

# CHRISTCHURCH CITY COUNCIL

## CONSTRUCTION STANDARD SPECIFICATION

### PART 7 – LANDSCAPES

#### CSS: PART 7 2014

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## APPENDICES

- 1 Landscape Construction Monthly Establishment Report
- 2 Compliance Requirements Checksheet
- 3 Tree Supply Inspection Form

## STANDARD DETAILS

### Tree Staking and Root Barriers

SD 701	detail deleted Revision 7.0
SD 702/1	Vertical Tree Staking – Street Trees
SD 702/2	Vertical Tree Staking – Reserve Trees
SD 703	Square Tree Staking
SD 704	Tree Root Barrier
SD 730	Hard Surface Tree Pit

### Tree Grates and Guards

SD 705	Small Tree Grate
SD 706	Large Tree Grate
SD 707/1	Tree Guard
SD 707/2	Tree Guard Base for Small Tree Grate
SD 707/3	Tree Guard Base for Large Tree Grate
SD 708	Footpath Grate Foundation
SD 709	Kerbside Grate Foundation
SD 710	Minor Grate Foundation

### Structures

SD 711/1,2	Standard Park Bench
SD 712	Park Bench Installation
SD 713	U-Bolt Concrete Litter Bin Fixing
SD 714	Post and Cable Fence
SD 715	Post and Chain Fence
SD 716	Park Entrance
SD 717	Standard Picnic Table
SD 718	detail deleted Revision 3.0
SD 719	Dog Bowl Base with e-mac Drinking Fountain and Bottle Filler
SD 720	Bus Stop Seat
SD 735	High Volume Central Bollard and Markings
SD 736	Shared Pathway Sign

Plant Bed Formation	SD 721	Plant Bed Formation and Edging Adjacent to Grass Area
Softfall Areas	SD 726	In-Ground and Timber Retaining Edge in Softfall Areas
	SD 727	Planting in Softfall Areas

## 1.0 FOREWORD

This Specification forms Part 7 of the Christchurch City Council Civil Engineering Construction Standard Specification (abbreviated as CSS). All parts of the CSS should be read in conjunction with each other and the Infrastructure Design Standards (abbreviated as IDS).

The full Specification includes the following Parts:

CSS: Part 1 2014 - General  
CSS: Part 2 2014 - Earthworks  
CSS: Part 3 2014 - Utility Drainage  
CSS: Part 4 2014 - Water Supply  
CSS: Part 5 2014 - Lights  
CSS: Part 6 2014 - Roads  
CSS: Part 7 2014 - Landscapes

Part 7 of the Standard Specification includes those Standard Details (SD) relating to this part only. The Standard Details (SD) are not to scale and all units are in millimetres (mm) unless otherwise shown. All rights reserved on Standard Details.

## 2.0 RELATED DOCUMENTS

The following documents shall be read and form part of this standard specification, together with revisions, replacements and amendments up to the date of calling tenders. The requirements of this specification supersede the requirements of any related documents listed or referred to within this specification. Where this document is referred to in a contract, the requirements of that contract supersede the requirements of this specification.

NZS 3602:2003	Timber and wood-based products for use in building
AS/NZS 4680:2006	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 4787:2001	Timber - Assessment of drying quality
AS 4373: 2007	Pruning of amenity trees
BS 3998: 2010	Tree work. Recommendations
BS 4043: 1989	Recommendations for transplanting root-balled trees
BS 5837: 2012	Trees in relation to design, demolition and construction. Recommendations

### **3.0 APPROVAL OF MATERIALS, OPERATORS/CONTRACTORS, LABORATORIES AND WORKMANSHIP**

‘Approved’ in this document means approved by the Engineer unless otherwise specified.

Schedules of approved materials and contractors can be found on the Christchurch City Council web page at:

[www.ccc.govt.nz/business/constructiondevelopment/approvedmaterials.aspx](http://www.ccc.govt.nz/business/constructiondevelopment/approvedmaterials.aspx)

[www.ccc.govt.nz/business/constructiondevelopment/approvedcontractors.aspx](http://www.ccc.govt.nz/business/constructiondevelopment/approvedcontractors.aspx)

Selected materials are specified in CSS: Part 1 - General.

Approved testing laboratories are IANZ accredited to carry out the particular test being requested.

### **4.0 SUPPLY OF TREE AND PLANT MATERIALS**

#### **4.1 Scope of Work**

This specification is for the supply of healthy, vigorous tree and plant materials that are disease, damage and defect free.

#### **4.2 Inspection and Acceptance**

*Acceptance of trees and plants shall be at the discretion of the Council. The Contractor shall provide a certificate from the supplier confirming that the trees and plants meet the requirements of this clause prior to planting.*

Council recommends that trees and plants be quality inspected by the Council prior to planting. This may be undertaken at the nursery, the contractor’s yard or on site.

Regardless of nursery visits, the Council reserves the right to inspect trees and plants on site, prior to planting.

The ‘Tree Supply Inspection Form’ appended may be used to certify that trees meet the requirements of this specification.

#### **4.3 Trees**

##### **4.3.1 Above Ground**

- *Identification*

*Trees shall be clearly labelled until planted. Where specified, indigenous tree labels shall include evidence of provenance.*



- *Health and Vigour*

*The size, colour and appearance of leaves should be typical for the time of year and stage of growth of the species/cultivar. Leaves should not be stunted, misshapen, discoloured or otherwise atypical. Foliage shall be hardened off for Christchurch conditions and substantially free from chlorosis and necrosis. Extension growth should be typical for the time of year and stage of growth of the species/cultivar with no die back.*

- *Pest and Disease*

*Trees shall be free of pest or disease infestation.*

- *Injury*

*Trees shall show no evidence of foliage damage (e.g. distortion from herbicides or frost) or trunk or branch damage (e.g. ties too tight, sunburn, rough handling, mechanical, inappropriate care in transit, frost damage, wind damage, snow damage).*

- *Self Supporting*

*Trees shall be able to support themselves in an upright position with a full head of foliage while standing in the container and also after planting without the use of canes or stakes. The trunk should be rigid for the lower quarter to half of its height, becoming gradually more flexible through the upper half. The trunk should be able to bend by approximately 30° side to side without the container lifting off the ground when the tree is bent at 80% of the tree's height, and shall return to an upright position after the test has been completed. This test shall be undertaken after the cane has been removed.*

- *Trunk*

*The trunk shall be strong, upright and reasonably straight. The calliper at any given point on the trunk must be greater than the calliper at any higher point on the trunk.*

Trunk taper is the increase in calliper size down the stem and is a response to the tree's physical movement and presence of branch attachments while it is growing. An un-tapered, parallel trunk may be accepted by Council where it is a species/cultivar characteristic e.g. standard cherries, *Pseudopanax* spp. Straightness of trunk can be species dependent (e.g. *Araucaria columnaris*, *Carpinus betulus*, *Koelreutaria paniculata*, some *Sophora*).

- *Pruning*

*Pruning practices shall benefit the tree's development. Pruning shall be undertaken to internationally recognised arboricultural standards, practices and procedures. Trees shall not be pruned just before shipping. With the exception of standard cultivars (e.g. cherries) clean trunk height shall not exceed 40% of the*

*total tree height. The diameter of any wound shall not exceed 50% of the diameter of the trunk immediately above the point of pruning.*

- *Apical Dominance*

*Species with a juvenile excurrent form shall have a clearly defined central leader for the height of the tree, with the apical bud intact. Trunks shall be free of co-dominant stems (double leaders) and large vigorous upright growing branches that will compete with the central leader.*

- *Crown Symmetry*

*The difference in crown distribution on opposite sides in any aspect shall not exceed 20%. Branches shall be distributed radially around (species dependent) and vertically along the trunk and shall be no greater than 50% of the diameter of the trunk, measured 20mm above the branch bark ridge.*

It is recognised that species vary in their branching habit and some species are sparingly branched as juveniles. Some native trees have a marked juvenile stage that differs from the adult tree.

- *Included Bark*

*Trees shall be free of included bark.*

Included bark is where the branch bark ridge fails to expand outwards and, as the trunk and branch continue growing, it becomes more and more enclosed. Branch bark ridges that are included (concave) are considerably weaker than those with a prominent ridge line (convex).

Some included bark will be tolerated in species where it naturally occurs e.g. kowhai, Tilia, Plagianthus, Ulmus.

- *Trunk Position*

*The distance from the centre of the trunk to the edge of the container shall not vary by more than 10% of the radius of the container. The trunk shall be firm and upright in the container.*

This allows roots to have an even 360° spread.

- *Graft Unions*

*Graft unions shall be sound and the scion and rootstock compatible. The union of the scion and rootstock shall be well knitted and show no obvious signs of incompatibility for the entire circumference of the graft.*

Graft unions are often different diameters and this does not indicate incompatibility.

4.3.2 Below Ground

*Roots shall be free of decay and damage. Pruning shall be undertaken to internationally recognised horticultural standards, practices and procedures.*

*Container trees shall be weed free and moist.*

- *Root Direction*

*Roots shall grow in a generally outwards and downwards direction. Roots that are distorted as a result of inappropriate growing practices shall not be accepted. The root collar shall be free of girdling roots.*

Trees with distorted roots can become structurally weak and this may not be apparent for years after planting. Even non woody roots, if left untreated, can eventually strangle a tree and cause it to fail. Mature tree roots generally grow outwards and downwards.

- *Rootball Occupancy*

*The root system shall fully occupy, and be well established in the container. Once the container is removed, 90% of the soil volume shall remain intact. When lifted by the trunk, the trunk and rootball shall move as one unit. The outer edge of the rootball shall be free of woody circling roots and the base free of matted roots. The trunk shall not be loose in the container.*

- *Height of Root Collar*

*The root collar shall be at or just below (i.e.  $\leq 3$  cm) the surface of the root ball.*

4.3.3 Open Ground Trees

*Open ground trees shall comply with the requirements in clause 4.3.1 – Above Ground excluding Self Supporting, Included Bark, Trunk Position, Graft Union.*

*Open ground trees shall be lifted at the nursery with minimum damage to the roots and with maximum retention of roots. Open ground trees shall have as much soil as possible retained around the rootball. Open ground trees shall comply with the requirements in clause 4.3.2 – Below Ground excluding Rootball Occupancy and height of Root Collar.*

*Evergreen trees shall be individually wrapped. All root balls shall be contained in moisture retentive material.*

## 4.4 Plant Materials

### 4.4.1 Above ground

- *Identification*

*Plants shall be clearly labelled until planted. Where specified, indigenous plant labels shall include evidence of provenance.*

- *Health and Vigour*

*The size, colour and appearance of leaves should be typical for the time of year and stage of growth of the species/cultivar. Leaves should not be stunted, misshapen, discoloured or otherwise atypical. Foliage shall be hardened off for Christchurch conditions and substantially free from chlorosis and necrosis. Extension growth should be typical for the time of year and stage of growth of the species/cultivar with no die back.*

- *Pest and Disease*

*Plants shall be free of pest or disease infestation.*

- *Injury*

*Plants shall show no evidence of foliage damage (e.g. distortion from herbicides or frost) or trunk or branch damage (e.g. ties too tight, sunburn, rough handling, mechanical, inappropriate care in transit, frost damage, wind damage, snow damage).*

- *Pruning*

*Pruning practices shall benefit the plant's development. Pruning shall be undertaken to internationally recognised arboricultural standards, practices and procedures. Plants shall not be pruned just before shipping.*

- *Trunk Position*

*The distance from the centre of the trunk to the edge of the container shall not vary by more than 10% of the radius of the container. The trunk shall be firm and upright in the container.*

This allows roots to have an even 360° spread.

- *Graft Unions*

*Graft unions shall be sound and the scion and rootstock compatible. The union of the scion and rootstock shall be well knitted and show no obvious signs of incompatibility for the entire circumference of the graft.*

Graft unions are often different diameters and this does not indicate incompatibility.

#### 4.4.2 Below Ground

*Roots shall be free of decay and damage. Pruning shall be undertaken to internationally recognised horticultural standards, practices and procedures.*

*Container plants shall be weed free and moist.*

- *Root Direction*

*Roots shall grow in a generally outwards and downwards direction. Roots that are distorted as a result of inappropriate growing practices shall not be accepted. The root collar shall be free of girdling roots.*

Plants with distorted roots can become structurally weak and this may not be apparent for years after planting. Even non woody roots, if left untreated, can eventually strangle a plant and cause it to fail. Mature plant roots generally grow outwards and downwards.

- *Rootball Occupancy*

*The root system shall fully occupy, and be well established in the container. Once the container is removed, 90% of the soil volume shall remain intact. When lifted by the trunk, the trunk and rootball shall move as one unit. The outer edge of the rootball shall be free of woody circling roots and the base free of matted roots. The trunk shall not be loose in the container.*

- *Height of Root Collar*

*The root collar shall be at or just below (i.e.  $\leq 3$  cm) the surface of the root ball.*

### **4.5 Measurement of Work and Basis for Payment**

Supply of tree and plant materials shall be paid at the individual rate for the specified size.

Any Council staff costs related to inspections outside of Christchurch are at the tree or plant supplier's expense.

## **5.0 TRANSPORT OF TREE AND PLANT MATERIALS**

### **5.1 Scope of Work**

This specification is for the transportation and storage of plant materials.

### **5.2 Supply and Collection**

*Trees and plants shall be handled with care at all times, lifted by the container and placed on the ground or into vehicles. Trees or plants shall not be substituted without the Engineer's approval.*

Tree and plant materials shall be supplied by the Christchurch City Council's nursery, unless otherwise specified. Where supplied by the Christchurch City Council, they have been pre-ordered and can be collected from the Linwood Nursery in Smith Street. Open ground trees are usually available between 1 June and 31 August subject to seasonal conditions. Open ground (bare root stock) and container trees, e.g. PB95, can be collected from the Harewood Nursery at 239 Gardiners Road. The collection location for other suppliers will be specified.

The Contractor shall advise the nursery of the intended pick-up date for the trees and plants at least five working days in advance (contact Christchurch City Council Nursery Supervisor, business hours, at telephone 381-2499, fax 381-2503 or other supplier as specified). The Contractor shall give twenty-four hours notice of the intended time of pick-up.

The Contractor shall check the trees and plants at the nursery at the time of collection and, if they are not considered to be of a suitable standard, shall inform the Engineer.

It is the Contractor's responsibility to ensure trees and plants are thoroughly watered before they are transported from the nursery. Once trees and plants leave the nursery they are the responsibility of the Contractor.

### **5.3 Transportation and Storage**

*All tree and plant material shall be carefully packed and protected during transport to the site to prevent damage. Foliage shall be protected from desiccation during transportation. Black polythene shall not be used for this. Container grown plants shall not be bundled together.*

*Plant roots shall be protected at all times from drying out. Bare rooted plants, such as trees, shall have individual root balls contained in moisture retentive material.*

*Trees and plants shall be planted within 48 hours of delivery. The Engineer shall be informed where this is not achieved. Plants that cannot be planted immediately on delivery shall be kept in the shade, well protected, sheltered and the soil kept well watered.*

If damage occurs the trees or plants shall be replaced at the Contractor's expense.

Pots and other protective materials shall not be removed until immediately prior to planting, and shall be disposed of off the site after planting. Plastic pots may be returned to the Christchurch City Council's nursery for reuse.

## **5.4 Measurement of Work and Basis for Payment**

Collection, transportation and storage of tree or plant materials shall be included in the rate for planting.

## **6.0 PLANTING OF SPECIMEN TREES**

### **6.1 Scope of Work**

This specification is for setting out, planting, fertilising and establishment of specimen trees. Site preparation and topsoil placement is specified in CSS: Part 2 clause 9.0 – Topsoil Placement.

### **6.2 Timing**

Planting shall generally take place between 1 April and 30 September (the planting season). The final planting date for bare root stock is 1 September. Planting may occur outside these times with the approval of the Engineer.

The Contractor shall carry out the works to protect the existing subsoil and prevent soil structural damage.

### **6.3 Setting Out**

Planting positions shall be in accordance with the planting plans.

The Engineer may require minor refinement to the design with adjustments to lines, levels and grouping of trees locally as the planting proceeds. The Contractor shall cooperate with this.

In areas of block planting, plants shall be spaced so that when established they will completely and evenly fill the areas indicated, unless otherwise specified. The extent of the area to be filled by each species shall first be defined with plants spaced around the perimeter. The remaining plants shall then be used to fill the centre of the area in an informal manner avoiding straight lines and regular geometric patterns, unless otherwise specified.

### **6.4 Container Trees**

*Containerised trees shall be thoroughly moistened at the time of planting. If the soil is dry, the plant shall be submerged in water for five minutes until air bubbles stop rising. Allow time to drain before planting.*

Balled and container grown plants shall have the cloth cordage, container, wire containment and hessian removed immediately prior to planting. Care shall be taken to ensure that the root ball is not disturbed during container removal or planting.

If plants are slightly potbound the roots shall be loosened, trimmed and spread out to ensure healthy growth. Roots shall not be exposed to the sun or wind.

