

PART L19
TREE TRANSPLANTING AND RELOCATING

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1. GENERAL

- .1 This Part specifies the requirements for transplanting/relocating trees.
- .2 The work shall be supervised by a qualified arboriculturist experienced in this type of work.
- .3 The following documents are referenced in this Part:
 - (a) ISO 9001 Quality Management Systems
 - (b) AS 4373 Pruning of Amenity Trees
 - (c) Part L60 Maintenance of Plants

2. SOIL TESTING

- .1 The Contractor shall conduct soil tests prior to tree relocation. Analysis of the soil at the proposed transplant site and any imported backfill material shall be carried out so that appropriate amendments may be applied. Analysis may include pH, EC, Organic Matter, Major and Trace Elements and Exchangeable Cations.
- .2 Soil tests shall be conducted by a laboratory accredited under ISO 9001 and results shall be submitted to the Principal.

3. TREE PREPARATION**General**

- .1 The north side of the tree trunk shall be marked prior to removal to facilitate orientation at the new site.

Formative Pruning

- .2 The Contractor shall selectively remove specific branches to enhance form and improve structure, and to directionally shape the tree. With smaller diameter branches it may be necessary to reduce the branch to a dormant bud. Formative pruning shall aim to reduce the development of structural weaknesses and to accommodate site constraints and reduce encroachment on utilities or buildings as the tree grows.
- .3 All pruning shall conform to AS 4373.

Root Preparation Requirements and Responsibilities

- .4 The Contractor shall conform to the following root preparation requirements and responsibilities.
 - (a) **Root Preparation Method Specified by Principal:** The method of root preparation for the project shall be as specified by the Principal.
 - (b) **Root Preparation Method Recommended by Contractor:** The Contractor shall undertake an assessment and recommend the preferred method of root preparation for the project.

Root Preparation Method Specified by the Principal

- .5 The Contractor shall use the following root preparation methods:

- (a) **Root Pruning and Soaking:** Root pruning and soaking shall be carried out a minimum of 6 months before transplanting.
A radial trench shall be excavated exposing the pruned roots. The pruning trench shall be backfilled with a sandy loam soil mixture and kept moist leading up to the transplant date. The soil moisture content shall be maintained to adequately support the health of the tree. The remaining soil shall be used to build a water holding berm around the outside of the backfilled trenches.
- (b) **Berm and Soaking:** The Contractor shall build a radial water-holding berm. The root ball within the berm shall be thoroughly watered during the remaining weeks prior to transplanting. The trench shall be soaked with approximately 100 litres of water every third day. The frequency of watering and the applied quantity is dependent on the tree species, soil types and current weather conditions.

4. ROOT EXCAVATION METHOD

- .1 Before any excavation is carried out, the Contractor shall mark the proposed root ball size on the ground.
- .2 The Contractor shall use the following root excavation methods:
- (a) **Hand Spade Excavated:** Prior to digging, the soil around the root system shall be thoroughly moistened to help keep the root ball together.
The root ball shall be excavated around the outside of the root trench. All exposed roots shall be pruned flush with the face of the root ball. Sharp secateurs or loppers shall be used to cut roots. Roots shall be cut in a way that will not jar and loosen the soil in the root ball. The depth of the root ball is dependent on each individual tree species. Digging below the root ball shall occur when the amount of roots reduce considerably within the root ball trench. This will determine the depth of the root ball. Tension shall be applied by the crane while undercutting the root ball.
- (b) **Mechanically Excavated:** The root plate shall be mechanically excavated around the outside of the root pruning trench. A qualified operator shall carry out the work. Once the desired depth has been reached, the root plate shall be shaped by hand. All exposed roots shall be pruned flush with the face of the root plate using sharp loppers. Roots shall be cut and removed, ensuring the root plate is not loosened. This technique requires root pruning pre-excavation.
- (c) **High Pressure Water Blasting:** A high pressure water blaster shall be used to clean cut roots. A Provisional Sum has been included in the Schedule of Rates for this work.

5. TRANSPORT

Lifting Technique

- .1 Lifting of trees shall be carried out or supervised by a qualified and/or suitably experienced arboriculturist and crane operator using a crane and supports.
- .2 Appropriate lifting equipment shall be used.
- .3 Suitable slings shall be attached around a balance point of the trunk and shall provide a support system around the root ball. When a sling is attached to the trunk, padding and protection is required to reduce possible damage. Trees shall not be lifted by the trunk alone. A qualified crane operator shall determine the support system to be used.

