

Sydney Trains Environmental Management System Template

Station Garden Bed Technical Specification

Document History

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1 Introduction

1.1 Background

Station Garden beds are to be constructed and planted out as per this instruction and at specific locations and placements as outlined in the Landscape Plans for each Sydney Trains station.

These details aim to fulfil the following requirements for platform garden beds:

- Require minimal maintenance.
- Require minimise inspection efforts for high alert situations.
- Comprise a limited number of standardised designs to provide consistency across the network.
- Follow the CPTED principals (Crime Prevention through Environmental Design).
- Provide maximum amenity, while minimising the number of garden beds.
- Discourage rubbish dumping.
- Provide timeless designs that will not date or require replacement.

1.2 General Considerations

Planting advanced specimens into pavements is a time consuming process. It is essential that the tree and associated ground covers and shrubs are in optimal condition when planted and their method of planting, protection and early maintenance is of a high standard.

1.2.1 Quality of Nursery Stock

Trees supplied for pavement plantings are to be grown to a standard that will allow them to establish rapidly and continue to thrive while keeping their desired form.

Nursery stock must meet the design criteria for minimum dimensions, container size and shape, plant shape and any special pruning requirements specified.

	Root ball volume	Height (above container)	Caliper (at 300mm)	Clear trunk height
Trees	100 litre	2.4 metres	50mm	1500mm
Shrubs	200 mm dia X 200 mm deep	300 mm	NA	NA
Ground covers	150 mm dia X 150 mm deep	NA	NA	NA

Other general requirement to be met, include:

- Plants must be true to type, ie the species and cultivar specified.
- Plants must be healthy and vigorous.
- Plants must be free from pests and disease.
- Trees must have the crown well formed and balanced.
- Trees must have sufficient “stem taper” to be self supporting and not require staking, (staking will not be required unless specified by the principals representative – see section 2.2.6
- Ensure that formative pruning work undertaken at the nursery is quick to recover.
- Trees should not to have “included bark” in “joint” or “crotch” that may result in long term structural problems.
- Trees must have a defined central leader.

- Trees should be planted in the same orientation to north that it was grown in the nursery to protect the sheltered side of the tree.
- Root systems must not be girdling or lacking strong progressive primary root system. Too much secondary division of roots can cause watering problems.
- Root systems must be fully developed in the container, so that when shaking the unsupported root ball, at least 90% of the soil volume should remain attached.

1.2.2 Plant species

Plant species will be specified in the individual station drawings. For direction on species selection see section 3, or consult the Landscape Plan for the station of interest.

1.2.3 Rejection of non conforming specimens

Any tree or plant not conforming to this standard will be rejected and a replacement will be required.

2 Scope of Works

- Excavation of subgrade for tree pits and for garden bed edging
- Construct formwork for garden bed edging
- Construct concrete edging
- Supply and installation of imported soil mixes
- Supply and installation of trees
- Supply and install mulch and ground cover species, or install Terrabond®.(where required)
- Supply and installation of tree guards, ties and guys as required to maintain stability
- Maintenance of trees for establishment post planting for sixty (60) days.

2.1 Expertise

All tree planting works should be carried out by a Landscape Contractors Association affiliated contractor who has demonstrated experience in the field of landscape work, tree planting and tree establishment.

The site supervisor/ foreman must hold as a minimum qualification of a NSW TAFE Coarse Certificate in Urban Horticulture, or its recognised equivalent, with a minimum of three years demonstrable experience in similar landscape projects.

2.2 Materials

2.2.1 Back fill soil mix

Backfill soil mix will comprise the following components.

Component	Description	Proportion of mix (%)
Coarse sand	Washed, sharp coarse river sand 0.25 to 2.0mm diameter, free of weeds, debris or other deleterious material.	60
Imported top soil	Commercially available premium grade sandy loam conforming to Australian Standard, AS4454.	35
Organic matter	Commercially available aged and composted green waste or cow manure, free of weeds, debris or other deleterious material.	5

Note: Do not reinstate the material removed during the digging of the pit, but back fill with the above mix.