## **6.5 Transplanted Trees**

*Transplanted trees shall be handled in accordance with BS 4043 "Recommendations for transplanting root-balled trees".*

## **6.6 Tree Pit**

*Tree pits shall be three times the size of the root ball to be planted, with a minimum depth of 1.5 times the depth of the root ball. The bottom of the pit shall be forked over to an additional depth of 300mm to facilitate root penetration, air movement and free drainage. See SD 702 sheets 1 or 2 for installation details.*

## **6.7 Planting**

Trees shall be set upright in the centre of the pit at such a depth that the soil, when firmed down, is at the same height as the top of the root ball. Soil shall be heeled in using natural body weight and not compacted by machinery or 'stamped' down. Any major roots that accidentally break off or fray shall be cleanly cut off flush with the root ball using sharp secateurs or a handsaw.

Where roots are pot bound and/or girdling they shall be cleanly severed at the edge of the root ball and gently teased out in a radial fashion.

Loose roots shall be spread out in a radial fashion and the pit progressively backfilled with first class topsoil, carefully placed under and amongst them to fill all voids and consolidated so that no air pockets are present and the tree is firmly held. For bare root stock the soil shall be heeled firmly round the root collar.

The Engineer may approve the use of excavated material for backfilling. Where an auger or other mechanical method is used to excavate the tree pit, the sides of the excavation shall be scarified before planting.

Each tree shall be watered thoroughly after planting, ensuring that the moisture has penetrated to the full depth of the root ball (initial watering is also important to settle the soil around the roots).

Unless otherwise specified, all newly planted trees shall be staked and mulched in accordance with clauses 8.0 - Mulching and 9.0 – Staking Trees and Shrubs.



## 6.8 Establishment

Works to achieve establishment of the trees shall be carried out by the Contractor, in accordance with clause 14.0 - Establishment. This will mainly consist of watering and weed control. The acceptance criteria set out below may be used to assess the planting throughout the establishment period.

The provision of a monthly report on plant condition and establishment works undertaken shall be submitted to the Engineer within five days of the end of each month. A sample report form is shown in the appendices. Information to be provided in this report is set out in clause 14.0 - Establishment.

## 6.9 Acceptance Criteria

*Trees shall:*

- *be located as specified.*
- *be upright and firm in the ground.*
- *be securely staked.*
- *have the top of the root ball level with the surrounding surface.*
- *be healthy with no evidence of decline or damage (e.g. dead/dying/diseased foliage/tips/branches, loss of foliage that is uncharacteristic to the species, discoloured foliage, pests and diseases).*

## 6.10 Measurement of Work and Basis of Payment

### 6.10.1 Planting of Specimen Trees

Planting shall be paid per tree and shall include tree transport, site preparation, setting out, fertiliser, planting and mulching to tree pits only. Excavation and filling of tree pits is paid separately.

### 6.10.2 Establishment

Establishment shall be paid per tree per month. Establishment shall include all items as set out in clause 14.0 - Establishment. The 'Monthly Establishment Report' for the period being claimed must be presented with the claim before payment will be made.

## 7.0 PLANTING OF SHRUBS, GROUND COVER AND WETLAND PLANTS

### 7.1 Scope of Work

This specification is for setting out, planting, fertilising and establishment of plant materials. Site preparation and topsoil placement is specified in CSS: Part 2 clause 9.0 – Topsoil Placement.

## **7.2 Timing**

Planting shall generally take place between 1 April and 30 September (the planting season). Planting may occur outside these times with the approval of the Engineer.

The Contractor shall carry out the works to protect the existing subsoil structures and prevent excessive soil structural damage.

Wetland areas that involve permanently or regularly saturated soils, e.g. inter-tidal zones and stream margins may be planted outside the recognised planting season.

## **7.3 Setting Out**

*Planting positions shall be in accordance with the planting plans and spacing shall be as specified. Plants shall be a minimum of 500mm from the edge of the plant bed.*

The Engineer may require minor refinement to the design with adjustments to lines, levels and grouping of shrubs, groundcover or wetland plants locally as the planting proceeds. The Contractor shall cooperate with this.

In areas of block planting, plants shall be spaced so that when established they will completely and evenly fill the areas indicated, unless otherwise specified. Plants shall be spaced around the perimeter first to define the extent of the area to be filled by each species. The remaining plants shall then be used to fill the centre of the area in an informal manner avoiding straight lines and regular geometric patterns, unless otherwise specified.

## **7.4 Containerised Shrubs and Groundcover**

*Containerised plants shall be thoroughly moistened at the time of planting. If plants are dry, they shall be submerged in water for five minutes until all air bubbles stop rising. Allow time to drain before planting.*

Balled and container grown plants shall have cloth cordage, containers wire containment and hessian removed immediately prior to planting. Care shall be taken to ensure that the root ball is not disturbed during container removal or planting.

If plants are slightly potbound the roots shall be loosened, trimmed and spread out to ensure healthy growth. Roots shall not be exposed to the sun or wind.

## **7.5 Planting Hole**

*The planting hole shall be twice the root ball width and twice the root ball depth. Planting holes, except for wetland plants, shall be loosened for at least 75mm each side of and under the plant prior to planting.*

## **7.6 Fertilisers**

*The specified fertiliser shall be thoroughly mixed with the soil in the base of the planting hole, prior to planting.*

Apply quantities as recommended by the manufacturer. The Engineer may vary the amount depending on conditions and stock. The Contractor shall allow for a minimum average fertiliser application rate of 50 grams of 8-9 month slow release fertiliser or approximately one handful and the application of a balanced NPK mix per shrub or ground cover. Wetland plants shall not be fertilised.

## **7.7 Planting Shrubs and Groundcover**

Plants shall be set upright in the centre of the pit at such a depth that the soil, when firmed down is at the same height as the top of the root ball. Soil shall be heeled in using natural body weight and not compacted by machinery or 'stamped' down. Any major roots that accidentally break off or fray shall be cleanly cut off from the plant.

Loose roots shall be spread out in a radial fashion, and the pit progressively backfilled with first class topsoil, carefully placed under and amongst them to fill all voids and consolidated so that no air pockets are present and the plant is firmly held.

Where roots are pot bound and/or girdling they shall be cleanly severed at the edge of the root ball and gently teased out in a radial fashion.

Each plant shall be watered thoroughly after planting, ensuring that the moisture has penetrated to the full depth of the root ball (initial watering is also important to settle the soil around the roots).

Unless otherwise specified all newly planted trees (shrubs and groundcover) shall be mulched in accordance with clause 8.0 - Mulching.

## **7.8 'Wetland' Plants**

Plants identified for 'Wetland' areas shall be planted into permanently or temporarily saturated areas. Planting of aquatic and semi aquatic wetland plants (in stream beds and inter-tidal zones) requires roots to be buried to ensure they do not float away. These plants may also require pinning down or a small amount of gravel may be added to weight down soil.

Plant in bands or lines following natural contours or as required by the Engineer.

Extreme care is required to ensure 'wetland' plants do not dry out during storage, transportation and planting. If drought conditions occur planting into some areas should be delayed until soil moisture levels are sufficient to sustain the plants. The Contractor shall consult the Engineer over any concerns with soil moisture levels.

## **7.9 Establishment**

Works to achieve establishment of the plants shall be carried out by the Contractor, in accordance with clause 14.0 - Establishment. This will mainly consist of watering but may also include works such as some plant protection and judicious pruning. The acceptance criteria set out below may be used to assess the planting throughout the establishment period.

The provision of a monthly report on plant condition and establishment works undertaken shall be submitted to the Engineer within five days of the end of each month. A sample report form is shown in the appendices. Information to be provided in this report is set out in clause 14.0 - Establishment.

## **7.10 Acceptance Criteria**

*Plants shall:*

- *be located as specified.*
- *be upright and firm in the ground.*
- *have the top of the root ball level with the surrounding surface.*
- *be healthy with no evidence of decline or damage (e.g. dead/dying/diseased foliage/tips/branches, loss of foliage that is uncharacteristic to the species, discoloured foliage, pests and diseases).*

## **7.11 Measurement of Work and Basis of Payment**

### **7.11.1 Shrubs, Groundcover and Wetland Plants**

Shrubs, groundcover and wetland plants shall be paid per plant. Payment shall include plant transport, excavation of the planting holes and disposal of spoil, planting preparation, setting out, filling, fertiliser where specified and planting.

### **7.11.2 Additional Subgrade Modification**

Additional subgrade modification shall be per m<sup>2</sup> and shall include excavation, disposal of excavated material, supply of second-class soil and its placement.

### **7.11.3 Establishment**

Establishment shall be paid per m<sup>2</sup> of plant bed per month. Establishment shall include all items as set out in clause 14.0 -

Establishment. The 'Monthly Establishment Report' for the period being claimed must be presented with the claim before payment will be made.

## **8.0 MULCHING**

### **8.1 Scope of Work**

This specification is for post planting spraying with pre-emergent herbicides and mulching.

### **8.2 Preparation**

*Grass shall be removed by careful hand excavation or shall be standing dead (i.e. not recently sprayed) prior to mulch being applied.*

*Spraying and the use of herbicides shall comply with the requirements of CSS: Part 2 - Earthworks. Pre-emergent herbicides shall be applied as specified and at the manufacturer's recommended rate.*

Spraying with pre-emergent herbicides shall occur after planting and before mulching. The topsoil surface shall be smooth, uniform and lightly consolidated prior to spraying. If the ground is dry, a thorough watering shall be carried out before spraying.

### **8.3 Mulch**

*Mulch shall be as specified.*

#### **8.3.1 Decomposed Tree Chip, Cambium Grade Bark, Crushed Shell, Other Medium**

*The surface of the mulch shall be flush with or no more than 25mm below the surrounding ground surface, kerb, path or other formed surface and shall be even and free of hollows.*

*Mulch to tree pits in reserves shall be placed over the tree pit radially to 1000mm from the trunk of the tree or to the extremity of the tree's drip line, whichever is the greater. Mulch to tree pits in streets shall be spread radially to 600mm from the trunk of the tree.*

*Mulch shall not touch the stems of plants. A small circle shall be cleared (diameter of 50mm minimum) around the stem to avoid stem rot. Mulch shall be pulled back to 100mm off the trunk of any tree to prevent collar rot.*

*Unless specified otherwise, mulch shall be placed and maintained to a minimum consolidated depth of 100mm for planting beds and tree pits.*

*Topsoil shall not be mixed into the mulch during placement, planting or weeding.*

*Bark mulch shall not be placed below the annual flood level within the channel or within regularly inundated tidal margins.*

8.3.2 Wool Mulch

Rolls shall be laid across the slope and pegged down with wire hoops. Wire holding hoops shall be at least 200mm long and shall be spaced at a minimum of 1.0m centres. The soil conditions and gradient may require hoops to be placed at closer centres. Overlap between rolls shall be at least 100mm. The top surface or uppermost edge shall lie on top of the bottom edge of the adjacent sheet. Where specified 1 x 1m square mats shall be placed around individual plants. A wire hoop shall peg down these mats in each corner.

8.3.3 Cardboard/Paper Mats

Cardboard circular mulch mats and paper mats shall be placed around each plant after planting where specified. Cardboard or paper mats or circles shall be securely pegged down. Pre-emergent herbicide shall not be placed under these mats. CCC Linwood Nursery will supply the mats, unless otherwise specified.

## 8.4 Surface Boxes

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels*

## 8.5 Acceptance Criteria

8.5.1 Decomposed Tree Chip, Cambium Grade Bark, Crushed Shell, Other Medium

*Mulch shall be free of weeds and a minimum consolidated depth of 100mm or as specified at Practical Completion, during the defects liability period and at the issue of the Defects Liability Certificate.*

*Mulch shall cover the specified area*

*Mulch shall not spread onto paved surfaces or onto lawn areas. Where a mulched area is adjacent to a hard surface, mulch shall*

*be flush with or no more than 25mm below the surrounding surfaces.*

*Topsoil shall not be mixed into the mulch.*

- 8.5.2 Wool Mulch and Cardboard or Paper Mats  
*Wool mulch mats and paper or cardboard mats shall be securely pegged down.*

## **8.6 Measurement of Work and Basis of Payment**

- 8.6.1 Decomposed Tree Chip, Cambium Grade Bark, Crushed Shell, Other Medium  
Mulch shall be paid by m<sup>2</sup>, to the nearest m<sup>2</sup>. Mulch rates shall include supply and application of pre-emergent herbicide. Mulching of tree pits shall be included in the rate for planting of specimen trees.

- 8.6.2 Wool Mulch  
Wool mulch shall be paid by m<sup>2</sup>, to the nearest m<sup>2</sup>. Mulch rate shall include the supply and application of pre-emergent herbicide.

- 8.6.3 Cardboard/Paper Mats  
Cardboard and paper mats shall be paid per item and shall include transport, installation and fixing.

- 8.6.4 Surface Boxes  
The Contractor shall include the cost of adjustment of all water supply service boxes, including repainting, vents, sewer gully traps, existing storm water inspection openings, and traffic signal loop toby boxes in the rate for the placement of mulch.

Payment for the adjustment of storm water and sewerage manhole tops shall allow for all work involved.

## **9.0 STAKING TREES AND SHRUBS**

### **9.1 Scope of Work**

This specification is for the staking of specimen trees and the identification and stem protection of trees and shrubs.

### **9.2 Tree Stakes**

*Newly planted specimen trees shall be supported by stakes complying with SD 702, unless specified otherwise.*

Stakes shall be untreated timber, 50mm x 50mm dimension, uniform in appearance, straight and finished to a uniform height. Stakes shall be driven into the ground to a depth sufficient to support the tree, shall be upright and immovable.

All tree ties shall be either jute (Hessian) or rubber inner bicycle tubes to allow minor movement without chafing of the stems and to allow the development of supportive 'reaction wood' and a strong supporting root system. Other tree ties shall be approved by the City Arborist prior to use. Unless otherwise specified, tree ties shall be placed at one third the height of the tree from ground level to a maximum height of 600mm.

### **9.3 Identification Stakes**

*Identification stakes shall be installed to plants as specified. These shall be inserted at the time of planting to ensure that roots are not damaged. The identification stake shall be of untreated timber or similar and shall be no longer than 1.0m.*

### **9.4 Stem Protectors**

*Planting shall be protected with flexible corrugated and perforated PVC pipe where specified. Trees shall have 150mm diameter 300mm long protectors and shrubs shall have 150mm diameter 200mm long protectors. The protectors shall be installed around the base of the plant and secured into the ground.*

### **9.5 Measurement of Work and Basis of Payment**

Tree staking, identification stakes and stem protectors shall be per item.

## **10.0 ROOT BARRIERS**

### **10.1 Scope of Work**

This specification is for the supply and installation of tree root barriers.

### **10.2 Construction**

*Root barriers shall be supplied and installed in accordance with SD 704.*

The location of root barriers shall be as specified. The barrier shall be centred about the stem. Each barrier shall be impermeable to penetration by roots, a minimum of 2000mm length and 300mm depth. The top of the root barrier shall be level with the surrounding surfaces i.e. not protruding above the surface.

*All root barriers shall be installed prior to the planting of trees or as specified.*



### **10.3 Measurement of Work and Basis of Payment**

Root barriers shall be paid per barrier or per metre, as specified and shall include supply of all materials, installation, backfilling and restoration.

## **11.0 TREE GUARDS AND GRATES**

### **11.1 Scope of Work**

This specification is for the supply and installation of tree guards and tree grates.

### **11.2 Construction**

*Foundations for tree grates shall comply with SD 708, SD 709 or SD 710, as specified. Tree grates shall comply with SD 705 and SD 706, as specified. Tree guards shall comply with SD 707.*

### **11.3 Measurement of Work and Basis for Payment**

Tree grates, grate foundations and tree guards shall be paid per item and shall include supply and installation.

## **12.0 TURF SUPPLY AND LAYING**

### **12.1 Scope of Work**

This Specification is for the supply, laying and establishment of turf.

### **12.2 Materials**

*The turf shall be of good quality, free of weeds and pests and of a minimum thickness of 20mm.*

The turf grass mix shall be as specified. The turf shall be sufficiently fibrous for turves to hold together when handled, but excess fibre or thatch is undesirable.

The Contractor shall inform the Engineer of the location of the supply so that the turves can be inspected prior to lifting.

### **12.3 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or*

*Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels.*

#### **12.4 Traffic Signs**

*All regulatory traffic signs shall be reinstated prior to the removal of the traffic management. All information signs shall be reinstated as soon as practicable. All traffic signs shall be reinstated in terms of CSS: Part 6 clause 24.0 - Traffic Signs.*

#### **12.5 Laying**

*Turf shall be delivered to the site and installed within 36 hours of lifting. Turf shall be kept damp. Slow release fertiliser shall be applied as specified to the turf prior to watering.*

Turf shall be laid on topsoil placed to CSS: Part 2 - Earthworks. Topsoil shall be cultivated to 25mm to form a fine even bed.

The Contractor shall carry out the works to protect the existing subsoil structures and prevent excessive soil structural damage.

Turf shall be handled with care and laid in a stretcher bond pattern. The turf shall be laid from planks working over turves previously laid.

The turves shall be thoroughly watered until the turf mat and top 50mm of soil is wet. Allow a 'soaking in' period prior to lightly and evenly rolling so that the turf mat and the soil surface are thoroughly bonded.

Any inequalities in finished levels owing to variation in turf thickness or uneven consolidation of soil shall be adjusted by raking and/or packing fine soil under the turf, not by topdressing the turf surface.

#### **12.6 Establishment**

Works to achieve establishment of the turf shall be carried out, by the Contractor, in accordance with clause 14.0 - Establishment. This will mainly consist of watering, mowing and weed control. The acceptance criteria set out below may be used to assess the lawn throughout the establishment period.