Preparation for Transport

- .4 Only natural fibre materials that have not been chemically treated shall be used to support the root ball. Synthetic materials shall not be used. Burlap shall be applied before moving the tree to protect the shape and structure of the root ball during transport. Once the tree is lifted burlap shall be used to cover the base of the root ball.

Transport Vehicle

- .5 The transport vehicle shall be adequate to transport the tree without damage.

6. PLANTING PROCEDURE

Preparation of Planting Hole

- .1 Soil shall be removed in profile layers as specified.
- .2 Excavated soil may be used as backfill if it is free of weeds, deleterious materials and particles larger than 25 mm.

- .3 When backfilling, sedimentary layers in soil shall be observed so topsoil remains above the subsoil.
- .4 The Contractor shall remove from site any unsuitable material brought to the surface during excavation.
- .5 The Contractor shall perform the following preparation of planting hole methods:
 - (a) **Hand Spade Excavated Planting Hole:** The planting hole shall be excavated by spade. The hole shall be 600 mm wider than the diameter of the root ball and no deeper than the height of the proposed root ball. If the depth of the hole exceeds the root ball height, compacted soil shall be added to the hole to prevent settling after transplanting. The sides of the hole shall be roughened to create an irregular surface that will facilitate root penetration. The bottom of the hole shall be decompacted to a depth of 150 mm and lightly compacted.
 - (b) **Mechanically Excavated Planting Hole:** The planting hole shall be excavated by a mechanical excavator. The hole shall be 1 000 mm wider than the diameter of the root ball. The hole shall be no deeper than the height of the proposed root ball height. If the depth of the hole exceeds the root ball height, compacted soil shall be added to the hole to prevent settling after transplanting. The sides of the hole shall be vertical and shall be roughened to create an irregular surface that will facilitate root penetration. The bottom of the hole shall be shaped to suit the root ball. The bottom of the hole shall be decompacted to a depth of 150 mm and lightly compacted.

Orientation

- .6 The tree shall be orientated at the new site in the same direction as at the original site.

Drainage and Inspection Point

- .7 Inspection pipes shall be installed in the 4 corners of the planting hole. Inspection pipes shall be 150 mm diameter slotted PVC pipe with a screw inspection lid located within a valve box with lock. The top of the valve box shall be 50 mm below the surface of the mulch and the screw inspection lid shall be 150 mm below the finished ground level.

Watering Basin

- .8 A shallow watering basin (100 mm deep) shall be constructed with soil around the perimeter of the root ball. The watering basins holding capability shall be determined by the size of the tree and its root ball.
- .9 The watering basin shall be kept intact at all times, unless instructed otherwise by the Principal.

Backfill

- .10 Where in the opinion of the Principal excavated material is unsuitable for backfill, imported soil shall be used. Imported soil shall be matched as closely as practicable to the existing site soil. A certified soil laboratory shall be used to determine the soil type. Organic matter shall not be added to the backfill material.
- .11 Any soil deficiencies shall be rectified prior to placing backfill.

Fertiliser and Soil Additives

- .12 The Contractor shall use the following fertiliser and/or other soil additives:
 - (a) **TerraCottem:** TerraCottem shall be applied as required by the soil report and in accordance with the manufacturer's instructions.
 - (b) **Gypsum:** Gypsum shall be applied in accordance with the soil report.
 - (c) **Sugar:** The backfill shall be soil injected with a sucrose solution at 20 grams per litre of water and approximately 100 litres of solution applied per tree. Soil injections of Sucrose Solutions have been shown to improve the defence systems of stressed trees and increase the volume of new roots. A qualified arboriculturist shall carry out soil injections.
 - (d) **N-Fix:** The backfill shall be soil injected with N-Fix at 10 ml N-Fix per 1 litre of water applying approximately 100 litres of solution per tree, evenly injected over the available root zone. A qualified arboriculturist shall carry out soil injections.
 - (e) **Rooting Hormone:** Rooting hormone shall be mixed with the backfill material before the tree is positioned.

7. TREE SUPPORT

General

- .1 Tree support installation shall be carried out by a qualified arboriculturist experienced in the following guying methods. The methods used shall be safe for pedestrians.

