turf for specific lawn areas along medians and roadsides must be *Zoysia* "Empire" or equivalent.~~

Selected turf must be 25 mm thick of dense and well rooted grass. Turf must be verdant and fresh when delivered and be free of weeds, soil pests and disease and must be accompanied with a "Certificate of Authenticity" from the supplier. The turf must be mown and freshly cut in long lengths, of uniform width not less than 300 mm, and in sound unbroken condition.

2.11 TURF UNDERLAY

Turf underlay used must be topsoil material, ~~but may be general purpose topsoil~~ in accordance with Specification RMS R178.

The soil mix must not contain any of the following:

- (i) materials toxic to humans and plant health;
- (ii) plant roots of diameter greater than 12 mm;
- (iii) clay lumps; and
- (iv) stones greater than 10 mm size.

2.12 IMPORTED ORGANIC TOPSOIL

Refer to RMS R178 Clause 2.1.3

~~Imported organic topsoil must be a weed free “organic type” soil mix that conforms to AS 4419 and suitable for the culture of plant material in landscape areas. It must:~~

- ~~(a) be of a friable porous nature;~~
- ~~(b) contain no refuse or materials toxic to plant growth;~~
- ~~(c) contain no stumps, roots, clay lump or stones larger than 25 mm in size;~~
- ~~(d) have an organic content of at least 15% to 20% by mass, as determined by the method specified in AS 1289 D1.1 Part D;~~
- ~~(e) have a pH in the range of 5 to 6.5, when tested in accordance with Test Method RMS T123;~~
- ~~(f) have a soluble salt content not exceeding 0.06% by mass;~~
- ~~(g) be suitable for phosphorus sensitive plants; and~~
- ~~(h) be free of weed and weed refuse material.~~

~~Provide a sample of the soil to the Principal for inspection and approval.~~

2.13 TIMBER EDGING

Timber edging must be treated pine of size 100 mm x 25 mm or 100 mm x 50 mm, supported by pegs of size 25 mm x 50 mm x 300 mm at 2.0 m centres.

2.14 CONCRETE EDGING

Concrete edging must be 150 mm x 75 mm wide, formed concrete.

2.15 VEGETABLE DYE

Dye used in herbicide spraying must be a biodegradable, red coloured vegetable dye.

3 PLANTING OPERATIONS

3.1 TIMING

Unless directed otherwise by the Principal, carry out planting within seven (7) days of site seeding operations, to avoid unnecessary disturbance to areas of existing vegetation and to areas of the works previously topsoiled and/or seeded, hydroseeded or hydromulched.

Do not carry out planting in dry soil in hot and dry weather conditions, unless directed otherwise by the Principal.

3.2 TRANSPORT AND STORAGE OF PLANTS

Inspect all plants at the time of delivery and reject any plants which do not comply with the Specification.

Ensure that due care is taken in the transportation of plants to and from the site holding area. Undertake the loading, transportation and unloading of plants from holding areas to planting sites in a manner that causes minimal disturbance to the rootball and the overall stability of the plants.

Prior to and during planting, maintain the plants' root systems moist at all times, particularly during the period when the plants are stored on site.

Store plants in an area protected from wind, dust and vermin and with adequate water supply.

The Principal may reject plants which suffer from stress or which have been damaged, due to neglect and/or mishandling. Rejected plants must be replaced at your own expense.

3.3 PRESERVATION OF EXISTING VEGETATION

Preserve and protect existing vegetation except where specified or directed otherwise.

Protective measures for existing vegetation include:

- (a) minimising machinery movement over and disturbance to seeded and vegetated surfaces and surfaces adjacent to existing trees;
- (b) keeping deleterious material, including oil, petrol, cement, bitumen, spillage from washing operations and similar contaminants, clear of trees, shrubs and grass, including their root systems;
- (c) no stockpiling of materials over root systems; and
- (d) avoiding damage to overhead tree canopies by machine or truck operations.

Organise planting work and methods so as to minimise damage to surface vegetative work already completed under the Contract.

Rectify any damage to existing vegetation caused by your landscape planting operations or associated works at your expense.

3.3.1 Work near Existing Trees

All work near existing trees to be retained as shown on the Drawings must be in accordance with AS4970-2009, or as recommended by your qualified arborist, where an encroachment to the tree protection zone occurs.

Payment for consultation with the arborist and following their recommendations in relation to working near existing trees will be included in your rates generally.

3.4 SETTING OUT

Set out the positions of all planting areas (trees and shrubs) in accordance with the Landscape Drawings, or as directed by the Principal.

Except where shown otherwise on the Drawings:

- (a) do not plant trees or shrubs within 2.5 m of any pavement edge;
- (b) plant only low shrubs and ground covers within 2.5 m of a safety barrier;
- (c) do not plant trees or large shrubs within the clear zone shown on the Drawings or, where no clear zone is shown, within 10 m of any pavement edge, except where shown otherwise on the Landscape Drawings and approved by the Principal;
- (d) do not plant trees or shrubs at locations where the trees or shrubs, at maturity, are likely to obstruct any road sign from the drivers' view; and
- (e) do not plant trees or shrubs which, at maturity, will exceed 1.5 m in height under an electricity transmission line or be so close to the line that the mature canopy will come within 5 m of any conductor.

HOLD POINT

Process Held: Commencement of planting operations.

Submission Details: Notify the Principal, not less than 2 working days prior to the intended time for commencement of planting operations, that the setting out of all trees, shrubs and ground cover planting positions is complete and available for inspection.

Release of Hold Point: The Principal may inspect set out for the positions of all trees and shrubs prior to authorising the release of the Hold Point

3.5 PREPARATION

3.5.1 Weed Removal and Application of Herbicides and Pesticides

Where weed infestation occurs, take the following action before clearing planting areas:

- (a) for those species listed by the relevant local government authority as noxious categories W1, W2, W3, or W4 under the Noxious Weeds Act 1993, take action as required by the Act and the local Government Authority;
- (b) for all other species, spray with herbicide.

Use an appropriate herbicide or pesticide for the intended purpose, subject to the specific requirements of the relevant local Government Authority. The choice of herbicide or pesticide used must be based on health and environmental considerations.

Use herbicides and pesticides in accordance with the manufacturer's directions supplied with the product.

Before spraying, follow RMS Pesticide Use Notification Plan and comply with the requirements of Specification RMS G36 on public notification of pesticide use.

The operator must wear protective clothing and equipment when mixing and using herbicides and pesticides.

The Principal may direct that the area to be treated for weed infestation be extended beyond the area to be revegetated.

A biodegradable red dye is to be included in the herbicide spray. The dye content used must be sufficient to ensure that the treated areas can be identified.

Do not spray herbicide in windy weather (wind of 10 km/hr or greater) or within such distance of a watercourse which would permit the herbicide to enter the water.

Areas sprayed with herbicide must remain undisturbed for two weeks or as recommended by the manufacturer, whichever is the longer period. Follow up with a second herbicide spray to ensure complete removal of weeds *as recommended by the manufacturer*.

Unused herbicide and pesticide and empty containers must be used elsewhere, recycled or safely disposed of.

3.5.2 Clearing for Planting

Clear the following areas by slashing down to a height of not more than 100 mm:

- (a) for mass planting in mulched beds, the areas of the mulched beds; and
 - (b) for individual plantings, the area of each planting copse,
- together with a perimeter area 1.5 m wide.

Remove, recycle or dispose of all slashings in a legally and environmentally responsible manner from the Site. Spray all planting areas with approved herbicide and leave for two weeks before commencing excavation.

3.5.3 Cultivation

After weed removal by slashing and spraying operation, cultivate as follows:

- (a) **Mass planting in mulched bed:** Cultivate all mulched areas for mass planting to a depth of ~~200~~**300** mm by tractor mounted rotary hoe or similar equipment. Remove weeds, stumps, roots, clay lumps and stones greater than 50 mm and all other extraneous material not conducive to optimum plant growth. Place ~~100 mm deep~~ organic topsoil *to depths as specified on the Landscape Drawings* over the areas to be planted. Rake the areas to provide an even surface ~~for the installation of the weed mat~~. Final soil surface levels must be 75 mm below top of kerb or footpath;

- (b) **Individual planting in copse:** Where individual planting is to be carried out on slopes of 3 to 1 gradient or flatter, rip the copse area to a depth of 400 mm along each line of planting with tractor mounted tynes set at 300 mm centres. Each line of planting requires two passes with the second pass in the opposite direction to the first.

3.6 PLANTING

3.6.1 Planting Holes

Excavate planting holes to the dimensions as specified in Table R179.4.

Table R179.4 – Planting Hole Dimensions

Plant Size	Planting Hole Dimensions (mm)
“Viro-Tube”	60 x 60 x 150 deep
“Forestry Tube”	200 x 200 x 200 deep
“Semi Advanced”	300 x 300 x 300 deep
“Advanced”	400 x 400 x 400 deep
“Super Advanced” – 35 L	600 x 600 x 600 deep
“Semi Mature” – 75 L	1000 x 1000 x 1000 deep
“Semi Mature” – 100 L	1000 x 1000 x 1000 deep

Excavate the holes by hand tools or backhoe. Do not use an auger or similar implement which will result in compacted and glazed hole surfaces to excavated planting holes.

3.6.2 Planting and Backfilling

~~Where shown on the Landscape Drawings, install weedmat in accordance with the manufacturer’s recommendations as follows:~~

- (a) ~~**Mass planting in mulched beds:** Install the weedmat before excavating plant holes. Finish all ends of the weedmat in neat lines secured with steel pins, and cut and remove all excess material.~~
- (b) ~~**Individual planting:** After excavating the plant holes, place the weedmat of the size specified in Clause 2.6 around the base of each individually planted tree and shrub and secure the weedmat at the centre and each corner with steel pins.~~

At the bottom of each planting hole, incorporate a soil conditioner, at the rates recommended by the manufacturer, mixed with the topsoil backfill.

During planting and backfilling with site topsoil/general purpose topsoil/imported organic topsoil, place fertiliser tablets ~~underneath~~ *alongside* the rootball of each plant. The number of tablets must be as specified on the Landscape Drawings.

HOLD POINT

Process Held:	Planting and backfilling of planting holes
Submission Details:	Give at least 2 days notice of the date and time at which planting holes will be ready for inspection
Release of Hold Point	The Principal may inspect excavated holes for soil conditioner and fertiliser tablets prior to authorising the release of the Hold Point

Complete and lightly compact the backfilling of each hole by tamping down so that, on completion, the backfilled area is flush with the level of the surrounding soil.

3.6.3 Mulching

Where shown on the Landscape Drawings, place organic mulch as follows:

- (a) **Mass planting in mulched beds:** Place mulch over the disturbed area but keep clear of the plant stem. Spread organic mulch to form a ~~100 mm thick~~ layer *of a thickness as shown on the Landscape Drawings* over the area to be mulched.
- (b) **Individual planting:** Place organic mulch around the base of the plant as shown on the Landscape Drawings.

~~Where shown on the Landscape Drawings, install a tree guard around each plant.~~

3.6.4 Watering

Immediately after planting, water each plant in a manner which does not disturb the soil backfill and mulch.

The quantity of water required for each watering must be as specified in Table R179.5.

Table R179.5 – Quantity for Each Watering After Planting

Plant Size	Quantity
“Forestry Tube”	5 litres
“Semi Advanced”	10 litres
“Advanced”	10 litres
“Super Advanced” – 25 L	30 litres
“Semi Mature” – 75 L	50 litres
“Semi Mature” – 100 L	50 litres

Undertake watering at two day intervals until completion of all landscape planting and commencement of Post-completion Maintenance Period (if applicable); after which further watering must be in accordance with Clause 4.3.

Where specified or shown on the Landscape Drawings, install a hardwood stake or a bamboo stake at 200 mm clear of each plant. Attach the plant to the stake by a Hessian tie as shown on the Landscape Drawings.

Mark the location of “forestry tube” size trees using a bamboo marker stake. (This is not required where tree guards have been installed.)

3.7 TURFING ~~FOR SPECIFIC LAWN AREAS~~

Place turf ~~along medians and roadsides~~ where shown on the Drawings or where directed by the Principal.

Cultivate areas to be turfed to a depth of 100 mm. Remove all extraneous material from the Site.

Keep the turf moist at all times during transport and site storage and lay it in its final position as early as possible after delivery. Turf must be laid within 24 hours of delivery.

Place 50 mm of turf underlay over the area to be turfed and rake to provide an even surface.

Lay turf in a stretcher pattern with the joints staggered and close butted, and finish the joints flush after tamping the adjacent hard surfaces. Where practicable, lightly roll the turf to provide a level and even finish.

Water the turf immediately after laying until the underlay is moistened to its full depth. Continue watering every second day for the first fourteen (14) days, then at regular intervals until the turf is established. Turf must not be allowed to dry out during the establishment period.

Undertake further watering until Completion to maintain turf growth.

Turf will only be accepted when the feeder roots of the turf have infiltrated the turf underlay.

~~Turfing for slopes and open drain areas must be in accordance with RMS R178.~~

4 MAINTENANCE

4.1 REQUIREMENT AND DURATION

Maintain all landscape planting works in accordance with the requirements of Clause 4 ~~during the period of construction and, where specified in Annexure R179/A, during the Post completion Maintenance Period~~, until the ~~Contractual~~ **Contract Completion Date**.

~~The duration of this Post completion Maintenance Period is specified in Annexure R179/A.~~ Failure to maintain the landscape planting in a healthy condition may result in the Principal arranging for the maintenance work to be carried out by others at your expense.

4.2 MAINTENANCE INSPECTIONS

4.2.1 Frequency

Carry out maintenance inspections of the plantings at intervals not exceeding one month.

4.2.2 Inspection Reports

Submit a written report to the Principal within four (4) days of each maintenance inspection.

The report must include the date of visit, maintenance works completed, maintenance works in progress and maintenance works required. The report must give details of damaged, dead or missing plants and show their locations on the relevant sheets of the Drawings.

The report must also identify separately any damage to landscape planting which has not been caused by you. Rectification work to any such damage will be in accordance with Clause 4.7.

4.3 WATERING

Watering prior to ~~the commencement of the Post-completion Maintenance Period~~ **Completion** must be in accordance with Clause 3.6.4.

~~If Post-completion Maintenance Period is applicable, carry~~ **Carry** out maintenance watering at the following application rates:

- (i) 20 litres of water per plant at weekly intervals for the first 12 weeks;
- (ii) 10 litres of water per plant at fourteen (14) day intervals thereafter.

Notwithstanding the watering application rates specified above, ensure that a distinct level of moisture in the soil is maintained at all times ~~during this Post-completion Maintenance Period~~ and that plants do not dry out during this period.

Water the turf immediately after laying until the underlay is moistened to its full depth. Continue watering every second day for the first 14 days, then at regular intervals to maintain a discernible level of soil moisture until the turf is established. Turf must not be allowed to dry out during the establishment period.

Turf that is deemed to have died through your neglect, must be replaced and all associated costs for re-establishment of the turf will be at your own expense.

The frequency of watering may be varied during periods of adequate rainfall with the approval of the Principal.

Notify the Principal in advance of each watering for verification of payment purposes.

4.4 ORGANIC MULCH / ~~WEEDMAT~~

Maintain **areas of** organic mulch in a weed free condition and reinstate the organic mulch as necessary.

~~The cost of organic mulch / weedmat maintenance during the Post-completion Maintenance Period must be included in Pay Item R179P10.~~

During each Maintenance Inspection, inspect all mulched areas and, where necessary, top up all areas to maintain the depth of organic mulch as specified in Clause 3.6.3.

4.5 WEED CONTROL

Keep all planting areas, and up to the limit of clearing as specified in Clause 3.5.2, free of grass and weed.

Carry out grass and weed removal at intervals of not more than four (4) weeks and ensure that weeds do not flower to form seed heads.

For those species listed by the relevant local government authority as noxious categories W1, W2, W3, or W4 under the Noxious Weeds Act 1993, take action as required by that local Government Authority. For all other species, spray with herbicide in accordance with the manufacturer's recommendations.

Do not spray where herbicide could fall into a watercourse or when wind conditions could cause drift outside the area to be treated or onto desirable plants.

After spraying, lop any dead weeds flush with the ground surface and dispose of the cuttings.

Remove by hand any weeds which cannot be controlled by herbicide. Ensure that the entire weed including all roots is removed. Dispose of the weeds off site.

4.6 DISEASE AND INSECT CONTROL

Plants must be sprayed with pesticides to control disease and insect infestation ~~when and where directed by the Principal~~ **as required to maintain them in a healthy condition.**

Spraying must only be undertaken on windless days (wind speeds of less than 10 km/hr). Inform the Principal, at least 24 hours before the intended time of spraying, of the following:

- (a) type of chemical to be used;
- (b) plant species to be treated;
- (c) extent of the infestation; and
- (d) timing of the proposed application.

Spraying must not be undertaken where there is a risk that pesticide could enter into a watercourse or when wind conditions could cause drift outside of the area to be treated.

4.7 PLANT REPLACEMENT

Replace at your own expense, any missing or dead plants, or plants nominated by the Principal as unsatisfactory, within fourteen (14) days of detection. Replacement plants must be of similar size and quality and of identical species and variety to the plant being replaced, unless directed otherwise by the Principal. Plant all replacement plants in accordance with Clause 3.6 and reinstate any disturbed areas.

~~If the maintenance inspection report described in Clause 4.2 identifies damage which is not caused by you, carry out rectification work to the extent directed by the Principal. Plant replacement will be paid under Pay Item R179P14.1.~~

~~Other rectification work to repair such damage will be dealt with as a variation under the Contract.~~

4.8 STAKES AND TIES / TREE GUARDS

Repair any tree ties that have been broken and replace any missing stakes.

Maintain the tree guards around each plant so that the natural plant growth is not impeded or restricted. Replace damaged and missing tree guards as soon as practicable after being identified.

Remove tree guards progressively as plants mature and where it is deemed that the tree guard provides no further benefit to the establishment of the plant. By the end of Post-completion Maintenance Period, all tree guards must be removed and disposed of in a responsible manner.

4.9 PRUNING

Carry out all pruning in accordance with AS 4373.

4.10 MOWING AND EDGING

Mow and edge all turf areas and remove all grass clippings. Do not mow if there is litter, roadside rubbish and debris left on the turf as the litter may be transformed into confetti-like pieces after mowing.

Deal with the litter, roadside rubbish and debris in accordance with Clause 4.11.

Unless directed otherwise, the cut grass height must not be less than 35 mm or greater than 75 mm. Do not remove more than 50% of the height of the uncut grass at any one time. The upper limit may be varied to account for terrain, species of grass and presence of debris.

Clippings may remain where they fall, except for those that fall on road surfaces, line drains, footways or paved areas where they must be swept clear.

4.11 RUBBISH REMOVAL

Remove all rubbish and debris left by you within the area of landscape planting, and recycle or dispose of them in a responsible manner, and leave the Site in a clean and tidy condition.

The Principal may direct you to remove rubbish left by others as a variation to the Contract.

ANNEXURE R179/A – DETAILS OF WORK

A1 POST-COMPLETION LANDSCAPE MAINTENANCE

Post-completion Landscape Maintenance required?	Yes / No
Duration of Post-completion Maintenance Period:	N/A months

A2 PRINCIPAL SUPPLIED PLANT MATERIALS

The Principal will not supply any plant materials.

~~The plants listed below will be supplied by the Principal, to be collected from:~~

Name of Nursery: _____

Address: _____

Species	Number	Size

ANNEXURE R179/B – MEASUREMENT AND PAYMENT

Payment will be made for all costs associated with completing the work detailed in this Specification in accordance with the following Pay Items.

Where no specific pay items are provided for a particular item of work, the costs associated with that item of work are deemed to be included in the rates and prices generally for the Work Under the Contract.

Unless specified otherwise, a lump sum price for any of these items will not be accepted.

~~Pay Item R179P1 – Preparation for Mulched Beds~~

~~The unit of measurement is the square metre of area prepared.~~

~~This item covers the preparation of mulched bed planting areas and includes clearing, mechanical weeding, cultivation and/or ripping (to various depths as detailed in the drawings), removal of extraneous material and levelling.~~

~~Pay Item R179P2 – Weed Control – Herbicide Application~~

~~The unit of measurement is the square metre of area sprayed.~~

~~The schedule rate includes the supply, preparation and application of herbicide and the disposal of used containers.~~

~~This pay item is only applicable to site preparation works and is not applicable during the Post-completion Maintenance Period.~~

~~Pay Item R179P3 – Imported Organic Topsoil~~

~~The unit of measurement is the square metre.~~

~~The schedule rate includes supply, transport and spreading of imported organic topsoil at the nominated depth.~~

~~Pay Item R179P4 – Organic Mulch~~

~~Pay Item R179P4.1 – Imported Organic Mulch~~

~~The unit of measurement is the square metre.~~

~~The schedule rate includes supply, transport and spreading of imported organic mulch. This item is applicable to mulch placement in mulched beds only.~~

~~Pay Item R179P4.2 – Site won Organic Mulch~~

~~The unit of measurement is the square metre.~~

~~The schedule rate includes the transport and spreading of site mulch at the nominated depth of 100 mm.~~

Pay Item R179P5 — Weed Mat

The unit of measurement is the square metre of weedmat.

The schedule rate includes supply, transport, installing and securing of the weed mat for mulched beds.

Pay Item R179P6 — Trees and Shrubs

Pay Item R179P6.1 — Trees and Shrubs — Mass Planting

Pay Item R179P6.2 — Trees and Shrubs — Individual Planting

The unit of measurement is “each” plant.

Separate prices must be provided as follows:

- (a) — Principal supplied plants
- (b) — Contractor supplied plants

Separate rates must also be provided for each size and/or species of plant, as required.

The schedule rate includes supply and transportation of plant materials to Site (or in the case of Principal supplied plant materials, their collection and transportation only), site preparation, excavation (in all types of material), planting, backfilling, fertilising, incorporating soil conditioner, installation of weedmat and tree guard, staking, mulching and watering as necessary until Completion and opening of the works, but excluding work during the Post completion Maintenance Period.

Pay Item R179P7 — Edging

Pay Item R179P7.1 — Concrete Edging

The unit of measurement is the linear metre of concrete edging.

The schedule rate includes excavation, forming, concrete supply, pouring, joints, curing and backfilling.

Pay Item R179P7.2 — Timber Edging

The unit of measurement is the linear metre of timber edging, including fixing pegs.

The schedule rate includes excavation, supply and installation of timber edging and backfilling.

Pay Item R179P8 — Turf Underlay

The unit of measurement is the square metre of turf underlay (using topsoil material) installed at 50 mm thickness.

The schedule rate includes site preparation, supply, installation, and levelling of the soil.

Pay Item R179P9 — Turfing for Lawn Areas along Medians and Roadsides

The unit of measurement is the square metre of turf laid.

The schedule rate includes the supply, laying of turf, rolling and establishment watering.

(Note: Pay Items R179P10 to R179P17 are applicable to maintenance of landscape planting during the Post-completion Maintenance Period only.)

Pay Item R179P10 — Landscape Planting Maintenance

The unit of measurement is “month”.

The schedule rate includes all activities as specified in Clause 4 of this Specification during the Post-completion Maintenance Period, with the exception of those maintenance items allocated below (i.e. Pay Items R179P11 to R179P17 inclusive).

Pay Item R179P11 — Pruning and/or Removal of Dead Plants (Provisional)

The unit of measurement is “hour”.

The schedule rate includes labour, materials, equipment and removal from the site and disposal and/or recycling of mulching.

Pay Item R179P12 — Mowing (Provisional)

The unit of measurement is the square metre.

The schedule rate includes labour, materials, equipment, associated sweeping, litter removal, edging and trimming of grass to adjoining surfaces and objects.

Pay Item R179P13 — Organic Mulch Reinstatement (Provisional)

The unit of measurement is the square metre.

The schedule rate includes supply, transport and spreading of organic mulch reinstatement.

This Pay Item is only applicable when the need for reinstatement has been caused by one of the following causes below:

- (i) — Flood
- (ii) — Fire
- (iii) — Vandalism
- (iv) — Traffic incidents

Pay Item R179P14 — Replacement Works (Provisional)

These Pay Items are only applicable when the need for replacement has been caused by one of the following causes below:

- (i) — Flood
- (ii) — Fire
- (iii) — Vandalism
- (iv) — Traffic incidents
- (v) — Fungal attack of a plants root system

Pay Item R179P14.1 – Plant Replacement (Provisional)

The unit of measurement is “each” plant.

The schedule rate includes supply, excavation (in all types of material), planting, backfilling, fertilising, incorporating soil conditioner, installation of tree guard, staking, mulching and watering during the plant establishment period.

Separate rates are provided for each size of plant.

Pay Item R179P14.2 – Turf Replacement (Provisional)

The unit of measurement is the square metre.

The schedule rate includes supply, transport, ground preparation, installation of new turf and watering during the establishment period.

Pay Item R179P15 – Disease and Insect Control (Provisional)

The unit of measurement is “hour”.

This item includes labour, materials (including chemicals), equipment and disposal of surplus materials.

Pay Item R179P16 – Fertilising (Provisional)

The unit of measurement is “hour”.

The schedule rate includes labour, materials (including fertilisers/chemicals), equipment and disposal of surplus materials.

Pay Item R179P17 – Watering

Pay Item R179P17.1 – Watering within first 12 weeks of Post-completion Maintenance Period

Pay Item R179P17.2 – Watering after first 12 weeks of Post-completion Maintenance Period (Provisional)

The unit of measurement is “each” watering.

The schedule rate includes watering of all plant material including turf, as necessary to ensure that plants establish and do not dry out or die of dehydration during the Post-completion Maintenance Period (refer Clause 4.3).

Pay Item R179P18 – Landscape Planting and Maintenance (Up to Completion) Subcontract

Pay Item R179P18 is a Provisional Sum.

Measurement will be in accordance with Clause 1.4. Payment will be the actual amount paid to the Subcontractor by applying the subcontract schedule of rates for landscape planting adopted in accordance with Clause 1.4 plus the provisional sum margin added in accordance with Clause 55.4 of the General Conditions of Contract.

ANNEXURE R179/C – SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS

Refer to Clause 1.2.3.

C1. SCHEDULE OF HOLD POINTS

Clause	Description
<i>1.4.1</i>	<i>Inviting tenders for landscape planting and maintenance until Completion subcontract</i>
<i>1.4.2</i>	<i>Accepting tenders for landscape planting and maintenance until Completion subcontract</i>
3.4	Advice that the setting out of all planting positions is complete
3.6.2	Advice that planting holes are ready for inspection

C2. SCHEDULE OF IDENTIFIED RECORDS

The records listed below are Identified Records for the purposes of RMS Q Annexure Q/E.

Clause	Description of Identified Record
<i>1.4.2</i>	<i>Submitted tenders</i>
<i>1.4.2</i>	<i>Your examination, analysis and assessment of tenders</i>
4.2	Maintenance Inspection Reports

ANNEXURES R179/D TO R179/L – (NOT USED)

ANNEXURE R179/M – REFERENCED DOCUMENTS

Refer to Clause 1.2.4.

RMS Specifications

RMS G10	Traffic Management
RMS G22	Work Health and Safety (Construction and Maintenance Works)
RMS G36	Environmental Protection
RMS Q	Quality Management System
RMS R178	Vegetation

RMS Test Methods

RMS T123	pH Value of a Soil (Electrometric Method)
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Australian Standards

AS1289 D1.1	Methods of testing soil for engineering purposes – Soil chemical tests – Determination of the organic matter content of a soil (Standard method)
AS 4419	Soil for landscaping and garden use
AS 4373	Pruning of amenity trees
AS 4454	Composts, soil conditioners and mulches
<i>AS4970-2009</i>	<i>Protection of Trees on Development Sites</i>

NSW Government Publications

Noxious Weeds Act 1993

Work Health and Safety Act 2011

Work Health and Safety Regulation 2011

~~Code of Practice for the Safe Use and Storage of Chemicals (including Pesticides and Chemicals) in Agriculture 2006~~

Safe Work Australia Code of Practice Managing Risks of Hazardous Chemicals in the Workplace 2012