The grass shall be maintained over the establishment period at a height of between 25mm and 50mm as measured by the Rising Disc test method 'New Zealand Sports Turf Institute'.

#### **12.7 Acceptance Criteria**

*The lawn shall be an even sward of vegetation at a uniform height with a healthy colour throughout. The lawn shall be free from hollows arising*

*from uneven consolidation of the ground and from stones or similar debris.*

*The specified grasses shall be evenly distributed across the lawn and the entire ground surface covered. The grass sward shall not contain any non-specified grasses or weeds. The lawn height shall be between 25mm and 50mm.*

## **12.8 Measurement of Work and Basis of Payment**

- 12.8.1 Turf  
Turf shall be paid by m<sup>2</sup>, to the nearest m<sup>2</sup> and shall include preparation of the bed, fertiliser, rolling and establishment.
- 12.8.2 Surface Boxes  
The Contractor shall include the cost of adjustment of all water supply service boxes, including repainting, vents, sewer gully traps, existing storm water inspection openings, and traffic signal loop toby boxes in the rate for the placement of turf.  
  
Payment for the adjustment of storm water and sewerage manhole tops shall allow for all work involved.
- 12.8.3 Traffic signs  
Payment for the relocation of traffic signs shall be by lump sum or per sign relocated as specified.
- 12.8.4 Establishment  
Establishment shall be included in the rate for turf and shall include the disposal of clippings from mowing.

## **13.0 SOWING OF LAWN AREAS**

### **13.1 Scope of Work**

This Specification is for the formation, sowing and establishment of lawn areas in roadways (berms), parks and reserves (amenity areas and playing fields) and swales.

### **13.2 Seed Mixture**

*The seed mix shall be as specified. Mixes shall be in accordance with CSS: Part 1 - General.*

The Contractor shall provide the Engineer with a certificate from the seed merchant supplying the seed verifying that the mixture is as specified and that the seed is no more than one year old.

### **13.3 Sowing**

*The method of sowing shall achieve a uniform distribution of seed at the following rates, unless otherwise specified: 300kg per hectare (30 grams per square metre) for berm and high profile amenity areas; 250kg per hectare (25 grams per square metre) for playing field areas, swales and other amenity areas; 50kg per hectare for pasture.*

The seed shall be applied and cultivated to 20mm depth so that the minimum of seed is exposed. The seeded ground shall be levelled and lightly consolidated to ensure good soil/seed contact.

Slow release fertiliser shall be applied as specified before or during sowing at the manufacturer's specified application rates. Fertiliser shall not be applied in waterway areas.

A low-pressure system shall be used to avoid surface rilling or erosion.

### **13.4 Hydroseeding**

*The hydroseeding mulch shall be a mixture of the specified seed, wood-fibre based mulch, fertiliser and a binding agent. The percentage of wood fibre in the hydroseeding mulch shall be no less than 75%.*

*The mulch shall be applied to a minimum depth of 5mm. Application rates for berms and high profile amenity areas shall be no less than 200kg/1000m<sup>2</sup>.*

Products such as "Hydra red" or an equivalent are acceptable hydroseeding mulches.

Mulch shall be applied using a suitable pumping system with mixing abilities, to prevent settling between applications.

All existing site features, such as paths and fences, shall be protected during mulch application. Any overspray shall be removed promptly.

A low-pressure system shall be used to avoid surface rilling or erosion.

### **13.5 Surface Boxes**

*Surface boxes shall be accessible, adjusted and repainted in accordance with the requirements of CSS: Part 1 - General. Water supply surface boxes shall be adjusted and repainted in accordance with the requirements of CSS: Part 4 clause 12.4 – Surface Boxes Installed or Adjusted Separately from Watermain Works. Manholes shall be adjusted in accordance with the requirements of CSS: Part 3 clause 16.0 – Adjusting Manholes to Altered Surface Levels*

### **13.6 Traffic Signs**

*All regulatory traffic signs shall be reinstated prior to the removal of the traffic management. All information signs shall be reinstated as soon as practicable. All traffic signs shall be reinstated in terms of CSS: Part 6 clause 24.0 - Traffic Signs.*

### **13.7 Establishment**

Works to achieve establishment of the lawn shall be carried out, by the Contractor, in accordance with clause 14.0 - Establishment. This will mainly consist of barricading, watering, fertilising, mowing and weed control. The acceptance criteria set out below shall be used to assess the lawn throughout the establishment period.

The grass shall be first cut at 50mm and then maintained over the establishment period at a height of between 25mm and 50mm, as measured by the Rising Disc test method 'New Zealand Sports Turf Institute'. Swale areas shall have their first cut at 50mm grass height and shall be maintained over the establishment period at a height of between 50mm and 150mm.

### **13.8 Acceptance Criteria**

*The lawn shall be an even sward of vegetation at a uniform height with a healthy colour throughout. The ground surface shall be free from hollows arising from uneven consolidation of the ground and from stones or similar debris.*

*Within two months of sowing, the specified grasses shall be evenly distributed across the lawn with at least 90% of the ground surface covered and with no bare area greater than 30mm in diameter. The grass sward shall have less than 10% of its area in non-specified grasses and weeds, unless otherwise specified.*

*The lawn height shall be between 25mm and 50mm except swales, which shall be between 50mm and 150mm.*

### **13.9 Measurement of Work and Basis of Payment**

#### **13.9.1 Berms**

Berms shall be paid by m<sup>2</sup>, to the nearest m<sup>2</sup>, and shall include excavation and disposal of spoil, ripping, cultivation and scarification, topsoil supply and finishing, sowing or hydroseeding and establishment.

Separate rates will be provided for sawcutting and for the installation of battens.

- 13.9.2     Repair of Existing Lawn  
Repair of existing lawn shall be measured by the m<sup>2</sup>, to the nearest m<sup>2</sup>, and shall include preparation of existing landscape or grassed area, sowing and establishment.
- 13.9.3     Playing Fields and Amenity Areas  
Playing fields and amenity areas shall be measured by the m<sup>2</sup>, to the nearest m<sup>2</sup>, and shall include preparation, sowing and establishment.
- 13.9.4     Swales  
Swales shall be measured by the m<sup>2</sup>, to the nearest m<sup>2</sup>, and shall include preparation, sowing and establishment.
- 13.9.5     Surface Boxes  
The Contractor shall include the cost of adjustment of all water supply service boxes, including repainting, vents, sewer gully traps, existing stormwater inspection openings, and traffic signal loop toby boxes in the rate for the construction of lawn.  
  
Payment for the adjustment of stormwater and sewerage manhole tops shall allow for all work involved.
- 13.9.6     Traffic signs  
Payment for the relocation of traffic signs shall be by lump sum or per sign relocated as specified.
- 13.9.7     Establishment  
Establishment shall be included in the rate for the item and shall include the disposal of clippings from mowing where specified.

## **14.0 ESTABLISHMENT**

### **14.1 Scope of Work**

This Specification covers the work typically undertaken to provide optimum conditions to establish the constructed landscape, over the Defects Liability period.

This should include barricading, watering, weed control, cultivation, control of pests and diseases, removal of litter, checking of stakes and ties, trimming, pruning or mowing and other accepted horticultural operations necessary to ensure normal and healthy landscape establishment and growth, and the monthly reporting of the works carried out under this clause.

The two most important factors are adequate moisture and eliminating competition from other vegetation. Throughout the establishment period, the Contractor shall visit the site as and when necessary, to ensure that

plant establishment is not limited by drought stress or competition from other plants. Details of the proposed methods and frequency of such activities, and the reporting of these, shall typically be set out in the Contractor's Contract Quality Plan.

## 14.2 Watering

*The Contractor shall provide sufficient water to all lawn areas, trees and planting to maintain plants in a healthy condition. For trees, soil moisture shall contain an average volumetric water content of between 20 and 30%. This value shall be determined through taking four readings corresponding approximately to the four points of the compass. The readings shall be at 500mm below the topsoil surface and 300mm from the trunk for trees up to pb95 grade and 500mm from the trunk for pb150 grade trees. Moisture contents for trees above pb150 grade will be specified.*

For trees, this moisture content relates approximately to 40 litres of water per application in order to saturate the root ball. For trees larger than pb150 grade, each application should be approximately 80 litres of water. As a guide, shrubs and groundcover should receive 5 litres of water each per application in order to saturate the root ball. Applications should occur at least once a week during summer months (October – March inclusive) and/or as directed by Council.

Water shall be applied evenly and radially around the root ball to a distance of 600mm from the base of the trunk or to the extremity of the tree's drip line, whichever is the greater. Water shall be applied at low pressure from a height of less than 500mm. Care shall be taken to avoid the displacement of soil or mulch whilst undertaking watering.

## 14.3 Weed Control

### 14.3.1 Trees

*At no time shall any individual weed be larger than 100mm x 100mm x 100mm high. Weeds that are 50mm x 50mm x 50mm in size shall not exceed more than five per square metre. Weeds shall be controlled without the use of residual herbicides.*

The Engineer may approve the use of herbicides. Herbicide use shall comply with CSS: Part 2 - Earthworks.

*At establishment all tree mulch areas shall be free of weeds.*

### 14.3.2 Mulched Plant Beds

*Weed control shall be frequent enough to prevent weed species flowering and seeding. At no time shall any individual weed be larger than 100mm x 100mm x 100mm high. Weeds that are 50mm x 50mm x 50mm in size shall not exceed more than five per*

*square metre. Weeds shall be controlled without the use of residual herbicides.*

The Engineer may approve the use of herbicides. Herbicide use shall comply with CSS: Part 2 clause 6.0 – Pesticide, Herbicide and Fertiliser Application.

*At establishment all mulched plant beds shall be free of weeds.*

14.3.3 Unmulched and Revegetation Zones

*Weeds shall not encroach within 0.5m of the centre of any plant. Weeds shall be controlled manually within this area unless otherwise approved by the Engineer.*

*At no time shall any individual weed be larger than 400mm x 400mm x 400mm high. Weeds outside this area shall be maintained between 0.25m and 0.4m in height. When hoeing/pulling, care shall be taken to avoid damage to plants and their roots.*

The Engineer may approve the use of herbicides. Herbicide use shall comply with CSS: Part 2 clause 6.0 – Pesticide, Herbicide and Fertiliser Application.

14.3.4 ‘Wetlands’

*Weeds shall not encroach within 500mm of the centre of any plant. Weed control shall be frequent enough to prevent weed species flowering and seeding. At no time shall any individual weed be larger than 400mm x 400mm x 400mm high. Weeds outside this area shall be maintained between 0.25m and 0.4m in height.*

*Hand weeding and releasing shall be the only control method employed within and up to one metre from the waterway. In all other areas, weeds shall be controlled manually unless otherwise approved by the Engineer. When hoeing/pulling, care shall be taken to avoid damage to plants and their roots.*

*The removal of aquatic and semi-aquatic vegetation shall retain any natural stream meander within the channel.*

Aquatic vegetation removed from the channel shall be left on the bank margin within one metre of the channel for a period of 24 hours. This allows stream fauna to migrate back into the channel prior to removal of the debris off site. Volumes less than 0.5m<sup>3</sup> may be removed from site immediately.



#### **14.4 Pests and Diseases**

*The Contractor shall promptly report all animal, insect or fungal infestations to the Engineer.*

#### **14.5 Rubbish and Litter Collection and Removal**

*The Contractor shall remove all litter from the landscape area and berms or swales.*

Litter is defined as any refuse, garbage, rubbish, dead animal remains, plant debris including fallen leaves, glass (broken or whole), metal, organic or inorganic waste matter or any other material, which is detrimental to the appearance of the site including fly tipping. Fly tipping includes items such as rubbish bags, builders' rubble, motor vehicle bodies or larger items requiring removal by machine.

The Contractor shall notify the Engineer of suspected fly tipping.

#### **14.6 Pruning**

*All weak, dead, diseased or damaged growth, including spent flower heads, shall be removed. Sight lines at intersections and driveways shall be maintained and signs shall not be obscured.*

Pruning shall not be carried out during leaf burst or leaf fall.

##### **14.6.1 Pruning of Shrubs**

*Pruning shall be carried out on shrubs and groundcover by an appropriately qualified horticulturalist to maintain a high standard of presentation, display and plant vigour and to maintain the desired shape and size.*

The following pruning techniques shall be employed where appropriate:

- Tips shall be pinched or purged, as appropriate for species, to give desired shape and size.
- Form pruning of young plants to ensure compact form and shape.
- Undercutting of groundcovers at border edges.
- Plants shall be pruned so that they do not smother neighbouring plants.
- Plants shall be pruned off footpaths and accessways and hard surfaces

##### **14.6.2 Pruning of Trees**

*All tree pruning shall be undertaken by a qualified and experienced arborist to accepted modern international arboricultural standards. The name and qualifications of the*

*arborist shall be submitted to the Council through the Contract Quality Plan.*

*Pruning shall consist only of removal of broken or dead/dying or diseased branches.*

## **14.7 Plant Vandalism, Losses and Replacement**

### **14.7.1 Vandalism and Theft of Plants**

Any plants vandalised or stolen shall be reported promptly to the Engineer and recorded on the 'Monthly Establishment Report'. The likely cause of damage shall also be reported. The plants shall be removed and replaced where ordered.

Plant loss due to vandalism about which the Engineer is not notified shall be assumed a result of planting operations and replacement shall be at the Contractor's cost.

The Engineer will determine the value of plants or other landscape works lost due to theft, wilful damage or vandalism.

### **14.7.2 Losses**

The Engineer may determine losses of a single species greater than 25% are due to extreme weather and are therefore not the Contractor's responsibility.

### **14.7.3 Replacements**

*Replacements to make good defects shall be planted either during the planting season immediately following their loss or on discovery and then maintained until the next planting season. Replacements shall be the same as those specified, unless otherwise agreed between the Engineer and the Contractor.*

The Engineer may order replacement of plants that die through no fault of the Contractor.

Any defective stakes, ties, etc shall be replaced as soon as possible.

## **14.8 Lawn Vandalism and Damage**

*The Contractor shall be responsible for any damage that occurs prior to the first cut at 50mm or that is traceable to this period. Subsequent lawn damage from public vandalism, including vehicle, bicycle and foot damage, shall be promptly reported to the Engineer. The likely cause of damage shall also be reported.*

The Contractor shall notify the Engineer of grassed areas damaged by others during the course of their legitimate work, as opposed to

vandalism. The Contractor shall notify the Engineer of areas that in his/her opinion have become worn due to wear and tear.

#### **14.9 Monthly Establishment Report**

*An accurate and up to date monthly report, on plant condition and establishment works undertaken, shall be submitted to the Engineer within five days of the end of each month.*

Information to be provided in this report shall include the date that works were carried out and any types of work, as noted in the above clauses, to aid establishment of landscape areas and berms. A sample report form is shown in the appendices 'Monthly Establishment Report'.

*Unforeseen damage, for example vandalism, plant losses, shall be reported to the Engineer at the time of inspection.*

Any unreported damage or plant losses will be deemed the responsibility of the Contractor.

#### **14.10 Measurement of Work and Basis of Payment**

Establishment shall include watering, weed control, cultivation, control of pests and diseases, checking of stakes and ties, trimming, pruning or mowing and removal of clippings where required, removal of litter and other accepted horticultural operations necessary to ensure normal and healthy landscape establishment and growth, and the monthly reporting of the works carried out under this clause.

The 'Monthly Establishment Report' for the period being claimed must be presented with the claim before payment will be made.

- 14.10.1 Establishment of Specimen Trees  
Establishment shall be paid per tree per month.
- 14.10.2 Establishment of Shrubs, Groundcover and Wetland Plants  
Establishment shall be paid per m<sup>2</sup> of plant bed per month.
- 14.10.3 Replacements  
The supply and planting of replacement plants shall be at the Contractor's cost, unless otherwise agreed by the Engineer.
- 14.10.4 Lawn Vandalism and Damage  
The repair of lawn damage and vandalism prior to the first cut at 50mm or that is traceable to this period shall be at the Contractor's cost.