Guying Type

- .2 The Contractor shall use the following guying types:
- (a) **Root Plate Anchors:** No less than three Duckbill anchors shall be installed over the root plate in accordance with the manufacturer's recommendations. A wooden frame large enough to cover the top of the root ball shall be constructed and used to connect the anchors.
Duckbill Anchors are available from:
Ancor Loc Australia Pty Ltd (contact Robert Lunt)
Factory 4,
19-25 Grange Road
Cheltenham
Victoria 3192
Telephone: (03) 9585 6808
Fax: (03) 9585 6809
 - (b) **Anchors and Above Ground Cables – Arrowhead Land Anchors:** Guy wires shall be secured by arrowhead shaped land anchors installed at 45° towards the tree trunk. A minimum of three guys shall be used on each tree. Galvanised steel cable shall be used. Cable size will vary with tree size and site conditions. If necessary, turnbuckles shall be installed to adjust the length of each guy.
 - (c) **Anchors and Above Ground Cables – Steel Stakes:** Guy wires shall be secured by steel stakes installed at 45° towards the tree trunk. A minimum of three guys shall be used on each tree. Galvanised steel cable shall be used. Cable size will vary with tree size and site conditions. If necessary, turnbuckles shall be installed to adjust the length of each guy.
 - (d) **Anchors and Above Ground Cables - Deadmen:** Guy wires shall be secured by deadmen buried in the soil. A minimum of three guys shall be used on each tree. Galvanised steel cable shall be used. Cable size will vary with tree size and site conditions. If necessary, turnbuckles shall be installed to adjust the length of each guy.

Support Attachment

- .3 The Contractor shall use the following support attachment methods:
- (a) **Clamping Device:** An appropriate clamping device which does not damage the tree shall be secured to the top third of the tree. Once it is determined that the tree has stabilised itself with its new root system the guys shall be removed.
 - (b) **Polypropylene Webbing:** Polypropylene webbing loops shall be used around the tree to attach the cable. The polypropylene webbing shall be installed in accordance with the manufacturer's recommendations.
All polypropylene used for support shall be replaced after 18 months. Once it is determined that the tree has stabilised itself with its new root system the guys shall be removed.

8. MULCH

General

- .1 Mulch shall be evenly spread to a depth of 100 - 120 mm. Mulch material shall not be placed in contact with the trunk of the tree. The mulch shall be well leached and free from deleterious material such as soil, weeds, sticks and sawdust and shall have a low fines content.
- .2 Mulch available from removal of onsite vegetation shall be used only when approved by the Principal.
- .3 Following delivery of mulch to the site, the Principal may collect a sample to ensure consistency with the sample provided. If there are any deviations from the accepted sample, the Contractor shall either rectify the fault or remove the mulch from the site, replacing it with mulch that meets the specified requirements.

Mulch Type

- .4 The Contractor shall use the following mulch types:

- (a) **Recycled Arborist Waste:** Recycled Arborist waste shall be shredded and well leached before application. Any material larger than 25 mm shall be broken down or removed.
- (b) **Eco Mulch:** Eco mulch shall be manufactured from fully recycled industrial timber materials and free from nails, staples and cardboard.
- (c) **Red Gum Chip:** Red Gum Chip shall be of a consistent grade and free of bark.

9. WATERING

General

- .1 Immediately following planting, each tree shall be soaked to remove air pockets from the soil.
- .2 The Contractor shall ensure that trees maintain health and are free of water stress at all times until Practical Completion.
- .3 The Contractor shall monitor moisture levels to determine the exact watering requirements to ensure tree survival.

Method of Watering

- .4 The Contractor shall use the following watering methods:
 - (a) **Hand Watering:** Water shall be applied to the entire root area and not just the immediate trunk base.
 - (b) **Irrigation System:** A radial irrigation system including an inline drip tube shall be constructed over the root plate. Water application shall cover the entire root area.
The Contractor shall ensure that the irrigation system is fully operational at all times and that all trees are receiving the correct amount of water as programmed in the Irrigation Control System.

10. ANTITRANSPIRANTS

- .1 Antitranspirants shall be applied in a spray form by a qualified arboriculturist.
- .2 The Contractor shall use the following antitranspirants:
 - (a) **Anti-Stress:** Anti-Stress 2000 shall be applied to the foliage in accordance with the manufacturer's instructions and recommended rates.
 - (b) **Stressguard:** Stressguard shall be applied to the foliage in accordance with the manufacturer's instructions and recommended rates.
 - (c) **PVA Glue Mix:** An antitranspirant made from 1 part PVA glue mixed with 10 parts water shall be applied as a spray. This mix shall be re-applied after rain.

11. REINSTATEMENT OF SITE

- .1 The area where the tree was removed shall be reinstated to the condition existing prior to the Contractor commencing work.

12. MAINTENANCE

- .1 The tree shall be maintained in accordance with Part L60 Maintenance of Plants from the date of Practical completion for the period.

13. PRACTICAL COMPLETION

- .1 Practical Completion shall mean a healthy and upright tree has been achieved by the correct application of the prescribed methods.

14. HOLD POINTS

- .1 There are no Hold Points referenced in this Part.