2.2.2 Water

For the duration of the contract trees must be maintained in peak condition at all times by providing adequate moisture. There must be the capacity to apply 12 litres of water per square metre, gradually from a water supply system in any watering event.

2.2.3 Fertiliser

Fertiliser is to be of a proprietary brand delivered to site in sealed bags marked to show manufacturer or vendor, weight, fertiliser type, N:P:K ratio, recommended uses and application rates.

The following fertilisers are to be applied at the specified times after planting.

Application time	N:P:K ratio	Application rate
Tree at time of planting	18 : 2.1 : 2.9 Slow release 9 to 12 months. Osmocote® or equivalent	50g on top of root ball
Trees 60 days after planting	0.22 : 0.58 : 4.3 Liquid fertiliser. Seasol® or equivalent.	Solution of 100ml fertiliser concentrate / 9Lt water. Apply to the top of root ball.

2.2.4 Mulch

Mulch used in garden beds shall be a blend of woodchip and leaf material of the type commonly marketed as forest blend.

Mulch shall only be derived from waste timber. Under no circumstances shall wood chip, derived from trees, which have been specifically harvested for that purpose, be accepted by Sydney Trains.

Mulch shall be free of soil, weeds, stones, vermin, insects or other foreign material.

2.2.5 Terrabond®

Where beds are specified not to have mulch and ground covers, Terrabond® combined with gravel will be used around the advanced tree to cover the entire planting bed. Terrabond® (manufactured by Ortus Holdings P/L 02 93874533) is a material that bonds loose aggregates together to form a load bearing surface that is level with surrounding surfaces and is completely permeable while virtually maintenance free.

Terrabond® will be blended as per manufacturers recommendations with an off white pebble aggregate with a minimum particle size of 10mm. The colour should provide a minimum of 30% contrast to the platform surface.

Blue metal aggregate will be used under the Terrabond® and will be of minimum particle size of 14mm. Blue metal aggregate will be free of soil, weeds, stones, vermin, insects or other foreign material.

2.2.6 Ties and stakes (Where specified)

Generally trees will not be supported by stakes and ties, however in individual cases stakes and ties may be required to support or protect individual trees.

2.3 Garden bed edge construction

Concrete edging is to be of 25mpa, non-reinforced, centre jointed, colour to be at least 30% contrast to the platform surface and is to be poured on site, into formwork that achieves a width of 280mm and a depth of 280mm. The top of the edging is to be flush with the desired new platform surface.

Garden beds will be of the following sizes measured from the inside of the edging. Note measurements are inside measurements.

Bed Design	Width	Length
Type A	1.6 metres	2.4
Type B	1.2 metres	1.6

Beds are to be placed as per drawings and always orientated with the longest side a minimum of 2.6 metres from the coping edge centred on the platform. Where this is not possible the bed width should be reduced accordingly.

Where excavation for the planting hole reveals services inappropriately placed and likely to impact on the position of the trees rootball, the position of the bed should be moved to a more suitable nearby location. Sheathing of closely located services may be considered in consultation with the Sydney Trains representative.

2.3.1 Protect pit from contamination

Prevent any contamination of the planting pit and soil from concrete dust, mortar, excavated site soil or other debris.

2.4 Tree Pit Preparation

2.4.1 Excavation

Excavate tree pits to a depth equivalent to the depth of the new tree rootball measured from 150 mm below the new platform surface (and top of concrete flush edging).

Remove all excavated materials from site. Do not disturb services, excavate by hand around services as required.

If during excavation the site is deemed unsuitable for installation of the specified design, seek advice from the project manager on relocating the bed to an adjacent, more appropriate position.

2.4.2 Subgrade preparation

Cultivate or rip subgrade at base and sides of tree pits to a depth of 100mm if possible. Cultivate manually close to services. Remove stones greater than 50mm and any debris or rubbish brought to the surface during cultivation.

2.4.3 Placing Soil mix

Raise the level of soil to the desired height of the base of the root ball using soil mix as specified in clause 2.2.1.

2.5 Tree Pit Planting

2.5.1 Planting conditions

Do not plant in unsuitable weather conditions such as extreme heat, cold, wind or rain.

2.5.2 Watering prior to planting

Thoroughly water the root balls before planting and immediately after planting. Prevent the root ball from drying out during the planting phase. Water as required to maintain growth free of stress.

2.5.3 Placing advanced specimens

When the tree pit is excavated and the correct base level achieved using the backfill soil as specified, place the root ball in its final position. Ensure the tree is centered and plum, and with the top of the root ball approximately 110 mm below the top of the bed edging.

Do not use the trunk of the tree as a lever in positioning or moving the tree in the planting hole.

For container grown trees, carefully remove the tree before planting or cut away the container in the tree pit. For field grown trees remove hessian wrapping and wire from the base before positioning then remove the remainder of the wrapping when in the planting pit ensuring that a minimum of soil falls away from the root ball.

2.5.4 Root trimming

Undertake any remedial root pruning, only if problem “turned roots” are detected using clean and well maintained secateurs.

2.5.5 Backfilling

Fill around the root ball with the specified backfill soil to the height specified in the drawings where the irrigation manifold is to be installed. Manually compact (compacting by flooding is acceptable).

Install irrigation manifold as outlined in the following clause.

Fill the remaining areas with the backfill soil to be level with the top of the root ball soil.

2.5.6 Irrigation manifold

Install tree irrigation manifolds to tree pits as per detail drawings to fully surround the root ball and water the lower half of the ball. Construct manifold from 50mm diameter rigid slotted UPVC fitted with filter sock and set in a horizontal position to enable an even distribution of water across the root zone.

Fit upturns beyond the rootball, with the height extended 10 mm above the top or the proposed mulch level to prevent contamination entering the manifold opening, and flush with the level of Terrabond® where it is to be installed. Fit mesh or grate over the end of the manifold opening to prevent mulch or rubbish fouling the manifold.

2.5.7 Watering after planting

Hand water immediately after planting from the top of the root ball and by using the irrigation manifold. Water as required to maintain growth free of stress.

2.5.8 Tree Surgery (where requested by the principals representative)

Any formative pruning is to be done by an experienced and qualified arborist only. All pruning works are to be done to the Australian Standard for Pruning of Amenity Trees AS4373.

2.6 Ground Surface Treatment

There are two options for ground surface treatment. Mulching and planting with ground cover plants, or installing Terrabond®. Site drawings will detail the required treatment.

2.6.1 Installing ground cover plants (where specified in the drawings)

Ground cover species as specified will be installed in the garden bed at a density of nine plants per square metre unless otherwise stated in the drawings.

Ground cover plants are not to be planted into the existing root ball of the advanced tree specimen.

Water in all plants immediately. Water as required to maintain growth free of stress.

2.6.2 Installing mulch

Mulch is to be installed in the garden bed to a depth of 80mm over the entire area of the garden bed. Ensure that mulch is not hard against the stems and trunks of plants. Ensure that mulch does not enter the irrigation manifold.

2.6.3 Terrabond® (where specified in the drawings)

Once the backfill soil had been compacted by watering and settling top the area with the specified blue metal aggregate to a depth of 75 mm. Top this with the prepared Terrabond® mix as to a depth of 40 mm and must be flush with the top of the garden bed.

2.7 Shrub plantings (where required)

Excavate the garden bed to a minimum of one and a half times the depth of the root ball and back fill with the specified back fill soil.

Positions and planting densities of shrubs (where required) will be specified in the site drawings for individual stations.

2.8 Maintenance

2.8.1 Requirement and duration

Maintenance will commence upon the completion of planting and surface treatment and will extend for sixty (60) days.

2.8.2 Maintenance Inspections

All sites should be visited at intervals not exceeding fourteen (14) days to determine the status of the plantings and the effectiveness of maintenance previously carried out and in progress. However, this is a minimum requirement and if the site conditions requires more frequent, visits such as for watering plants in dry weather conditions, then a more regular visitation program is to be instigated.

2.8.3 Watering

Provide water to maintain trees and ground covers in peak condition at all times and have the capacity to apply 12 litres of water per square metre. Plants should be watered directly onto the garden bed, and should be deep watered using the irrigation manifold.

Plants should not be permitted to dry out at any time. The frequency of watering may be varied during periods of adequate rainfall. Weather conditions will dictate if more frequent than fortnightly watering is required.

Ensure that the irrigation system is operational to achieve optimum plant growth in the prevailing environmental conditions.

2.8.4 Mulch

The mulch should be kept in a weed free condition and additional mulch reinstated as required.

2.8.5 Weed Control

All planting areas are to be kept free of weeds and non specified plantings.

Weed removal shall be carried out at intervals of not more than two (2) weeks. Use the most suitable herbicide in accordance with the manufacturer's recommendations if no impact on desirable plants is possible. Ensure that the herbicide is listed in the *Sydney Trains Pesticides Register* (EMS-09-RG-0073), and the correct level of training is held by the applicator. The Sydney Trains representative must approve the application as per EMS-09-PR-0017 *Sydney Trains Pesticides System Procedure*.

Weeds which cannot be controlled by herbicide and is likely to impact on desirable plants shall be removed by hand. The entire weed shall be removed from site.

2.8.6 Disease and insect control

Plants shall be sprayed to control disease and insect infestation when required.

Spraying shall only be undertaken on windless days. Ensure that the herbicide is listed in the *Sydney Trains Pesticides Register* (EMS-09-RG-0073), and the correct level of training is held by the applicator. The principals representative must approve the application as per EMS-09-PR-0017 *Sydney Trains Pesticides System Procedure* as public notification is required for station pesticide application.

2.8.7 Plant replacement

Missing, dead and non-performing trees and plants shall be replaced. Replacement plants shall be of similar size and quality and of identical species and variety to the plant being replaced.

2.8.8 Staking and tying (where required)

Tree guards and ties (if present or required) are to be maintained around each plant so that the natural plant growth is not impeded or restricted. Damaged and missing tree guards and ties shall be replaced as soon as practicable after being identified.

Tree guards that are no longer required are to be removed from the site.

2.8.9 Fertiliser

Implement the specified fertiliser regime. Ensure that root balls are adequately watered prior to liquid fertiliser applications.

2.8.10 Additional Maintenance Period (Where required)

Ongoing maintenance requirements should include.

Maintenance Inspections

After the initial 60 day maintenance period maintenance inspections can be extended to monthly visits. All maintenance activities listed in the specification need to be addressed at each inspection.

Pruning

Any pruning is to be done by an experienced and qualified arborist only. As a minimum the arborist must have hold a NSW TAFE Coarse Certificate in Tree Surgery or its recognised equivalent with a minimum of three years demonstrable experience in the arboriculture industry.

Fertiliser application

Application time	N:P:K ratio	Application rate
Tree at time of planting	18 : 2.1 : 2.9 Slow release 9 to 12 months. Osmocote® or equivalent	50g on top of root ball
Trees 60 days after planting	0.22 : 0.58 : 4.3 Liquid fertiliser. Seasol® or equivalent.	Solution of 100ml fertiliser concentrate / 9Lt water. Apply to the top of root ball.
Monthly to trees 4 months after planting through to end of plant establishment period	0.22:0.58:4.3 Liquid fertiliser. Seasol® or equivalent.	Solution of 50ml fertiliser concentrate / 9Lt water. Apply monthly to top of root ball.

3 Specimen Tree and Ground Cover Selection

Delete this section when the species are selected. Include the species in the Landscape plan for the site, (ie from the Sydney Trains Station Landscape Plan).

Where species are not specified in the Plan select the appropriate species from the following tables for this specification or consult with the Environmental Specialist.

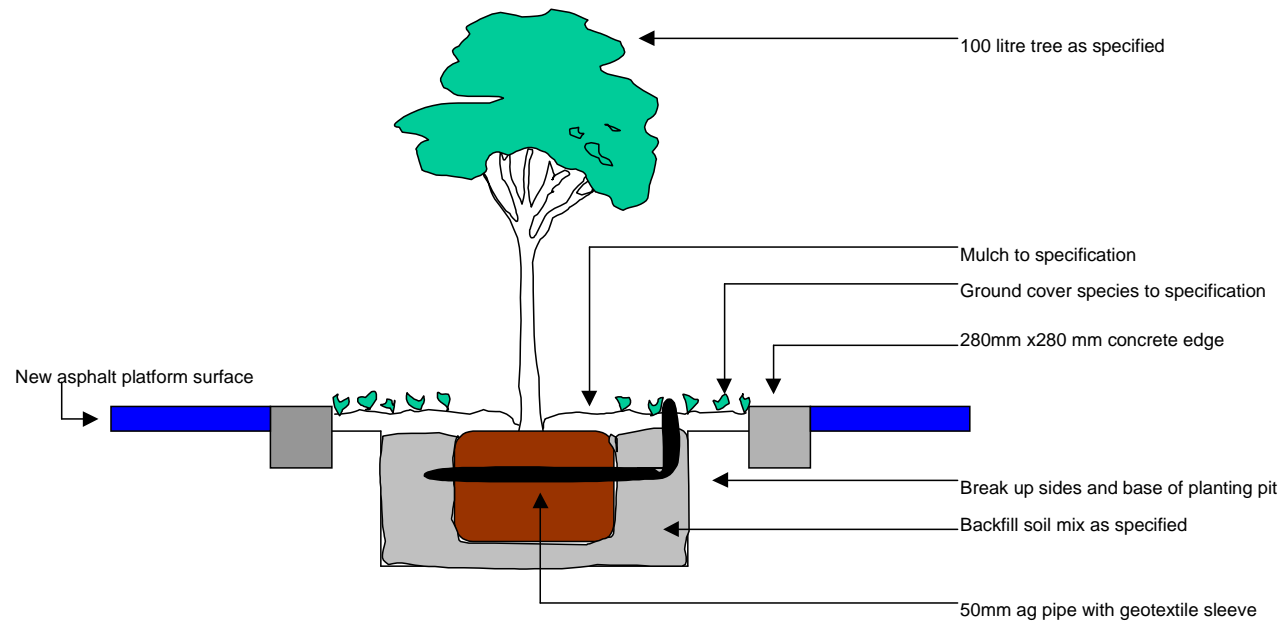
Species list – Specimen Trees for Platform Plantings

Species List - Small trees for Platforms	Minimum spacing	Suitable for Eastern Sydney	Suitable for Western Sydney	Suitable for Blue Mountains	Suitable for the Illawarra	Suitable for Central Coast
Crepe myrtle (deciduous) <i>Lagerstroemia indica</i>	5	X	X	X	X	X
Evergreen Ash, <i>Fraxinus grithitii</i>	5	X	X	X	X	X
Fried egg plant <i>Gordonia axillaris</i>		X		X		
Watergum, <i>Tristaniopsis laurina</i>	5	X	X		X	X
NSW Christmas bush <i>Ceratopetalum gummiferum</i> (do not use where a raised crown is required).	5	X	X	X	X	X
Weeping Bottlebrush, <i>Callistemon viminalis</i>	5	X	X	X	X	X

Species List – Ground Covers for Platform Plantings

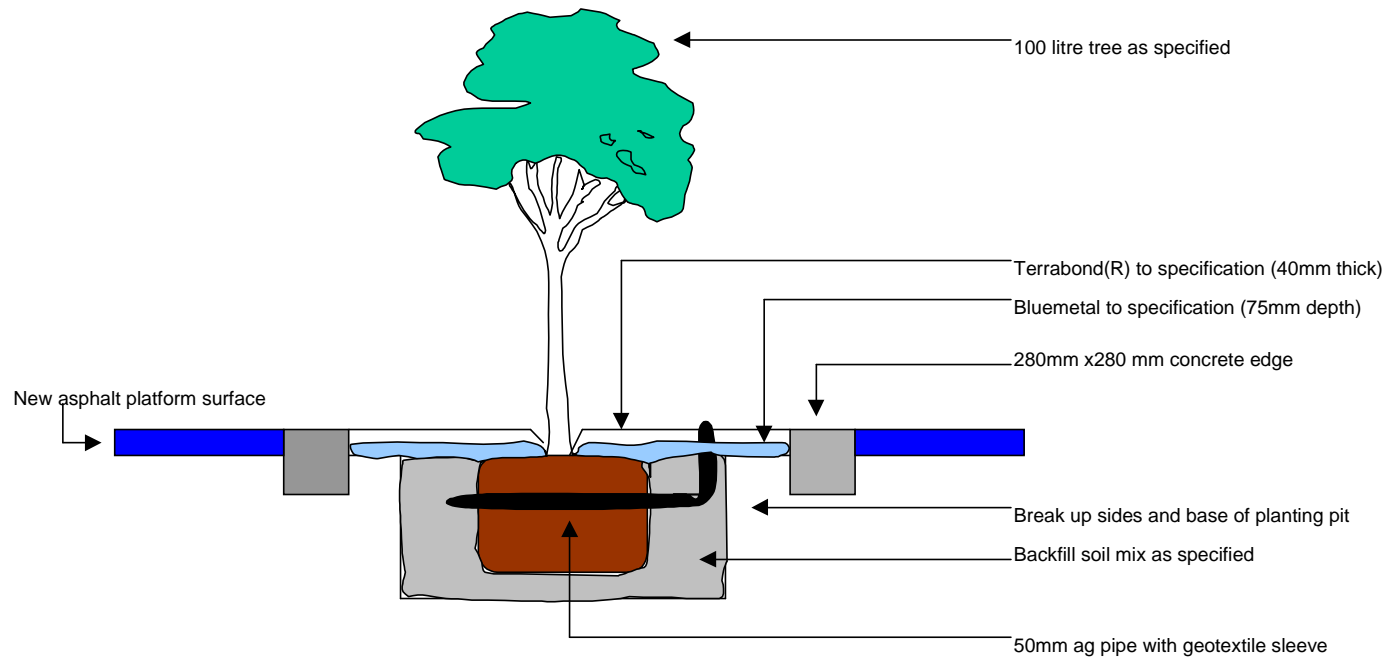
Species List - Ground Covers	Plants per square metre	Suitable for Eastern Sydney	Suitable for Western Sydney	Suitable for Blue Mountains	Suitable for The Illawarra	Suitable for Central Coast
Dianella sp. (select miniature varieties such as "Little Jess")	4	X	X	X	X	X
<i>Hibertia dentata</i> (prostrate scrambler)	2	X	X	X	X	X
<i>Lomandra longifolia</i> (tall upright growth)	4	X	X	X	X	X
<i>Myoporum parvifolium</i> (prostrate scrambler)	2	X	X	X	X	X
<i>Convolvulus sabatius</i> (prostrate scrambler)	2	X	X		X	X
Lomandra "Tanika" (finer and smaller foliage than <i>Lomandra longifolia</i>)	4	X	X	X	X	X

Appendix 1: Detail Sketches



DETAIL (not to scale)

Specimen tree with mulch
and ground cover species
ground treatment



DETAIL (not to scale)

Specimen tree with
Terrabond(R) ground
treatment