**COMPLIANCE REQUIREMENTS CHECKSHEET - LANDSCAPE**

ITEM	CSS REF	TASK	TEST STD/ DESCIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
<b>1</b>		<b>SUPPLY OF PLANT MATERIALS</b>						
	Pt 7 4.2	Tree and plant materials	Inspect	Healthy, prepared for planting, well grown				
	Pt 7 4.2.4	Tree materials	Inspect	Sturdy clean straight stems, root balls contained, evergreens individually				
	Pt 7 4.2.5	Shrubs and groundcover materials	Inspect	Strong well rooted, good bushy form				
	Pt 7 4.2.6	Wetland materials	Inspect	Well rooted				
<b>2</b>		<b>TRANSPORT OF PLANT MATERIALS</b>						
	Pt 7 5.2	Handling	Inspect	Lifted by container, true to specification				
	Pt 7 5.3	Transportation	Inspect	Not damaged, foliage and plant roots protected.				
	Pt 7 5.3	Storage	Inspect	Planted within 48 hours. Protected and watered for intervening period				
<b>3</b>		<b>PLANTING TREES</b>						
	Pt 7 6.2	Timing	Inspect	Plant between 1/04 and 30/9, unless approved				
	Pt 7 6.3	Planting positions	Inspect	Complies with plan				
	Pt 7 6.4	Container trees	Inspect	Thoroughly moistened before planting				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 7 6.5	Transplanted trees	BS 4043	Handling complies with standard				
	Pt 7 6.6	Tree pit construction	Measure	Width three times size of rootball, depth 1.5 times the rootball				
	Pt 7 6.6	Tree pit construction	Inspect	300mm forked over				
	Pt 7 6.6	Installation	<i>Specify SD</i>	<i>Complies with SD</i>				
	Pt 7 6.7	Planting	Inspect	Soil at top of rootball, roots spread and voids filled, tree firm, watered, staked and mulched				
	Pt 7 6.9	Tree acceptance criteria	Inspect	Upright, firmly in ground, healthy				
<b>4</b>		<b>PLANTING SHRUBS GROUNDCOVER, WETLAND PLANTS</b>						
	Pt 7 7.2	Timing	Inspect	Plant between 1/04 and 30/9, unless approved or wet area				
	Pt 7 7.3	Planting positions	Inspect	Complies with plan				
	Pt 7 7.4	Container shrubs	Inspect	Thoroughly moistened before planting				
	Pt 7 7.5	Planting hole	Measure	Width and depth to be twice rootball, loosen 75mm all around				
	Pt 7 7.6	Fertilisers	Inspect	Mixed thoroughly, specified amount				
	Pt 7 7.7	Planting shrubs and groundcover	Inspect	Soil at top rootball, roots spread and voids filled, plant firm, watered, upright				
	Pt 7 7.8	Planting wetland plants	Inspect	Plants anchored, surrounding soil moist				
	Pt 7 7.10	Plant acceptance criteria	Inspect	Upright, firmly in ground, healthy				

ITEM	CSS REF	TASK	TEST STD/ DESCIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
<b>5</b>		<b>MULCHING</b>						
	Pt 7 8.2	Grass removal	Inspect	Remove by hand or standing dead				
	Pt 7 8.2	Herbicide application	CSS Part 2	Complies with specification, after planting before mulch				
	Pt 7 8.3	Mulch material	<i>Specify</i>	<i>Complies with specification</i>				
	Pt 7 8.3.1	Mulch placement	Inspect	+0mm, -25mm surrounding surface, 100mm depth, No topsoil mixed in, not placed below flood or tide level				
	Pt 7 8.3.1	Mulch placement to trees in streets	Measure	100mm clear of trunk, to 600mm frm trunk				
	Pt 7 8.3.1	Mulch placement to trees in reserves	Measure	100mm clear of trunk, to greater of 1000mm from trunk or drip line				
	Pt 7 8.3.1	Mulch placement to plants	Measure	50mm clear of stem				
	Pt 7 8.3.2	Wool mulch	Inspect	200mm hoops at 1m centres, 100mm overlap, top edge on top				
	Pt 7 8.3.3	Cardboard/paper	Inspect	Pegged down, no herbicide, where specified				
	Pt 7 8.4	Compost and soil conditioner material	Inspect	Complies with specification				
	Pt 7 8.4	Placement - lawn	Measure	Base cultivated to 200mm, 100mm depth added and thoroughly mixed				
	Pt 7 8.4	Placement – plant beds	Measure	Base cultivated to 250mm, 75mm depth added and thoroughly mixed				
	Pt 7 8.4	Placement - trees	Measure	Equal amounts of compost or soil conditioner and soil				
	Pt 7 8.5	Surface boxes adjustment	CSS Part 1	Adjusted as specified.				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 7 8.6.1	Mulch acceptance criteria	Inspect	100mm depth, confined to specified area, no topsoil mixed				
	Pt 7 8.6.2	Mulch acceptance criteria	Inspect	Securely pegged down				
	Pt 7 8.6.3	Mulch acceptance criteria	Inspect	Material well mixed to consistent appearance				
<b>6</b>		<b>STAKING</b>						
	Pt 7 9.2	Tree stakes	<i>Specify</i>	<i>Complies with SD</i>				
	Pt 7 9.3	Identification stakes	Inspect	Installed at time of planting, untreated timber, under 1m				
	Pt 7 9.4	Stem protector materials	Inspect	150mm diameter, flexible corrugated perforated PVC pipe				
	Pt 7 9.4	Stem protectors - trees	Inspect	300mm long, secured to ground				
	Pt 7 9.4	Stem protectors - shrubs	Inspect	200mm long, secured to ground				
<b>7</b>		<b>ROOT BARRIERS</b>						
	Pt 7 10.2	Materials	SD 704	Complies with specification				
	Pt 7 10.2	Installation	SD 704	Located as specified, before tree planting				
<b>8</b>		<b>TREE GUARDS AND GRATES</b>						
	Pt 7 11.2	Construction	<i>Specify</i>	<i>Complies with SD</i>				
<b>9</b>		<b>TURF SUPPLY AND LAYING</b>						
	Pt 7	Turf materials	Inspect	Good quality, weed free, +20mm thick,				



ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	12.2			grass as specified, hold together				
	Pt 7 12.3	Surface boxes adjustment	CSS Part 1	Adjusted as specified.				
	Pt 7 12.4	Laying	Inspect	Laid within 36 hours of lifting, kept damp, fertilised prior to watering until top 50mm wet				
	Pt 7 12.4	Laying	Inspect	Stretcher bond pattern, on 25mm cultivated topsoil, with levelling soil underneath				
	Pt 7 12.6	Turf acceptance criteria	Inspect	Even healthy sward, uniform 25mm – 50mm height, no hollows or stones, ground covered, no weeds				
<b>10</b>		<b>SOWING LAWN</b>						
	Pt 7 13.2	Seed mixture	Inspect	Complies with specification. Certificate received, seed under 12 mths old				
	Pt 7 13.3	Sowing weights	Measure	Uniform 30g/m <sup>2</sup> berm, high profile, 20g/m <sup>2</sup> other lawn, swale, 50kg/ha pasture				
	Pt 7 13.3	Sowing method	Inspect	Cultivated to 20mm, lightly consolidated, fertilised, erosion avoided				
	Pt 7 13.4	Hydroseeding materials	Measure	Complies with specification, +75% wood fibre				
	Pt 7 13.4	Hydroseeding application	Measure	+5mm depth, 200kg/1000m <sup>2</sup> berms, overspray removed promptly				
	Pt 7 13.5	Surface boxes adjustment	CSS Part 1	Adjusted as specified.				
	Pt 7 13.7	Sown acceptance criteria - lawn	Inspect	Even healthy sward, uniform 25mm – 50mm height, no hollows or stones, 90% ground covered, <10% weeds, bare areas <30mm dia				
	Pt 7	Sown acceptance	Inspect	Even healthy sward, uniform 50mm –				

ITEM	CSS REF	TASK	TEST STD/ DESCIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	13.7	criteria - swales		150mm height, no hollows or stones, 90% ground covered, <10% weeds, bare areas <30mm dia				
<b>11</b>		<b>ESTABLISHMENT</b>						
	Pt 7 14.2	Watering	Inspect	Plants maintained in healthy condition. Tree soil have 20-30% avg volumetric water content				
	Pt 7 14.3.1	Weed control - trees	Inspect	Control individual weeds under 100mm height or spread, <5 weeds/m <sup>2</sup> over 50mm height or spread. No residual herbicide use				
	Pt 7 14.3.2	Weed control – mulched plant beds	Inspect	No flowering weeds. Control individual weeds under 100mm height or spread, <5 weeds/m <sup>2</sup> over 50mm height or spread. No residual herbicide use				
	Pt 7 14.3.3	Weed control – unmulched planting	Inspect	No weeds within 0.5m of plant. Handweed in this area. All weeds under 400mm height or spread, Weeds outside 0.5m circle kept between 250 and 400mm height				
	Pt 7 14.3.4	Weed control – wetlands	Inspect	No weeds within 0.5m of plant. No flowering weeds. All weeds under 400mm height or spread, Handweeded within 1m of waterway. Weeds outside this area kept between 250 and 400mm height Natural meanders kept in channel. Vegetation left on river bank 24 hours				
	Pt 7 14.4	Pests and diseases	Inspect	Infestations reported promptly				
	Pt 7	Rubbish and litter	Inspect	Landscape areas, berms and swales free of				

ITEM	CSS REF	TASK	TEST STD/ DESCIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	14.5			rubbish and litter				
	Pt 7 14.6	Pruning	Inspect	Plants green, healthy, vigorous, not damaged, well shaped. Sight lines, signs clear				
	Pt 7 14.7.1	Vandalism	Inspect	Reported promptly and recorded				
	Pt 7 14.7.3	Replacements	Inspect	Specified plants				
	Pt 7 14.8	Lawn vandalism	Inspect	Reported promptly				
	Pt 7 14.9	Establishment report	Inspect	Submitted within 5 days of end of month				

**TREE SUPPLY INSPECTION FORM**

Date of arrival \_\_\_\_\_  
 Purchaser: \_\_\_\_\_  
 Supplier: \_\_\_\_\_  
 Labelling correct:  Yes  No  
 Number of trees: \_\_\_\_\_  
 Batch #: \_\_\_\_\_  
 Stock:  Container  Bare rooted  Ball & Burlap  
 Container volume: \_\_\_\_\_ ltr.

**Above ground****Comment**

Health and Vigour	<input type="checkbox"/> Good	<input type="checkbox"/> Poor	_____
Pest and diseases	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Injury	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Self supporting	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Trunk	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Pruning	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Apical dominance	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Crown symmetry	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Included bark	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Trunk position	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Graft unions	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____

**Below ground**

Damage and decay	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Pruning	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Weeds	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Root direction	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Root ball occupancy (sufficient)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____
Height of root collar	<input type="checkbox"/> Yes	<input type="checkbox"/> No	_____

**Inspection method**

Diameter of nonconforming roots at root ball extremity in mm: \_\_\_\_\_  
 Inspection method used:  External only  Investigative internal

**Conformance with specification**

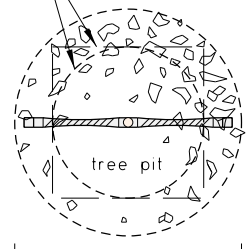
Conforming  Yes  No

Comments: \_\_\_\_\_

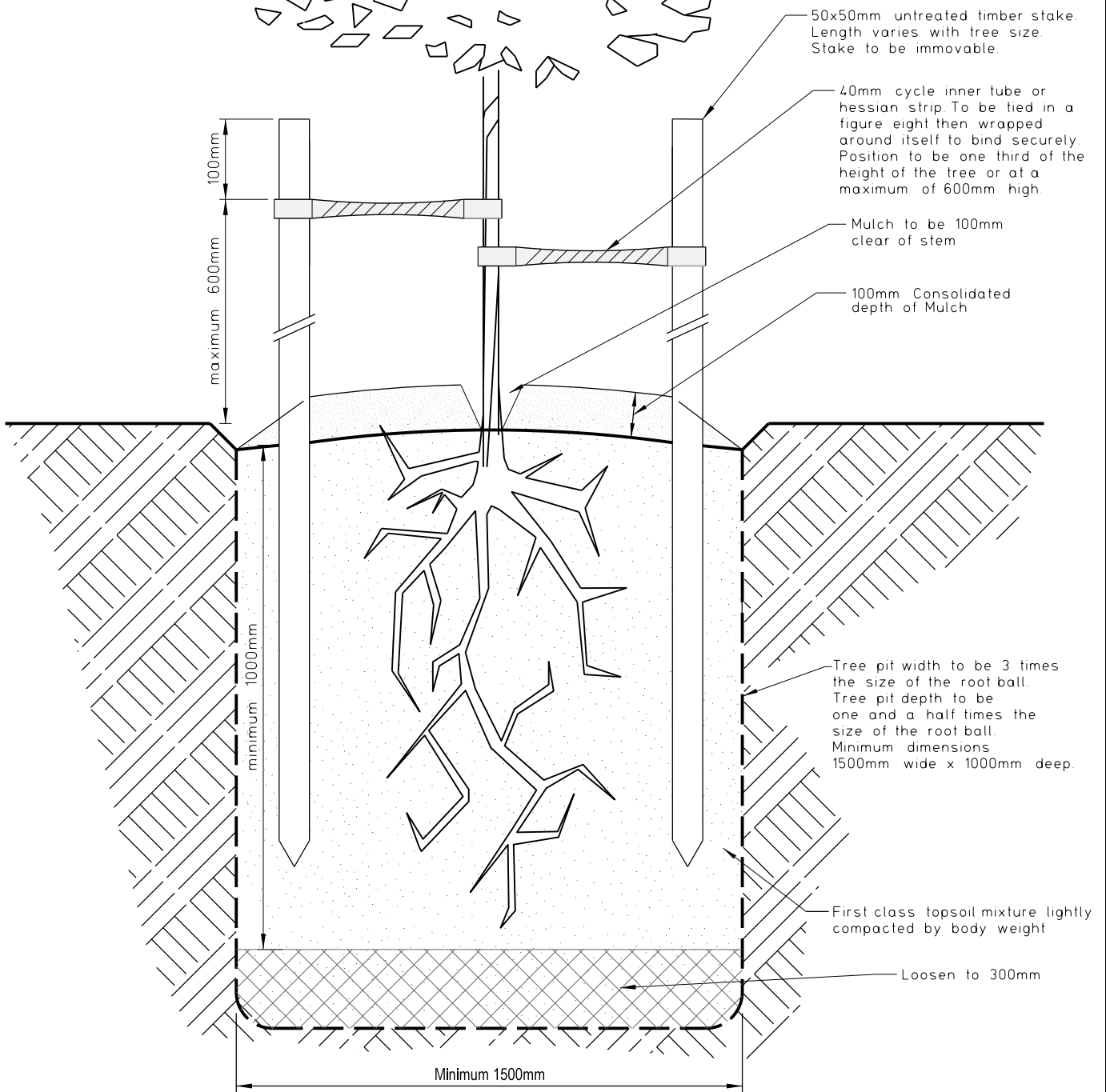
Name and signature (inspector): \_\_\_\_\_ Date: \_\_\_\_\_



Tree pit can be square or circular



2.0m minimum mulch circle



50x50mm untreated timber stake. Length varies with tree size. Stake to be immovable.

40mm cycle inner tube or hessian strip. To be tied in a figure eight then wrapped around itself to bind securely. Position to be one third of the height of the tree or at a maximum of 600mm high.

Mulch to be 100mm clear of stem

100mm Consolidated depth of Mulch

Tree pit width to be 3 times the size of the root ball. Tree pit depth to be one and a half times the size of the root ball. Minimum dimensions 1500mm wide x 1000mm deep.

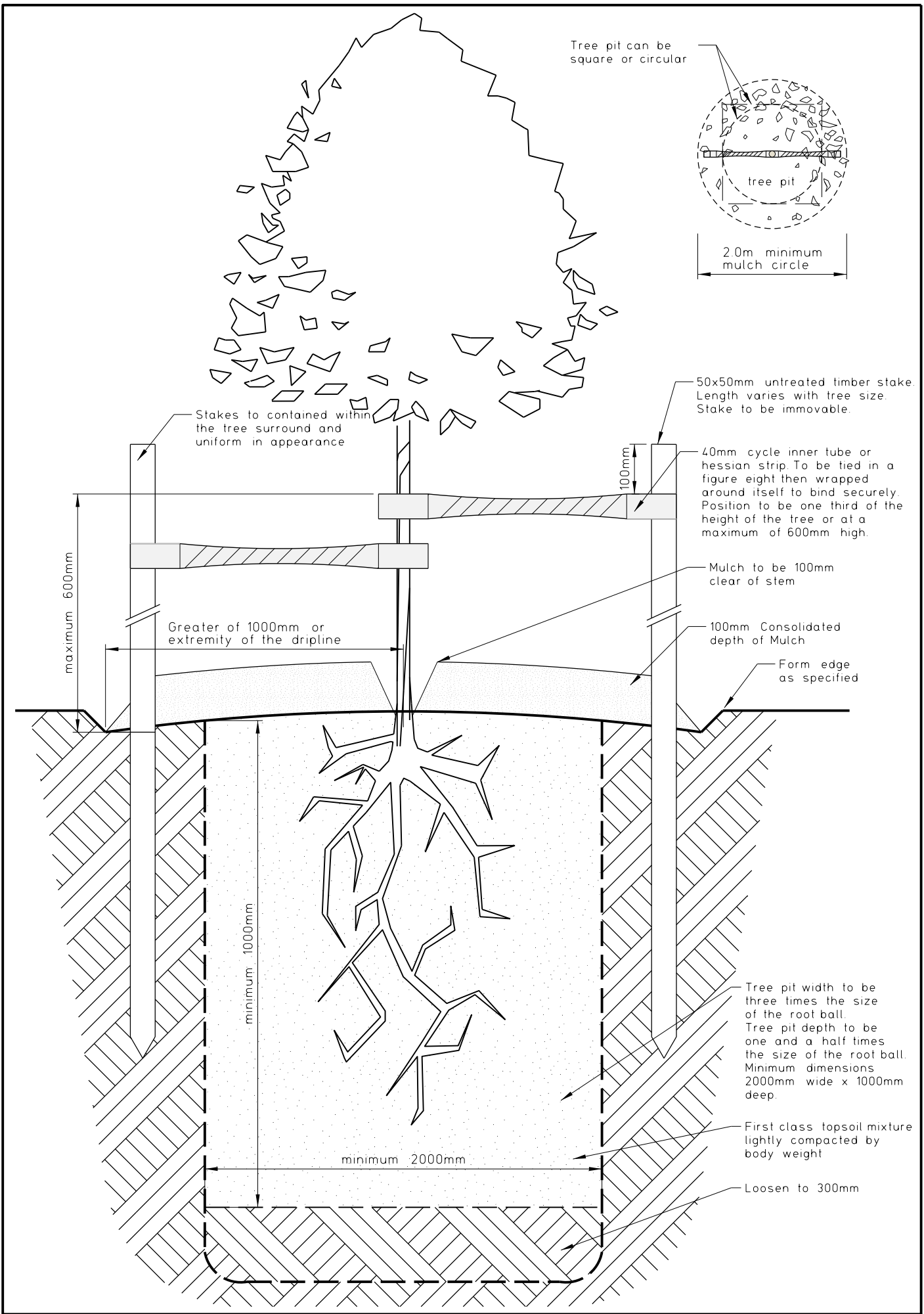
First class topsoil mixture lightly compacted by body weight

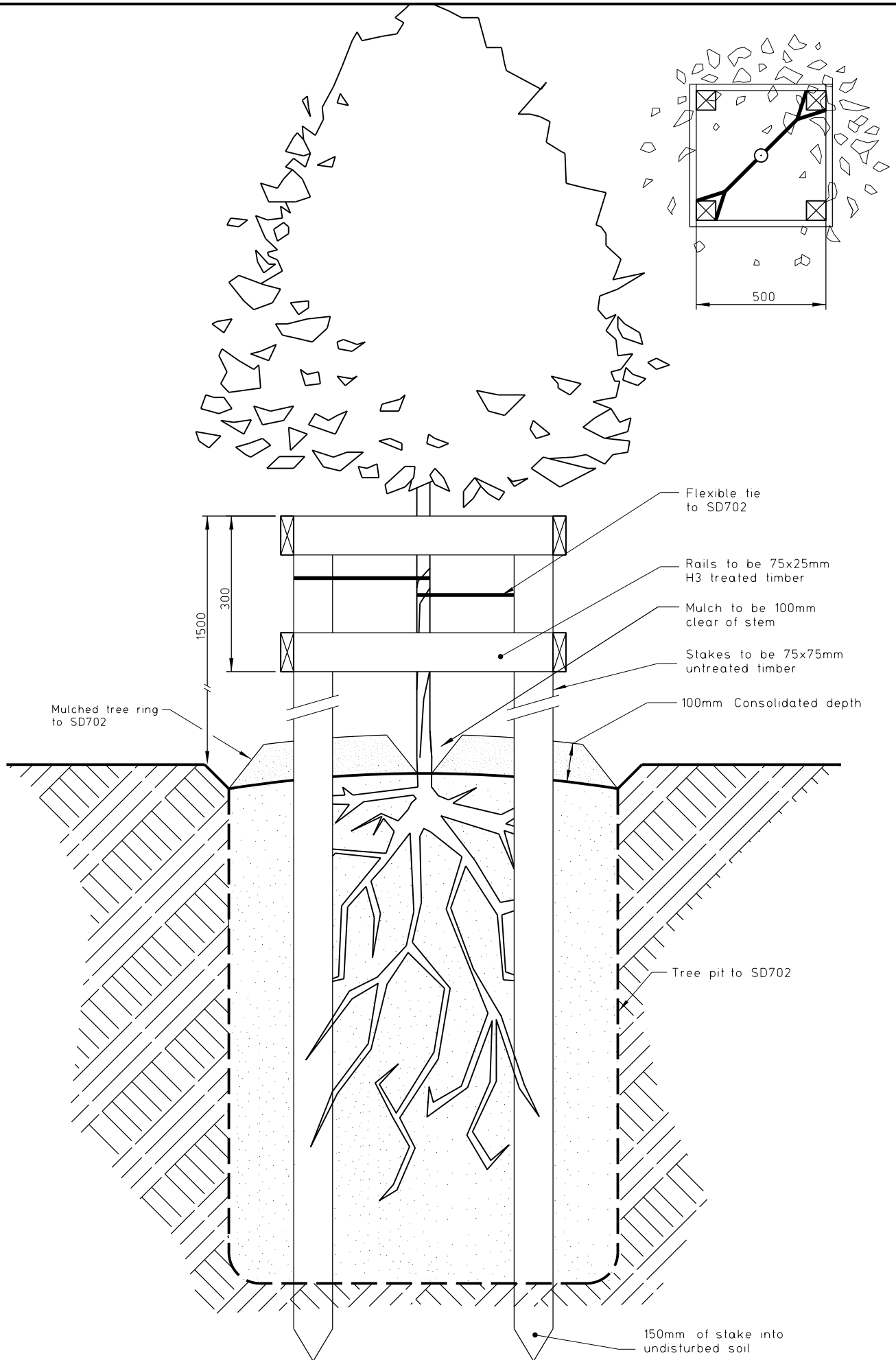
Loosen to 300mm

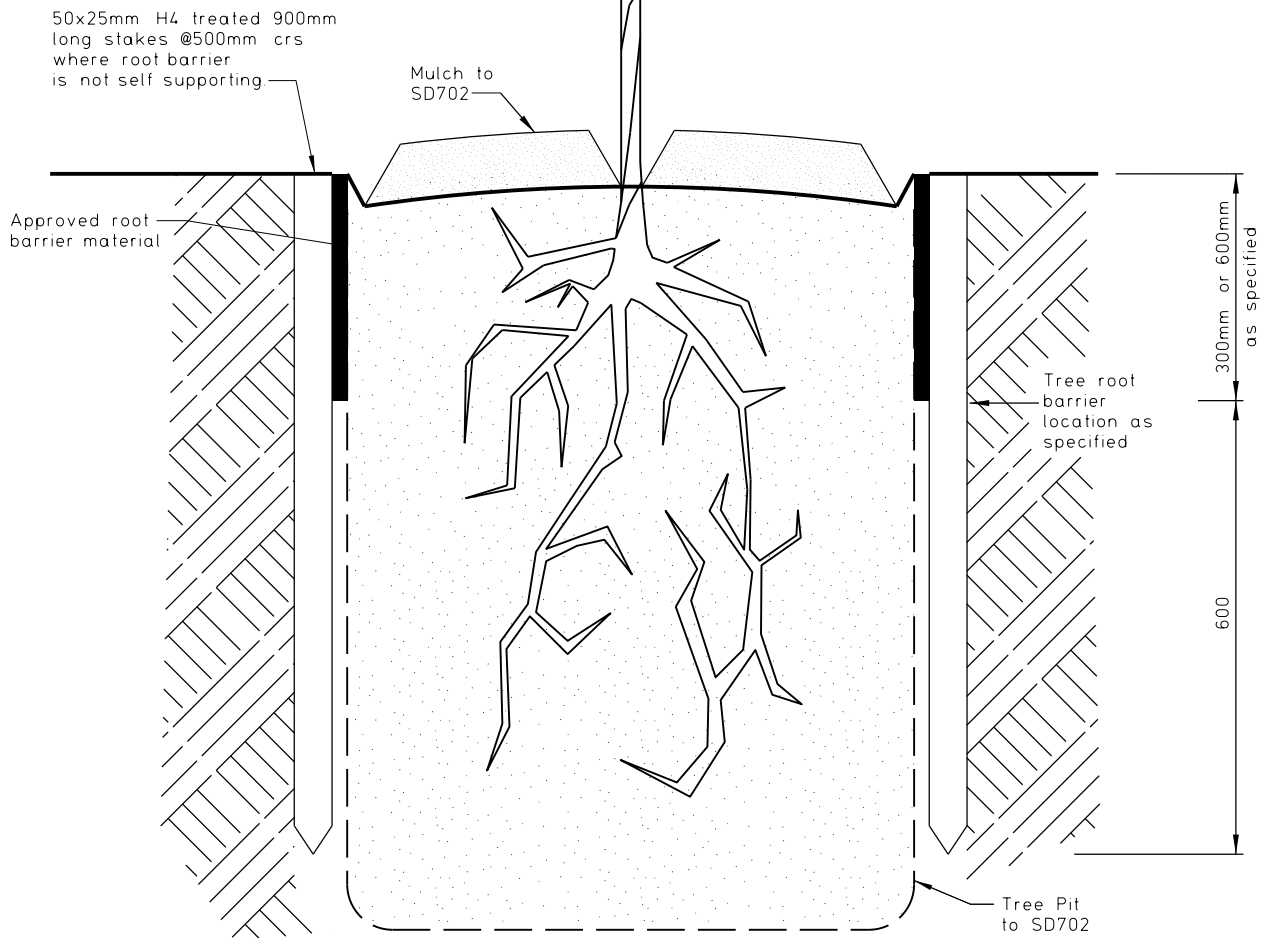
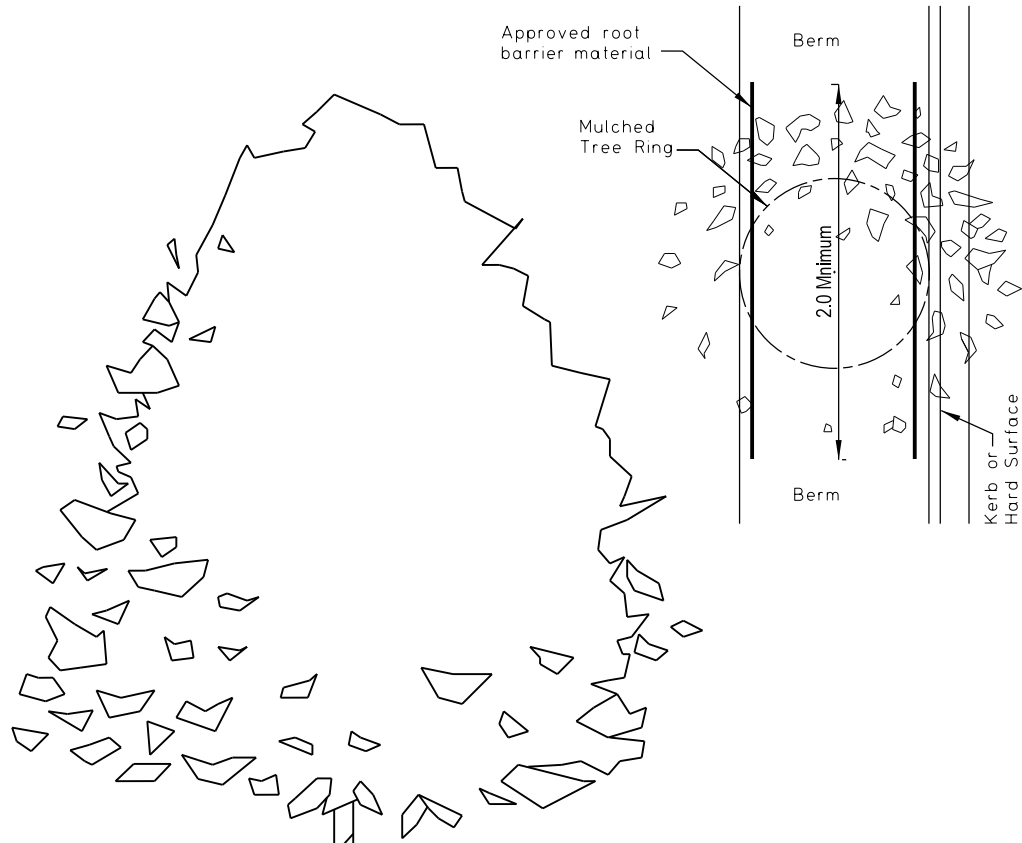
100mm  
maximum 600mm

minimum 1000mm

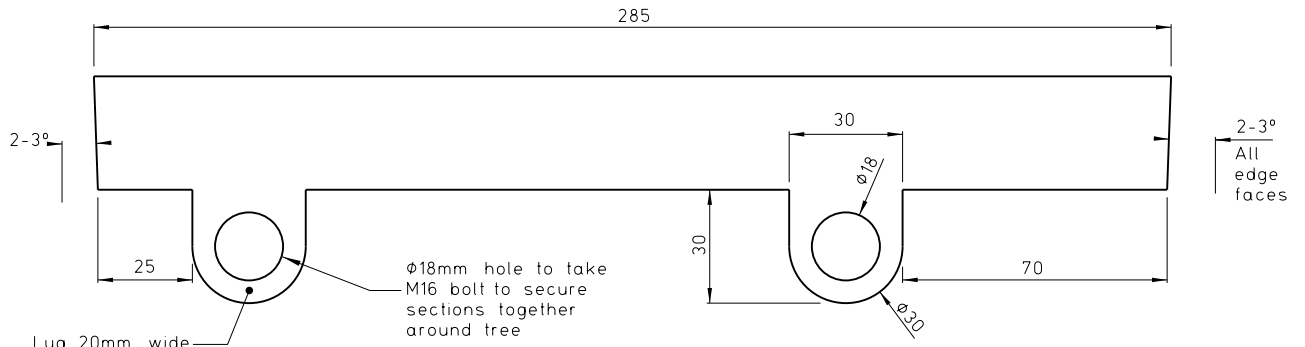
Minimum 1500mm





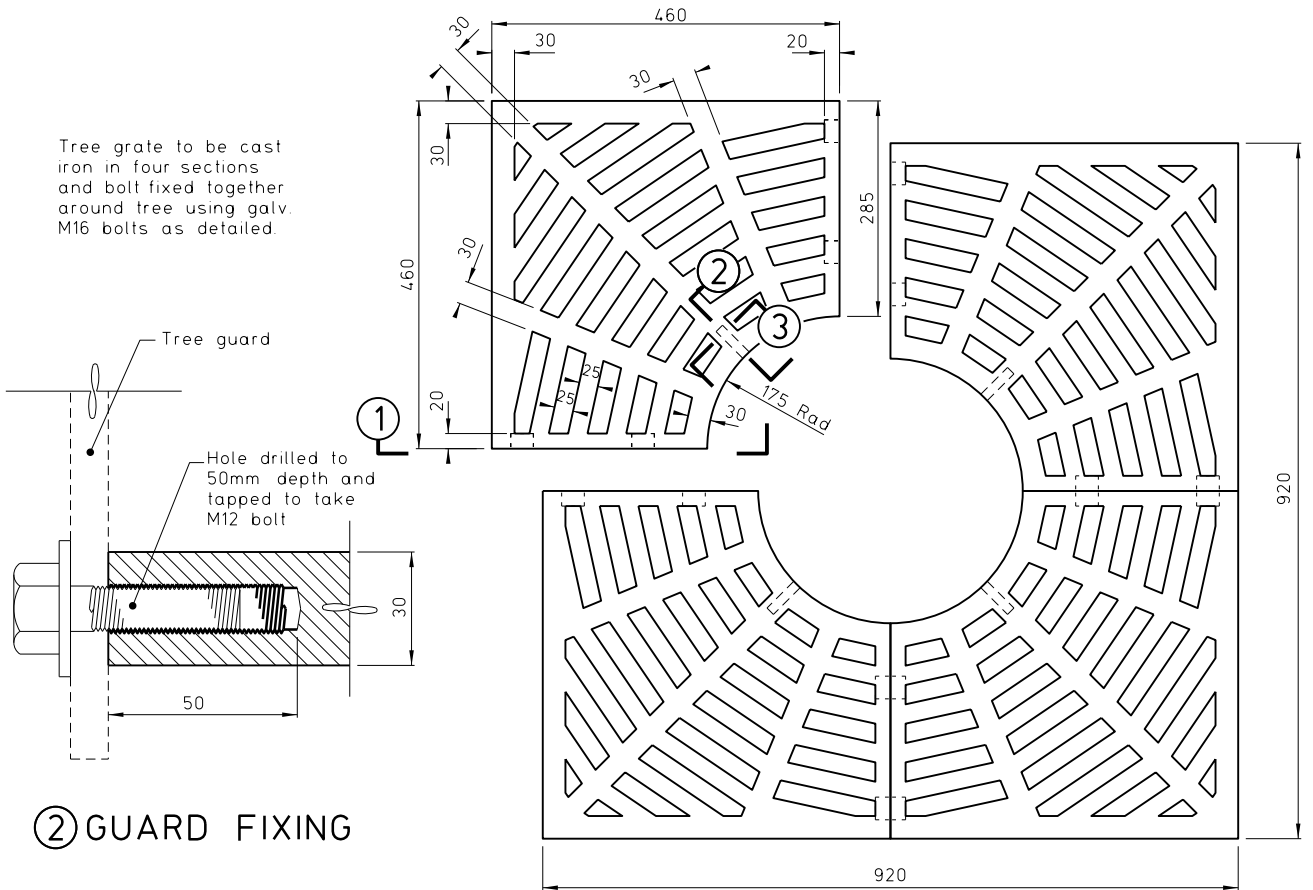




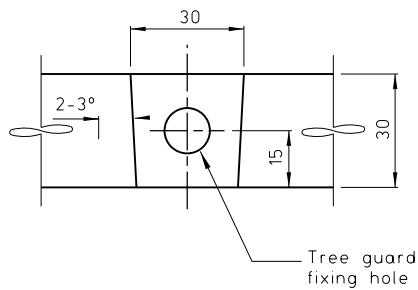


① TREE GRATE FIXING

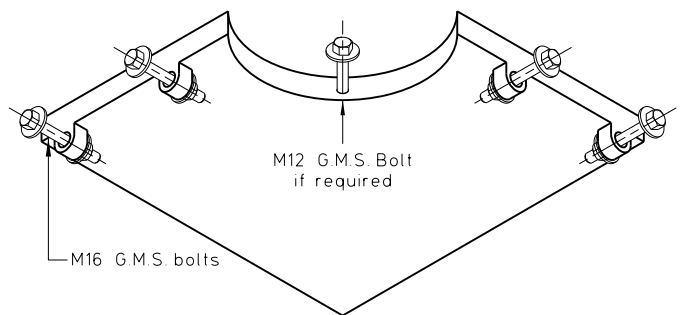
Tree grate to be cast iron in four sections and bolt fixed together around tree using galv. M16 bolts as detailed.



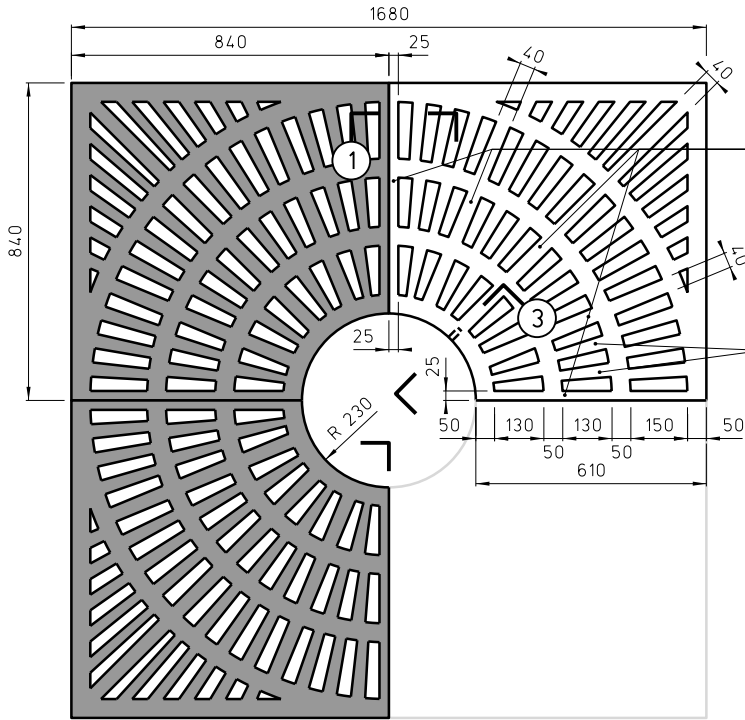
TREE GRATE PLAN



③ TREE GUARD FIXING



ISOMETRIC UNDERVIEW

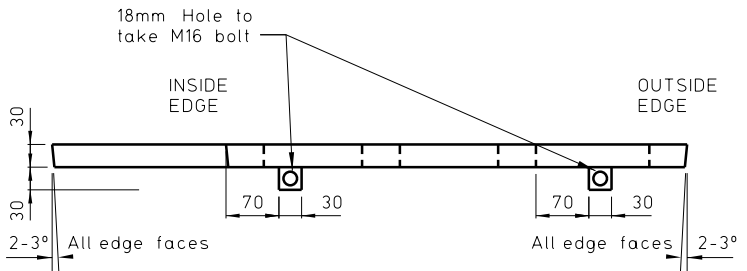
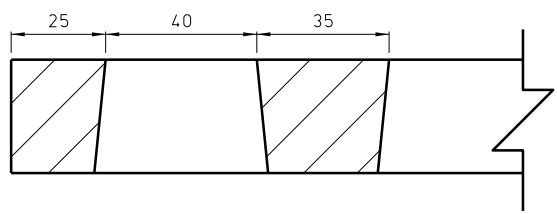


Main Spokes of equal thickness from outside edge through to centre

Tree grate to be cast iron in four sections and bolt fixed together around tree using galv. M16 bolts as detailed.

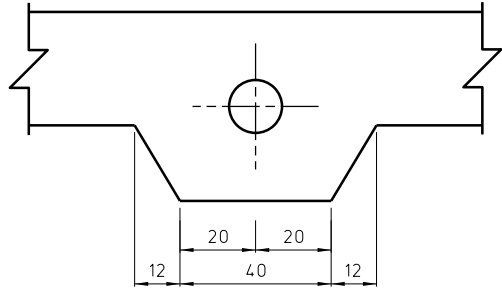
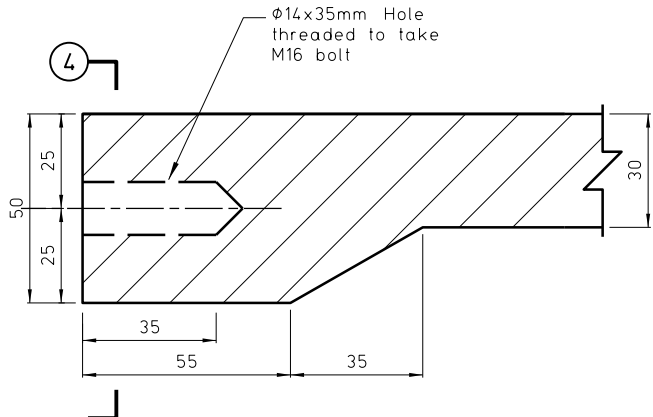
Sections between main spokes on radials & tapering thickness towards centre

② PLAN



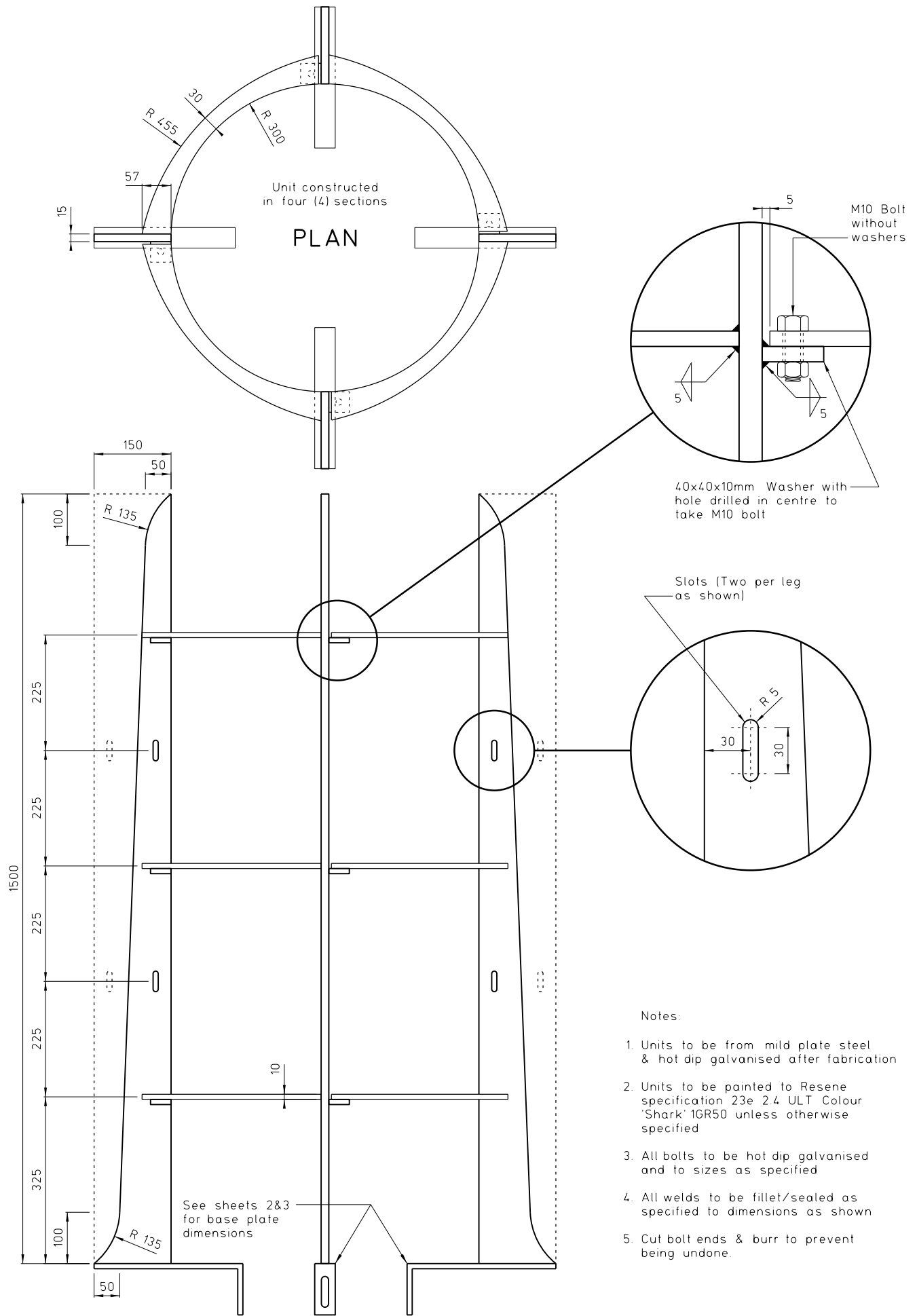
① CROSS SECTION

② TREE GRATE FIXING

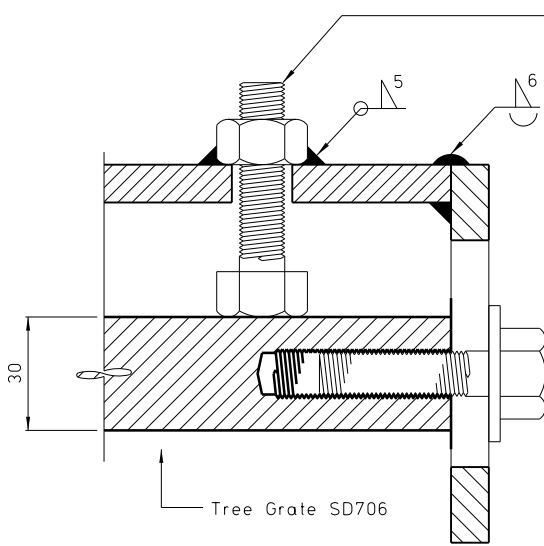


③ GUARD FIXING

④ TREE GUARD FIXING



- Notes:
1. Units to be from mild plate steel & hot dip galvanised after fabrication
  2. Units to be painted to Resene specification 23e 2.4 ULT Colour 'Shark' 1GR50 unless otherwise specified
  3. All bolts to be hot dip galvanised and to sizes as specified
  4. All welds to be fillet/sealed as specified to dimensions as shown
  5. Cut bolt ends & burr to prevent being undone.

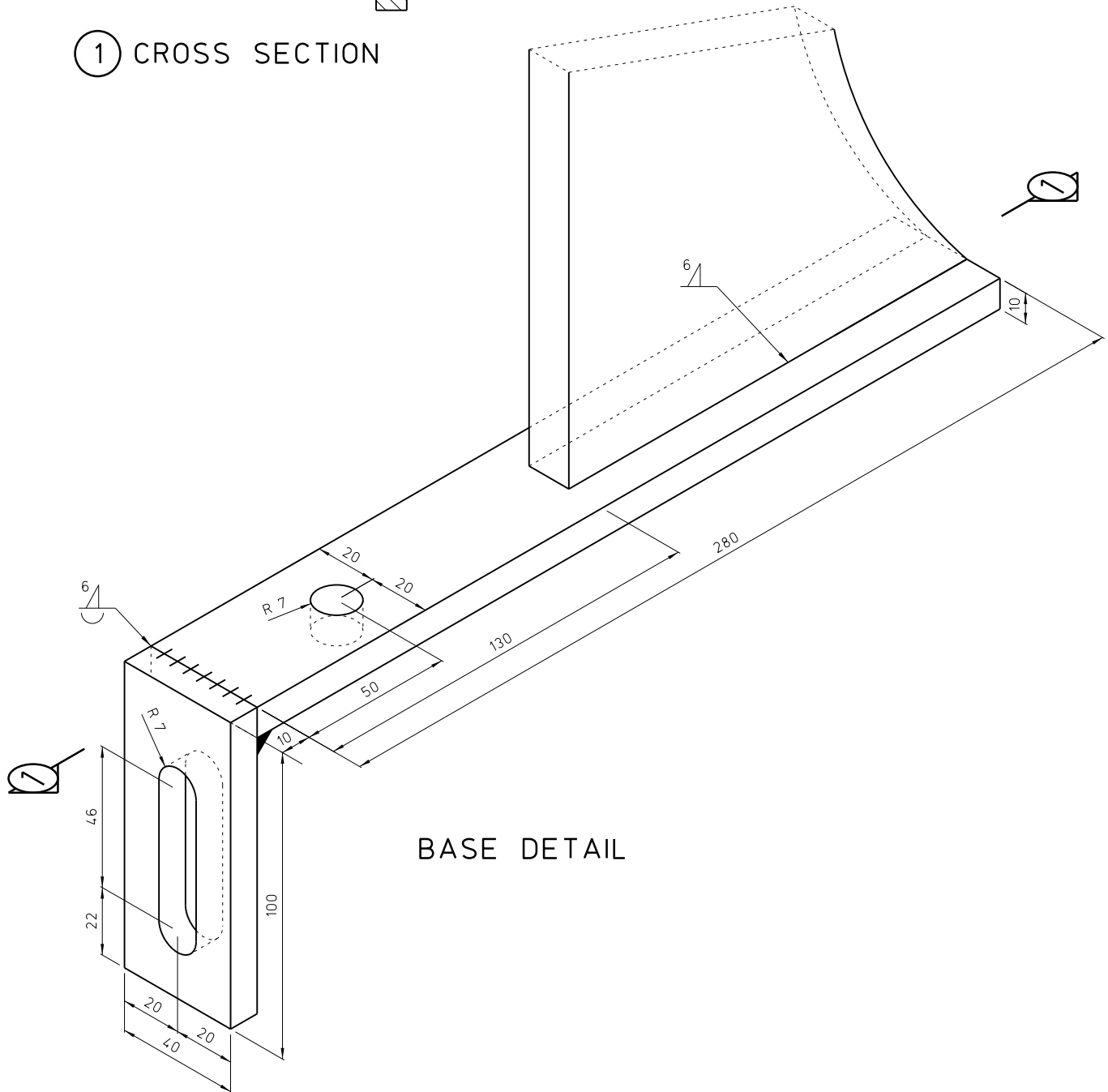


50mm M12 Bolt & nut with nut  
5mm fillet welded all round to  
base as shown. Bolt to act as  
set screw for levelling.

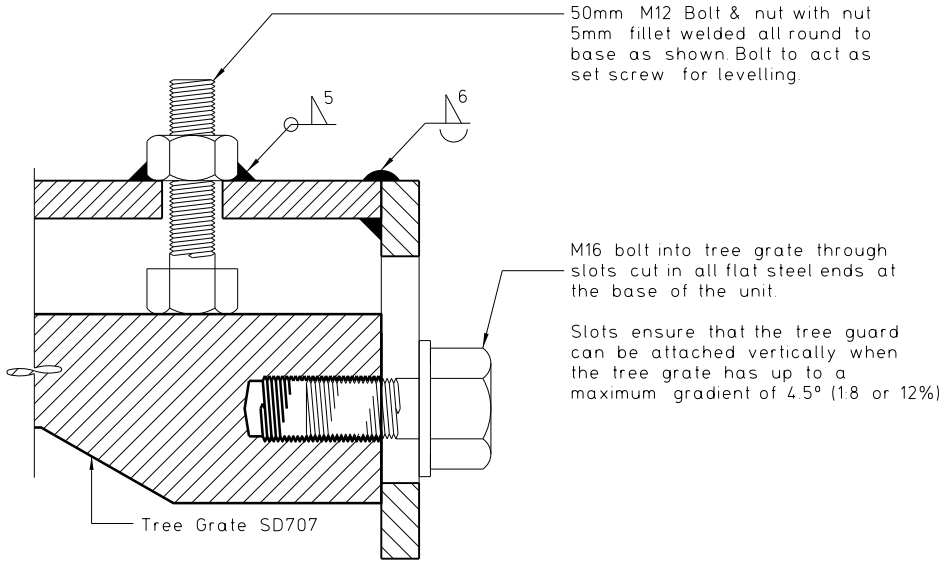
M12 bolt into tree grate through  
slots cut in all flat steel ends at  
the base of the unit.

Slots ensure that the tree guard  
can be attached vertically when  
the tree grate has up to a  
maximum gradient of 4.5° (1:8 or 12%)

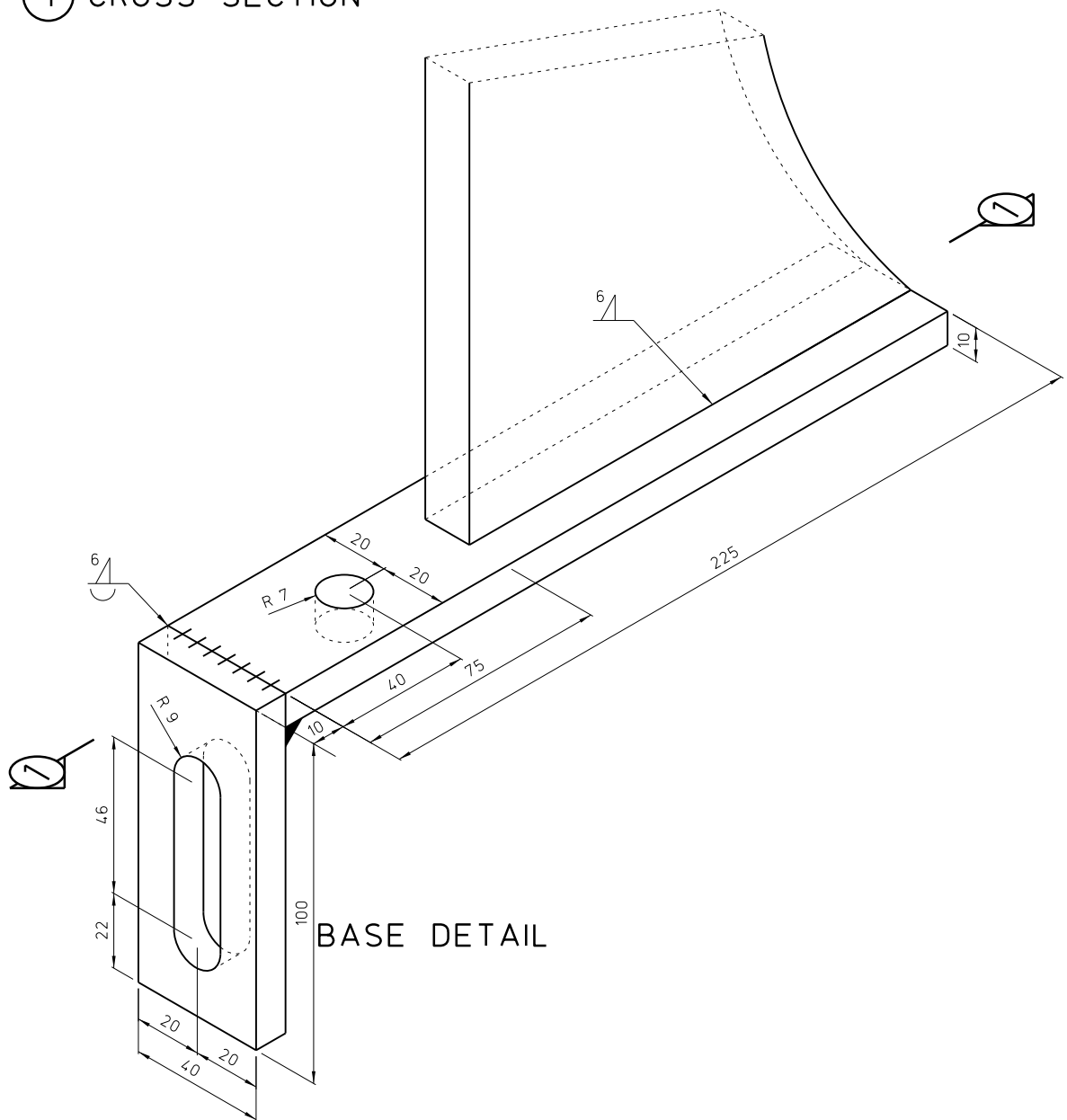
① CROSS SECTION

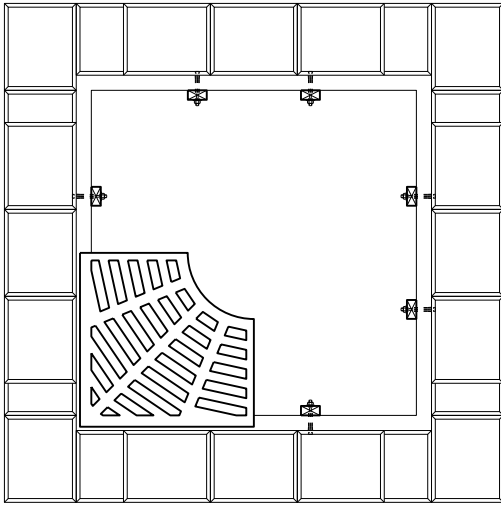


BASE DETAIL

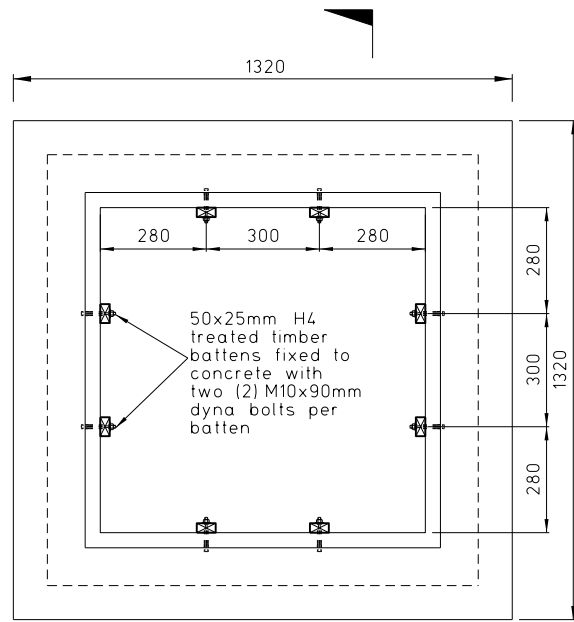


1 CROSS SECTION

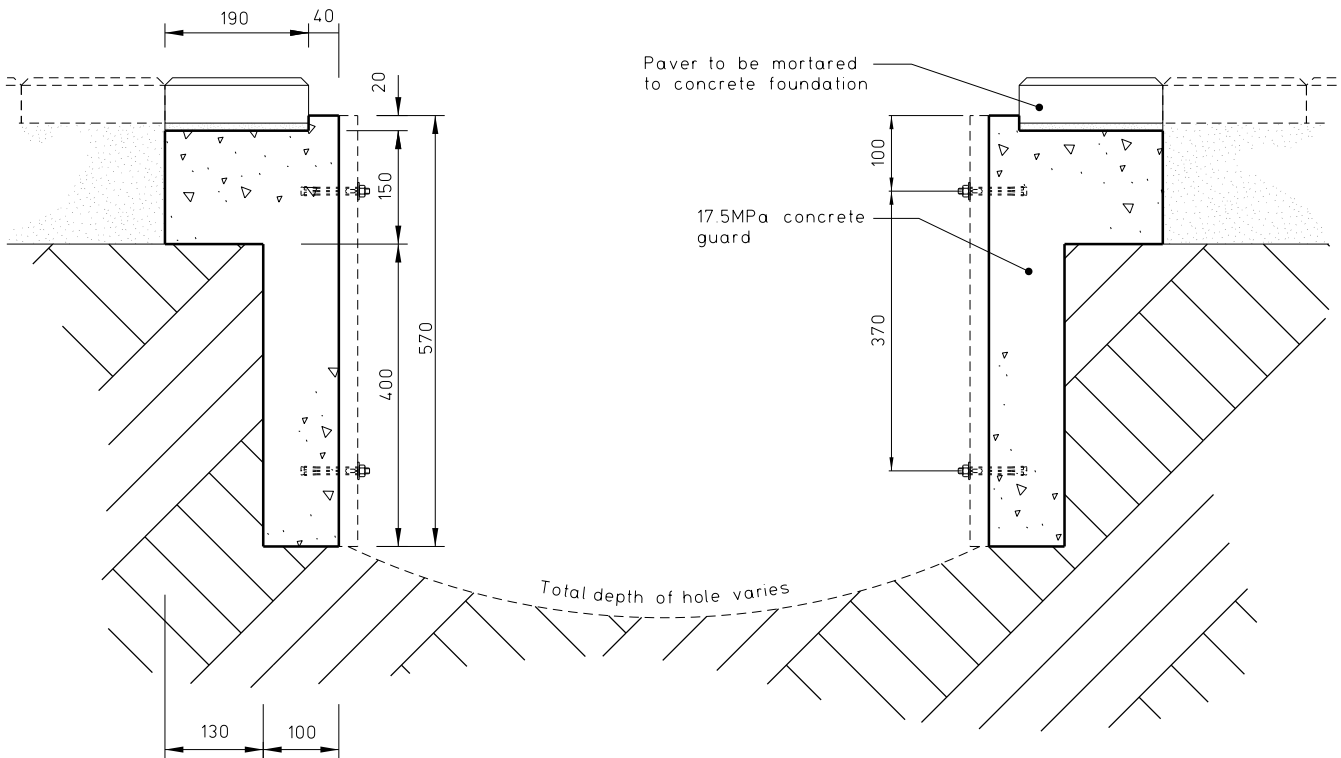




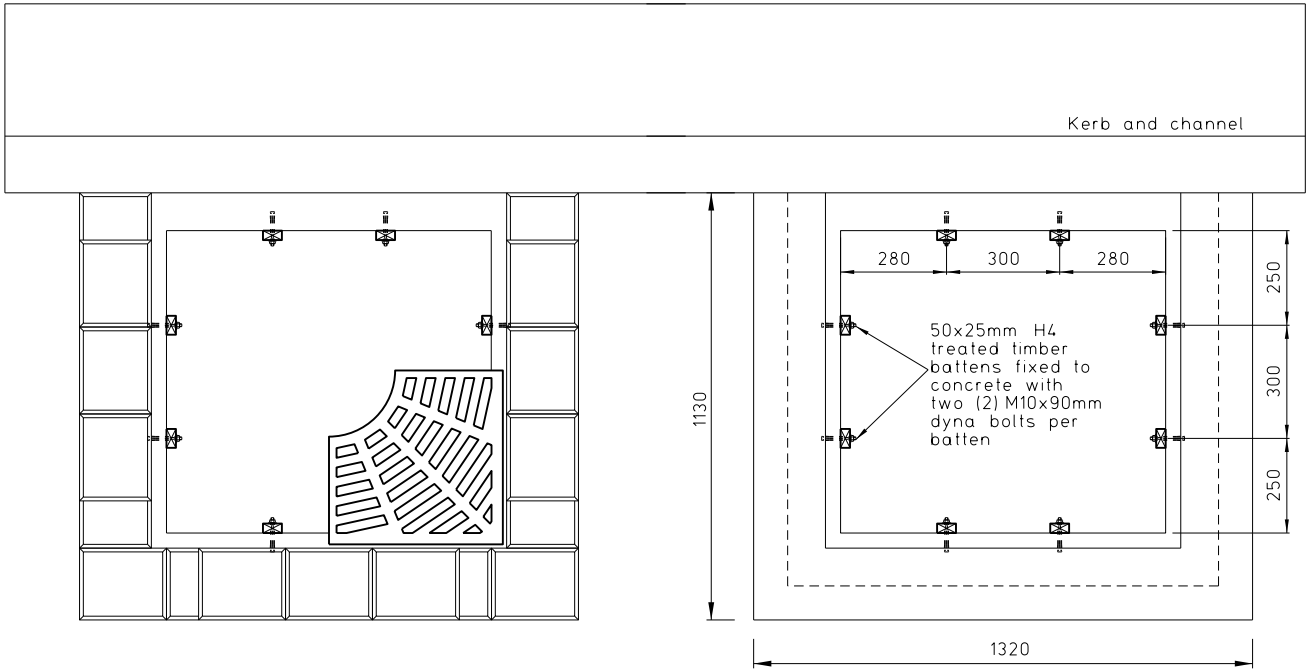
PAVER LAYOUT



PLAN 1

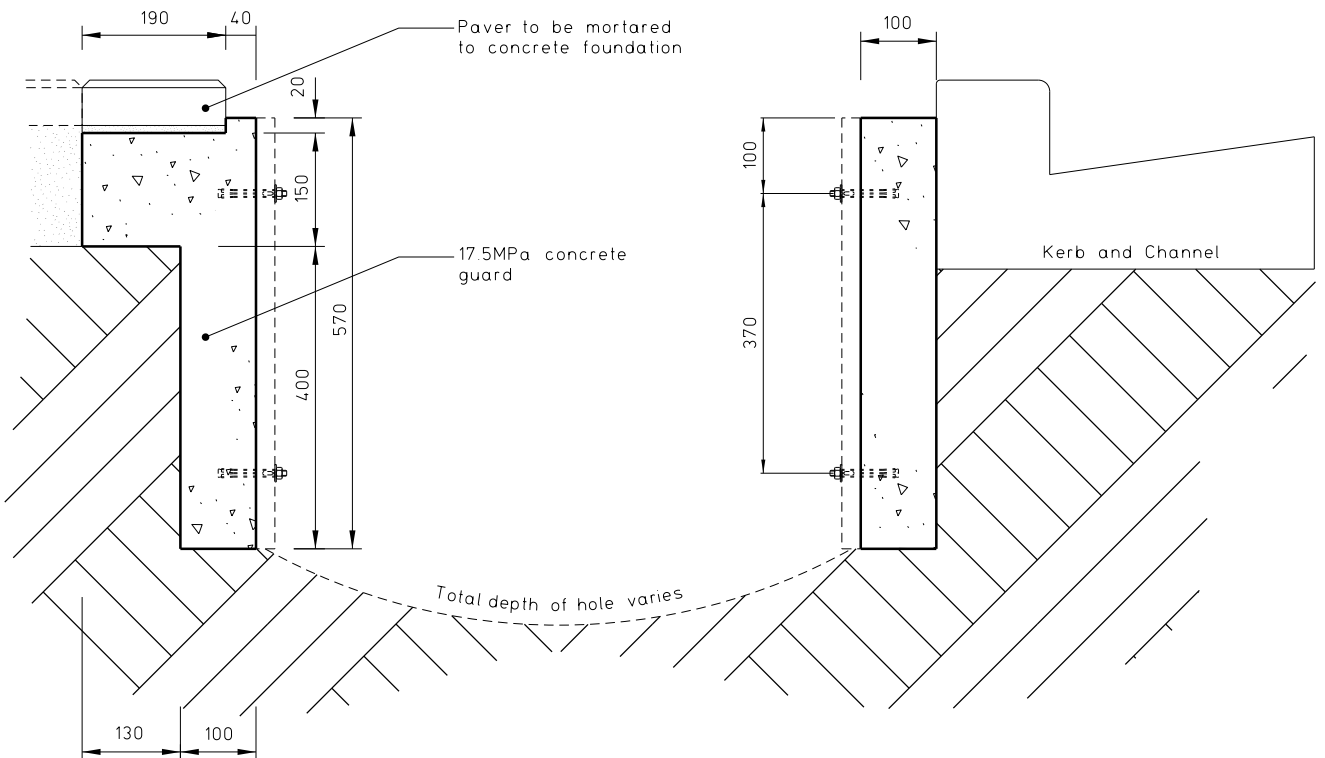


1 CROSS SECTION

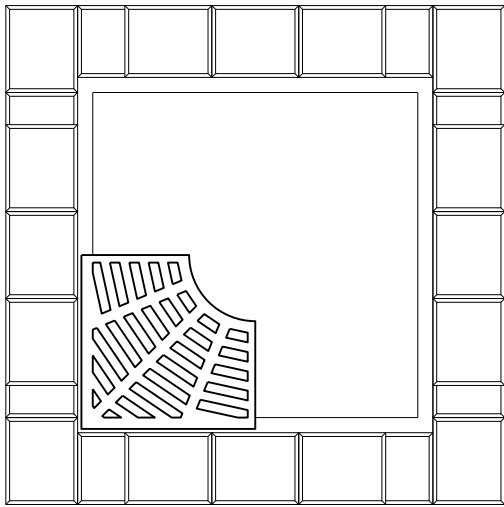


PAVER LAYOUT

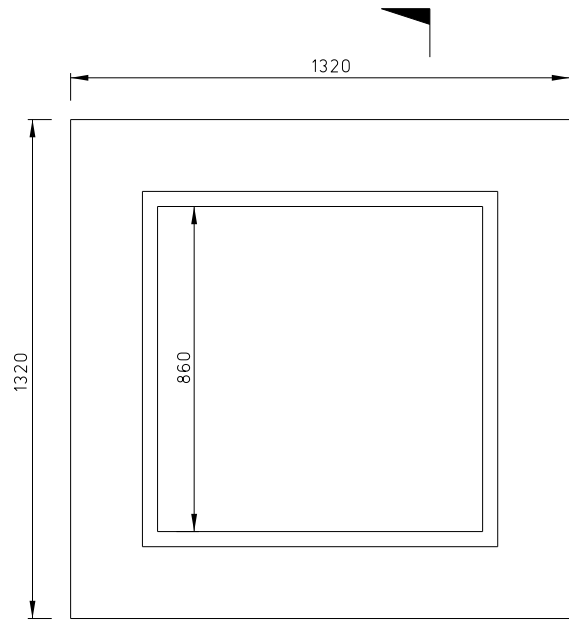
PLAN



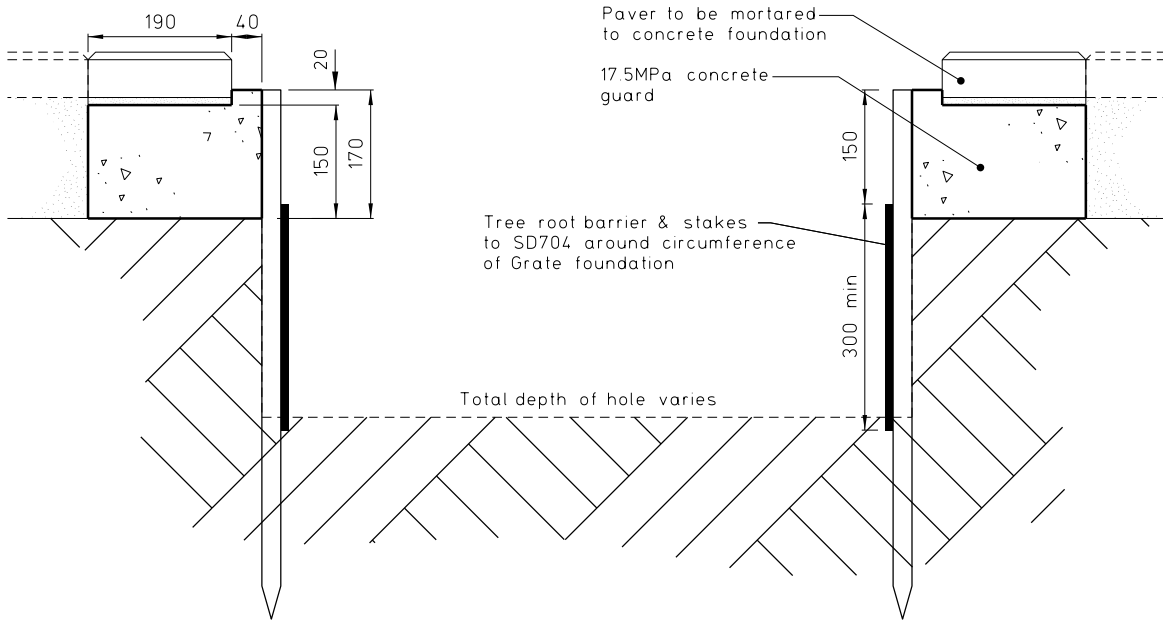
① CROSS SECTION



PAVER LAYOUT

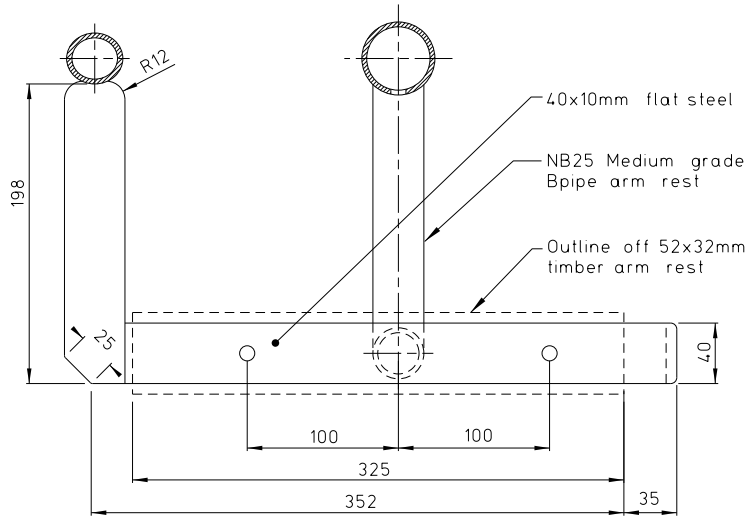


PLAN

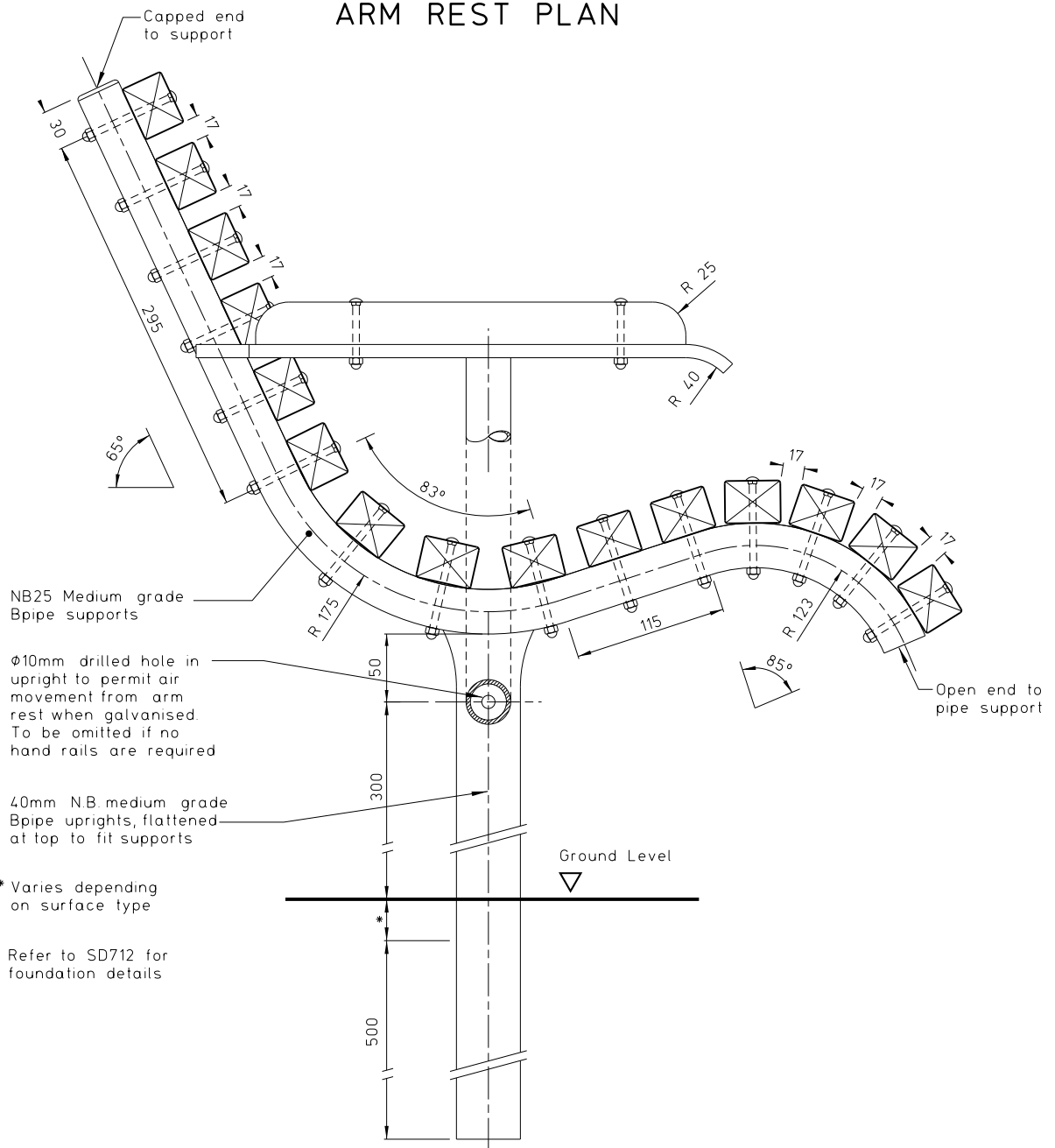


① CROSS SECTION





ARM REST PLAN



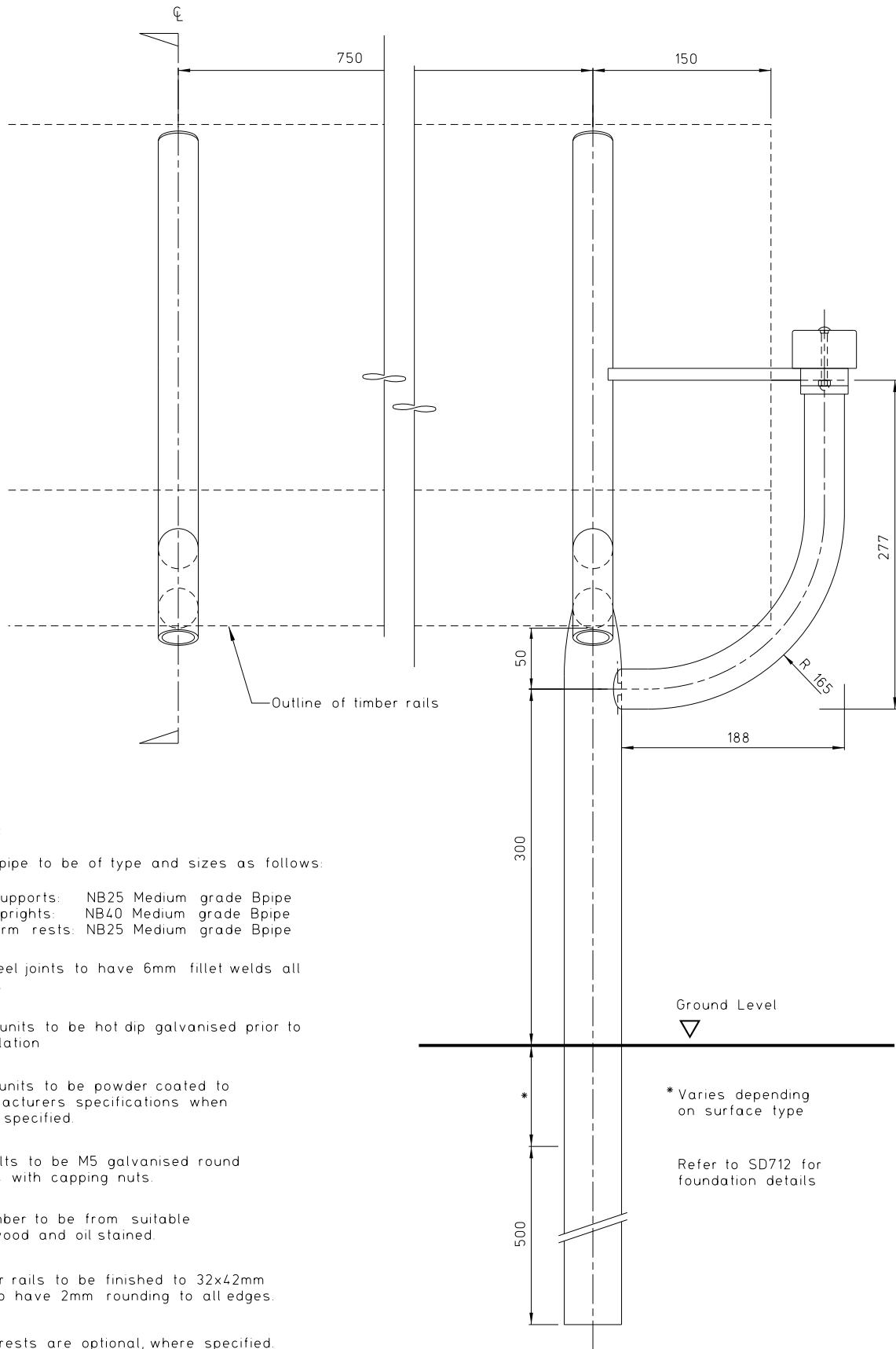
END ELEVATION

Φ10mm drilled hole in upright to permit air movement from arm rest when galvanised. To be omitted if no hand rails are required

40mm N.B medium grade Bpipe uprights, flattened at top to fit supports

\* Varies depending on surface type

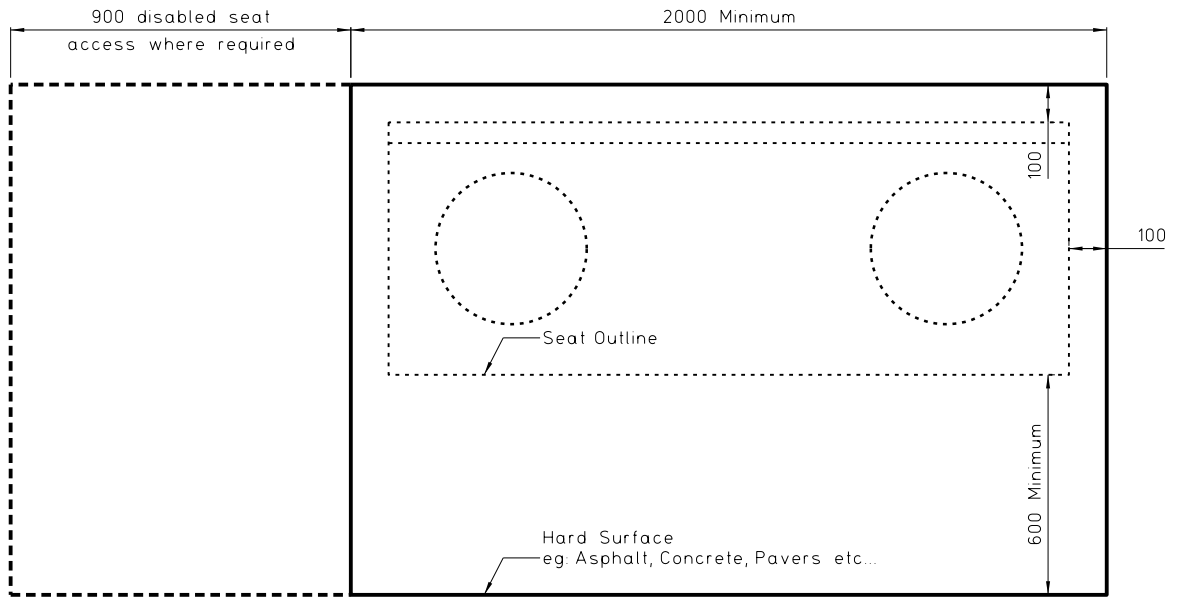
Refer to SD712 for foundation details



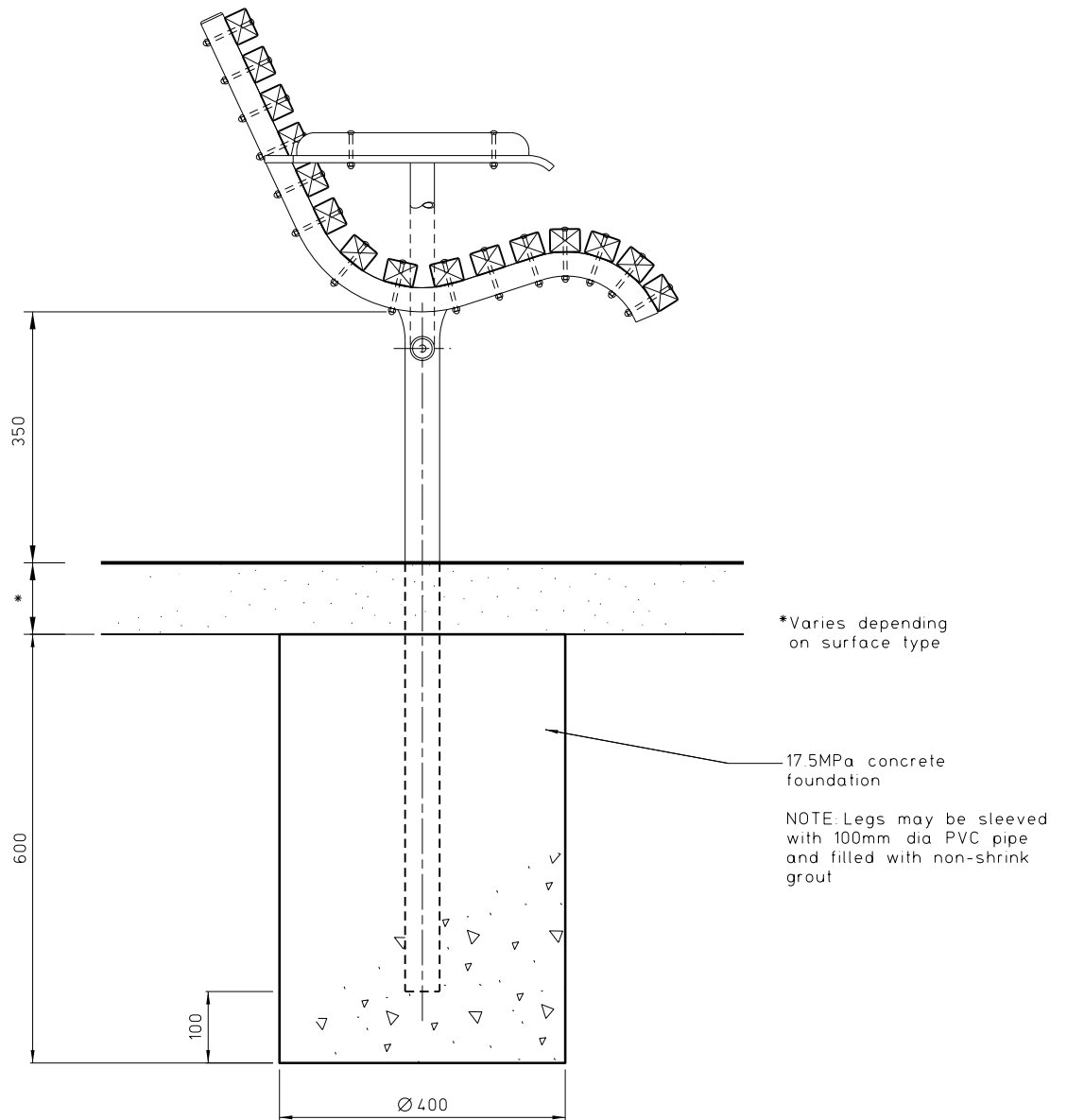
Notes:

1. Steel pipe to be of type and sizes as follows:
  - Supports: NB25 Medium grade Bpipe
  - Uprights: NB40 Medium grade Bpipe
  - Arm rests: NB25 Medium grade Bpipe
2. All steel joints to have 6mm fillet welds all round.
3. Steel units to be hot dip galvanised prior to installation
4. Steel units to be powder coated to manufacturers specifications when & as specified.
5. All bolts to be M5 galvanised round heads with capping nuts.
6. All timber to be from suitable hardwood and oil stained.
7. