Main Roads
Technical Standard

MRTS16C

Vegetation Works

June 09

Queensland Government

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Vegetation Works

1 INTRODUCTION

This Technical Standard applies to the general requirements of vegetation works for road construction and associated works.

This Technical Standard shall be read in conjunction with MRTS01 *Introduction to Technical Standards*, MRTS50 *Specific Quality System Requirements* and other Technical Standards as appropriate.

This Technical Standard forms part of the Main Roads Specifications and Technical Standard Manual.

2 DEFINITION OF TERMS

The terms used in this Standard shall be as defined in Clause 2 of MRTS01 *Introduction to Technical Standards*.

Landscape and revegetation related terms and abbreviations used in this Standard are defined in Table 2 of MRTS16 *General Requirements – Landscape and Revegetation Works*. Guidance on generic landscape and revegetation terms is contained in MRTS16 *User Guidelines Vegetation Ground Works*.

3 NOT USED

4 QUALITY SYSTEM REQUIREMENTS

4.1 Hold Points, Witness Points and Milestones

General requirements for Hold Points, Witness Points and Milestones are specified in Clause 5.2 of MRTS01 *Introduction to Technical Standards*.

The Hold Points, Witness Points and Milestones applicable to this Standard are summarised in Table 4.1.

Table 4.1 – Hold Points, Witness Points and Milestones

Clause	Hold Point	Witness Point	Milestone
5.1			Submission of samples
7.2.1	1. Submission of seed supply proposal (SSP)		
7.2.4		Inspection of unopened bags or containers of hydraulic seeding and mulching fibre	
7.3.1	2. Preparation of area to be seeded		
9.3.1	3. Preparation of area to be turfed		
10.2.1	4. Submission of plant supply proposal (PSP)		
10.2.1		Joint plant nursery inspections	
10.2.1		Delivery of plants	
10.3.1	5. Preparation of area to be planted with container stock		
10.3.2	6. Setout of plants		

5 GENERAL REQUIREMENTS

5.1 Samples

The Contractor shall submit to the Administrator, samples of materials as specified in Clause 2.1 of Annexure or where not specified as listed in Clause 5.4 of MRTS16 *General Requirements*. Milestone

6 SEEDING – GENERAL

6.1 General

Seeding operations shall be carried out where shown on the Drawings, or as specified elsewhere in the Contract.

Seeded areas shall be installed on either –

a) an input controlled basis; or

b) a performance basis (output controlled).

The basis of installation of seeded areas is shown in Clause 3.1 of Annexure MRTS16C.1.

7 SEEDING – INPUT CONTROLLED

7.1 General

Where seeding is to be carried out on an input controlled basis, the Contractor is responsible for applying the specified seed mix, at the specified rate, using the specified materials and method of application – and establish and monitor the seeding operation.

The Monitoring Period shall be 3 months from the date of Certificate of the Commencement of the Monitoring Period.

Refer to MRTS16E *Establishment and Monitoring* for seeding establishment requirements.

7.2 Material Requirements

Seed mixes used in hydromulching or straw mulching may be comprised of a grass seed mix and / or a native seed mix and / or a cover crop.

7.2.1 Seed Supply Proposal

The Contractor shall submit a Seed Supply Proposal (SSP) for grass seed, native seed and / or cover crop seed mixes. Hold Point 1 The SSP shall be submitted to the Administrator for a determination as to its suitability, at least two weeks before seeding. The SSP shall include the following –

a) the specified species or where specified species are unavailable, potential substitutes;

b) the proposed application rates for the substitute species;

c) the adjusted specified application rates where viable seed is less than the specified percentages;

d) harvesting or supply proposals for native seeds;

e) required certificates and permits; and

f) seed pre-treatment requirements.

7.2.2 Grass Seed

The grass seed mix species are given in Clause 4.1 of Annexure MRTS16C.1, or as shown on the Drawings or, where not specified or shown on the drawings, as listed in Table 7.3.3.1.

The Contractor shall obtain from the supplier of the proposed grass seed / cover crop mix, a certificate detailing the following –

a) seed purity;

b) seed germination viability;

c) name of the supplier; and

d) species (including cultivar) of the seed.

The supplier's certificate shall be included in the SSP.

The specified application rates of the proposed grass mixes are based on each grass seed species having a minimum purity of 95% and a minimum germination viability of 80%.

The Contractor shall adjust the specified application rates to account for the lower percentage of viable seed as indicated by the outcomes of the purity and germination tests.

7.2.3 Native Seed

The native seed mix species are given in Clause 4.2 of Annexure MRTS16C.1 or as shown on the Drawings.

Where indicated in Clause 4.3 of Annexure MRTS16C.1, native seeds shall be harvested prior to clearing and grubbing.

If so indicated, native seed shall be harvested in accordance with the Commonwealth Government's Natural Heritage Trust, Flora Bank Guidelines by a person holding a current permit relevant to the specific area where seed is being collected. These permits include, but are not limited to –

- DPI Forestry permit for state forests;
- Queensland Parks and Wildlife Service permit for state parks;
- local council permit for local government areas; and
- Ancillary Works and Encroachments (AWE) for state controlled roads.

For listed species (rare and threatened species) the Contractor shall contact the Environmental Protection Agency (EPA) for specific harvesting requirements and implement these requirements during harvesting operations.

Where native seed is proposed to be supplied from a seed merchant, the native seed shall include a certificate from the seed supplier detailing the following –

a) name of the supplier;

b) species of the seed;

c) purity percentage;

d) viability percentage; and

e) harvest or collection date and harvest location.

The percentage of viable seeds shall be confirmed by a tetrazolium chloride test (TZ test).

Those seeds that cannot be confirmed by a TZ test shall be confirmed with a germination test. Such seed types may include hard seeds (for example, Acacia) and very fine seeds (for example, Eucalyptus).

The specified application rates of the proposed native seed mixes are based on each native seed species having a minimum purity of 95% and a minimum germination viability of 60%.

The Contractor shall adjust the specified application rates to account for the lower percentage of viable seed as indicated by the outcomes of the purity and germination tests.

The harvest location of native seed shall be based on the following order of priority –

a) first priority – local provenance;

b) second priority – regional;

c) third priority – Queensland; and

d) fourth priority – Eastern Australia.

7.2.4 Fibres

Fibre shall be the type as specified in Clause 4.4 of Annexure MRTS16C.1.

Fibre shall be free from any matter toxic to plant growth, plant propagules (unless otherwise specified), soil, rubbish and other deleterious materials.

Fibre shall have a pH range of 5.5 to 7.5.

Fibres shall be supplied to site, in unopened bags or containers showing the manufacturer's analysis of contents and weight. The Contractor shall advise the Administrator at least 3 days before hydraulic seeding or mulching to allow the Administrator the opportunity to inspect unopened bags or containers of fibre. Witness Point

7.2.4.1 Sugar Cane

Sugar cane fibre shall be processed from sugar cane tops only. It shall be supplied to site, with a minimum moisture content of 15%.

7.2.4.2 Industrial Hemp

Industrial hemp fibre shall be processed from the bast fibre and hurd of the stalk of the industrial hemp plant. It shall be supplied to site in closed bags or containers showing the manufacturer's description, analysis of contents and weight.

7.2.4.3 Straw

Straw mulch shall be crop residue (such as cereal straw of predominantly stalk material) or sugar cane tops (predominantly leaf material). Cut and bailed pasture grasses shall not be used (unless otherwise specified).

7.2.4.4 Wood

Wood fibre shall be defibrated.

7.2.4.5 Paper (Cellulose)

Paper fibre shall be processed from recycled paper.

7.2.5 Binders

Binder (tackifier) type shall be as specified in Clause 4.4 of Annexure MRTS16C.1.

7.2.5.1 Guar Binder

Guar binder shall be a natural (non-cross linked) co-polymer binder with the following performance characteristics –

a) 100% pure guar;

b) biodegradable;

c) readily dispersible;

d) highly soluble;

e) self-hydrating; and

f) displays a delayed development of viscosity before final thickening takes place.

7.2.5.2 Bituminous binder

Bituminous binder shall be a bituminous slow curing emulsion in accordance with the requirements of MRTS21 *Bitumen Emulsion*, which shall be free from petroleum solvent or other components toxic to plant growth.

7.3 Construction

7.3.1 General

Seeding is the process of applying seed and / or fibre, water, binder and soil amelioration agents pneumatically, manually or mechanically.

The application of seeding shall not take place until the prepared area has been constructed in accordance with the specified requirements. Hold Point 2

7.3.2 Seed Mix Preparation

7.3.2.1 Seed Pre-treatment

The contractor shall pre-treat the seeds as per the seed supply proposal (SSP), unless otherwise specified in Clause 4.6 of the Annexure. Seed shall be sown within 24 hours of pre-treatment.

7.3.2.2 Amelioration Agents

Where fertilisers are specified in Clause 4.8 of Annexure MRTS16C.1 they shall be added to the slurry or, where not specified, fertiliser shall be added to the slurry as follows –

a) apply a controlled release, short term (approximately 3 months) fertiliser where cover crop seed or grass seed is specified;

b) apply a controlled release, long term (minimum 9 months) organic fertiliser where native shrub and tree seed is specified;

c) apply a combination of both of the above fertilisers where a cover crop and native seed mix is specified; and

d) in accordance with the manufacturer's instructions.

The rate at which the fertilisers are to be added to the slurry are dependent upon the nutrient value of the planting media. The fertilisers and application rates for the fertilisers, to be added to the slurry, shall be determined by the Contractor and included in the fertilising program in the PMMP-C.

Where additional soil amelioration agents, such as soil wetting agent are specified in Clause 4.8 of Annexure MRTS16C.1 they shall be added to the slurry at the specified rates.

Ameliorants shall be thoroughly mixed into the slurry.

7.3.3 Seed Mix Application Rates

7.3.3.1 Grass Seed Mix

The grass seed mix application rates are given in Clause 4.1 of Annexure MRTS16C.1, or as shown on the Drawings or, where not specified or shown on the drawings, as listed in Table 7.3.3.1.

Table 7.3.3.1 – Grass Seeded Mix and Application Rate

Time of Year	Grass Seed Mix	% Hulled	% Unhulled	Minimum Application Rate kg/ha
Warm Season October – March	Cynodon dactylon	70	30	30
	Japanese Millet – sterile hybrid			10
Cool Season April – September	Cynodon dactylon	70	30	30
	Wimmera Rye – sterile hybrid			10

Apply the 'off-season' mix (the passing season's mix) when seeding at the end of a season

7.3.3.2 Native Seed Mix

The native seed mix application rates are given in Clause 4.2 of Annexure MRTS16C.1 or as shown on the Drawings.

7.3.4 Drill and Broadcast Seeding

Drill seeding comprises the application by specialist equipment of seed and fertiliser into furrows. The Contractor shall invert the soil and broadcast or drill the seed over the treated area. After seeding, the Contractor shall ensure all seeds are covered with planting media to a depth equivalent to 1½ – 2 times (where practicable) the diameter of the seed.

Broadcast seeding comprises the mechanical or manual distribution of seed and fertiliser. After seeding, the surface of the planting media shall be lightly raked over the seeded area to ensure all seeds are covered with planting media to a depth equivalent to 1½ – 2 times (where practicable) the diameter of the seed.

Seed mix shall be uniformly blended with a bulking agent such as dry sharp sand or dry, fine sawdust at a rate of 1 part seed to 5 parts bulking agent by volume.

7.3.5 Hydraulic Seeding and Mulching

The Contractor shall use purpose-built equipment, capable of –

a) producing a homogenous slurry; and

b) uniformly applying the slurry over the area to be treated.

The mix types to be applied shall be as shown on the Drawings.

Application of the hydromulching slurry shall be from at least two directions to prevent a shadowing effect resulting in an uneven coverage of slurry. An indirect, dispersed spray pattern shall be used to achieve a uniform cover.

Binder application rates shall be as specified in Clause 4.4 of Annexure MRTS16C.1, or where not specified, shall be in accordance with Table 7.3.5-A. The rates given in Table 7.3.5-A are based on using a sugarcane mulch and the guar complying with the specified performance characteristics. Where fibres other than sugarcane mulch are used, adjustment to the binder rate may be required.

Table 7.3.5-A – Guar Binder Application Rates

Batter Slopes	Average Kilograms of Guar (dry weight) to 1000 Litres of Water
< 1 on 3 ≥ 1 on 3 and < 1 on 2	1.5 2 – 2.5
≥ 1 on 2	3

Fibre application types and rates shall be as specified in Clause 4.4 of Annexure MRTS16C.1. Where not specified, fibre type and application rates shall as specified in Table 7.3.5-B.

Table 7.3.5-B – Fibre Application Rates and Application Thicknesses

Function	Fibre Type and Application Details	Average Application Rate (dry weight) kg/ha
Sugar Cane Mulch		
Stabilising temporary works on batters	Single layer	2500
Stabilising permanent works on batters		4000
Stabilising permanent works on steep batters (1 on 2) and / or high risk site conditions	2 layers	3000 per layer (6000 total)
Industrial Hemp		
Dust suppressor and / or seed bed on flat areas	Single layer – 60% fibre (4.5 mm) and 40% hurd (dust)	2500
Stabilising temporary works on batters	Single layer – 70% fibre (4.5 mm) and 30% hurd (dust)	2500
Stabilising permanent works on batters	Single layer – 70% fibre (8.0 mm) and 30% hurd (dust)	4000
Stabilising permanent works on steep batters (1 on 2) and / or high risk site conditions	2 layers – 70% fibre (8.0 mm) and 30% hurd (dust)	3000 per layer (6000 total)
Straw Mulch		
Temporary or permanent works	Straw mulch	5000

Function	Fibre Type and Application Details	Average Application Rate (dry weight) kg/ha
Wood Fibre		
Stabilising permanent works on batters	Single layer	2500
As a seed carrier applied during the first pass (hydroseeding)		200
Paper Pulp		
Stabilising temporary or permanent works on batters < 1 on 3	Single layer	1500

The Contractor shall not carry out seeding operations if rainfall is imminent. Overspray and / or drift shall be minimised.

7.3.5.1 Hydromulching Single Pass

Where hydromulching using a single pass process is specified, all materials including fibre, seed, binder and amelioration agents are applied in a single pass.

Where hydroseeding is specified, all materials including fibre, seed and amelioration agents are applied in a single pass.

All material application rates are specified Clause 4.4 of Annexure MRTS16C.1.

7.3.5.2 Hydromulching Multiple Pass

Where hydromulching using a multiple pass process is specified, the first pass shall consist of a slurry of water, fibre (approximately 25% of the total specified amount of fibre), seed, fertiliser and other soil amelioration agents (as required) to the prepared surface. The second and subsequent passes shall consist of a slurry of water, fibre and binder only. The number of passes is given in Clause 4.5 of Annexure MRTS16C.1.

Where multiple passes of the hydromulch slurry are specified, the Contractor shall allow sufficient time between subsequent passes such that slumping of the hydromulch treatment does not occur.

7.3.5.3 Straw Mulching

Where straw mulching is specified, two separate applications are required. The initial application shall consist of a slurry of water, seed, fertiliser and other soil amelioration agents (as required) to the prepared surface. The second application shall consist of dry straw and binder applied simultaneously.

8 SEEDING – PERFORMANCE BASED

8.1 General

Where seeding is to be carried out on a performance basis (output controlled), the Contractor is responsible to design, apply, establish and monitor the seeding operation including a sample installation.

The Monitoring Period shall be 12 months from the date of Certificate of the Commencement of the Monitoring Period.

By the end of the Monitoring Period, the seeded areas shall contain established, specified species. Refer to MRTS16E *Establishment and Monitoring* for performance requirements.

8.2 Material Requirements

Seed mixes used in hydromulching or straw mulching may be comprised of a grass seed mix and / or a native seed mix and / or a cover crop.

8.2.1 Grass and Native Seed

The seed mix species are given in Clause 5.1 and 5.2 of Annexure MRTS16C.1 or as shown on the Drawings.

8.3 Construction

8.3.1 General

The Contractor shall achieve the ground surface for grass seeded areas as specified in Table 10.1.2.1 of MRTS16E at the Certificate of Commencement of the Monitoring Period (CCMP) and by the end of the Landscape and Revegetation Monitoring Period (LRMP).

The Contractor shall achieve the ground surface for native vegetation seeded areas as specified in Clause 5 of Annexure MRTS16E.1 at the Certificate of Commencement of the Monitoring Period (CCMP) and by the end of the Landscape and Revegetation Monitoring Period (LRMP).

8.3.2 Timing

Hydromulching shall be carried out within the following time frames:

a) Batters:

Within seven (7) days of the completion of top soiling.

b) Other Cleared and Grubbed areas

Within seven (7) days of completion of Clearing and Grubbing operations but no more than twenty one (21) days from commencement of Clearing and Grubbing operations on the area to be hydromulched.

Notwithstanding the above requirements, Hydromulch shall not be applied:

i. when wind speed exceeds 15 km/hr;

ii. where the surface is too wet or;

iii. during rain periods or when rain appears imminent.

8.3.3 Sample Installation

The Contractor shall prepare a sample installation of each specified seed mix to achieve the performance outcomes indicated in Table 10.1.2.1 of MRTS16E for seed mixes and Clause 5 of Annexure MRTS16E.1 for native vegetation seed mixes – within the time period stated in Clause 3.2 of Annexure MRTS16C.1.

The minimum area for each sample installation shall be 500 square metres. Where possible the sample installation shall form part of the final project.

Where an area that forms part of the final project cannot be prepared prior to the sample installation, the Contractor shall prepare a suitable area (that is, an area of similar site conditions to the final treatment area) for the sample installation within the time period stated in Clause 3.2 of Annexure MRTS16C.1.

All materials and operations used in the sample installation shall be same as those proposed for use in the final installations.

Photographs shall be taken of the sample installation at monthly intervals following seeding.

Where the ground surface cover rate has achieved the required performance standard, no adjustment of application rates materials or methods is required for the final as-specified installation.

Where the ground surface rate has not achieved the performance standard, the Contractor shall prepare another sample installation for assessment.

9 TURFING

9.1 General

Turfing operations shall be carried out where shown on the Drawings, or as specified elsewhere in the Contract.

9.2 Material Requirements

9.2.1 Turf

Turf species shall be as specified in Clause 6.1 of Annexure MRTS16C.1. The quality of the turf shall comply with the following –

a) A-grade turf shall consist of an A-grade cultivated sod comprising 95% of the turf species stated in Clause 6.1 of Annexure MRTS16C.1; and

b) B-grade turf shall consist of a B-grade cultivated sod comprising 80% of the turf species stated in Clause 6.1 of Annexure MRTS16C.1.

Turf shall –

a) be in a healthy condition free from weeds, pests, diseases and any matter toxic to plant growth; and

b) be showing signs of active growth and true to form of the species.

9.2.2 Reinforced Turf

Reinforced turf shall consist of a layer of mature turf grown onto an organic, felted jute fibre and reinforced with a reinforcement mesh.

Reinforced turf species, grade and width shall be as specified in Clause 6.2 of Annexure MRTS16C.1.

The reinforced turf installation shall be capable of withstanding surface water flow rates of 3 m/s without degradation.

9.2.3 Turf Stakes and Fixing Pins

Stakes shall be 25 x 25 x 300 mm hardwood stakes or equivalent. Stakes shall be removed and disposed of following establishment of the turf.

Fixing pins used to secure turf shall be 'U' shaped mild steel and of a size and strength to ensure turf maintains direct contact with the ground.

9.3 Construction

9.3.1 General

Turfing is the process of manually or mechanically laying turf.

The laying of turf shall not take place until the prepared area has been constructed in accordance with the specified requirements. Hold Point 3

9.3.2 Laying of Turf

Turf shall be delivered within 24 hours of cutting. Laying of turf shall commence within 24 hours after delivery.

Turf shall be laid in accordance with Standard Drawing 1652.

Turf shall be laid parallel to the contour on prepared ground. Cross joints shall be staggered and butted together.

Turf shall be rolled or tamped to achieve a consistent contact between planting media and sod and watered to minimise air pockets between the turf and the planting media.

9.3.3 Laying of Reinforced Turf

Reinforced turf shall be laid in accordance with Clause 9.3.2 and Standard Drawing 1652 with the following exceptions and additions –

a) refer to Drawings for details including the anchoring of the leading edge of turf in trenches;

b) lay turf parallel to the surface flow; and

c) pull turf taut before pegging down.

10 PLANTING OF CONTAINER AND EX-GROUND STOCK

10.1 General

Planting of container, ex-ground stock and / or site harvested plant material operations shall be carried out where shown on the Drawings, or as specified elsewhere in the Contract.

10.2 Material Requirements

Plant material used in planting operations may comprise plant stock obtained from nurseries, plant stock propagated from site plant material and grown-on in nurseries and / or material harvested and planted as is on site.

The plant material species are shown on the Drawings.

10.2.1 Plant Supply Proposal

Where planting has been scheduled using one or more of Items 3787 – 3791, the Contractor shall submit a Plant Supply Proposal (PSP) covering nursery supplied, nursery propagated and / or site harvested material. Hold Point 4 The PSP shall be submitted to the Administrator for a determination as to its suitability, within the period specified in Clause 7.1 of Annexure MRTS16C.1. The PSP shall include the following –

a) the proposed species or where specified species are unavailable, potential substitutes;

b) the proposed planting patterns and spacings, for the substitute species;

c) the proposed adjustments to planting patterns and spacings due to conflicts with existing and proposed services, road furniture, lighting and road signs;

d) harvesting and / or propagation proposals for site harvested plant material;

e) growing on, storing and maintaining plant stock;

f) required certificates and permits; and

g) proposed plant delivery program including dates for joint inspections at the nursery.

The Contractor shall give the Administrator a minimum of 24 hours notice of plant nursery joint inspections which are required within 2 months of the Administrator deeming the PSP suitable and every following 2 months where the growing on period is greater than 2 months. Witness Point

The Contractor shall give the Administrator a minimum of 24 hours notice of plant delivery. Witness Point

10.2.2 Containerised Plants and Ex-ground Stock

Plant material shall comply with the following –

a) plants shall be acclimatised to the conditions of the project site – acclimatisation shall include sun hardening and reduction in water;

b) plants shall be of a size commensurate with the container size;

c) plants and container soil shall be in a healthy condition free from weeds, pests and diseases;

d) plants shall be showing signs of active growth relative to season and true to form of the species;

e) plant roots shall be healthy, not pot bound and able to support healthy plant growth;

f) trees shall have a single leading stem unless otherwise specified;

g) each group of plant species shall be clearly and correctly labelled according to botanical nomenclature; and

h) labels shall be water resistant and tied securely to one species per tray.

10.2.3 Plant Stakes and Ties

The proposed plant material to be staked and the stake type number are shown on the Drawings. The Contractor shall determine the proposed type and size of stakes to be installed by referring to the type number and stake description in Table 10.2.3.

Hardwood plant stakes are to be free of knots and twists.

Table 10.2.3 – Plant Stake –types and sizes

Stake Type	Description
1	1500 x 25 x 25 mm hardwood stake
2	1800 x 50 x 50 mm hardwood stake

Stake Type	Description
3	600 x 10 mm diameter bamboo stake free from twists
4	900 x 38 x 15 mm hardwood stake painted with white paint for a length of approximately 150 mm from the top

The proposed plant material to be staked shall be secured to Stake Types 1 and 2 with ties made from 50 mm wide hessian webbing.

10.2.4 Plant Guying System

The proposed plant material to be installed with a guying system is shown on the Drawings. The guying system shall comply with the following –

a) wire cable shall be sized to adequately support the particular plant size;

b) turnbuckles shall be galvanised and sized to suit the cable;

c) wire cable shall be encased in hosing where it encircles the plant trunk and branches;

d) pegs shall be capable of anchoring the cable and support the plant; and

e) flags or plastic streamers shall be visible to prevent tripping or mowing over cables and pegs.

10.2.5 Site Harvested Plants

The proposed site harvested plant species and locations are as shown on the Drawings.

10.2.6 Sub-soil Drain

The materials required for sub-soil drainage systems are shown on Standard Drawing 1653-4.

10.3 Construction

10.3.1 General

Planting is the process of planting plant stock obtained from nurseries, plant stock propagated from site plant material and grown-on in nurseries and / or site harvested plant material.

The planting of plant material shall not take place until the prepared area has been constructed in accordance with the specified requirements Hold Point 5

10.3.2 Setting-out of Plants

The Contractor shall determine locations of all existing and proposed services, road furniture, lighting and road signs prior to setting out.

The Contractor shall set out containerised and ex-ground plant stock in the locations as shown on the Drawings.

The setting out of plants shall be offset from all existing and proposed services, road furniture, lighting and road signs by the offset distances as shown in the Drawings. Where no offset distances are shown in the Drawings, the Contractor shall set out the location of plants to avoid any future conflict with all existing and proposed services, road furniture, lighting and road signs.

The Contractor shall give the Administrator a minimum of 24 hours notice prior to commencement of planting operations. Hold Point 6

10.3.3 Installation of Containerised Plants

The soil moisture content of the prepared planting area and potting media of plant stock shall be between 80 – 100% of the field capacity (FC) of the planting area soil or potting mix.

Planting holes shall be excavated to a minimum width / diameter equivalent to twice the diameter of the plant container and to a depth equivalent to the height of the plant container. The material at the bottom of the hole shall be broken up to a depth of 50 mm. The sides of the hole shall be roughened.

The plant shall be installed so that the top of the root ball is level with the surrounding finished ground level. Mulch materials shall not contaminate backfill material.

Fertiliser, applied in accordance at the manufacturer's recommended rate of application, shall be placed at approximately half the hole depth. Fertiliser shall not be placed at the base of the plant or in contact with the plant's root system.

The planting media shall be tamped down to create a depressed area surrounding the plant – without exposing the plant's root system.

Where individual plantings, with a container size of 45 litres or greater, are installed a water retention basin shall be shaped around each planting hole. The basin shall have a minimum diameter of 1000 mm and a minimum berm height of 75 mm. The size and depth of the basin for individual plantings with container sizes less than 45 litre shall be adjusted proportionally.

As soon as practicable after planting, plants shall be watered with sufficient water for the surrounding planting media and root ball to reach FC.

The Contractor shall leave planting areas in a tidy condition. All rubbish is to be removed.

The Contractor shall leave sufficient plant tags on plants to allow identification of each plant species in any given area.

10.3.3.1 Installation of Containerised Plants on Sloped Surfaces

Plants to be installed on a sloped surface, for example embankments, shall be installed in accordance with Clause 10.3.3 with the following additions –

The excavated face of the subsoil shall –

a) in free draining embankment material, slope downwards towards the centre of the embankment; and

b) in heavy clay embankments, slope downwards towards the face of the embankment.

Where subsoil drain to planting holes of advanced stock is shown on the Drawings, the installation of subsoil drain shall be in accordance with Standard Drawing 1654.

Where planting of container stock other than advanced stock is shown on the Drawings, the stock shall be planted in accordance with Standard Drawing 1655.

10.3.4 Staking and Tying

Where two stakes are required per plant, the stakes shall be installed perpendicular to prevailing wind direction. Where two stakes are required per plant, and the plants to be staked are located near hardstand areas, the stakes are to be installed parallel to the hardstand areas.

Stakes shall be driven into the ground to approximately one third of the length of the stake. Stakes shall be positioned close to the plant without passing through the root ball. Type 1 and Type 2 stakes shall be tied to the plant at a height in accordance with Standard Drawings 1653-1655.

Type 3 and Type 4 stakes shall not be tied to the plants unless otherwise specified.

All stakes installed in containerised plants as part of plant production, shall be removed from site following planting operations. Only stakes as required in the Drawings shall remain.

10.3.5 Installation of Ex-ground Stock

The Contractor shall install ex-ground stock in accordance with the requirements of Clause 10.3.3.

Where the installation of a guying system is required it shall be installed in accordance with Standard Drawing 1656.

10.3.6 Harvesting and Planting of Site Plants

The site plant species and harvest areas shall be as shown on the Drawings. The harvesting method for each species to be site harvested is specified in Clause 7.2 of Annexure MRTS16C.1.

10.3.7 Potting On

Where containerised plant stock becomes pot bound, the Contractor shall arrange for the plant supplier to pot on the stock to the next largest container size.

11 SUPPLEMENTARY REQUIREMENTS

The requirements of MRTS16C *Vegetation Works* are varied by the supplementary requirements given in Clause 8 of Annexure MRTS16C.1.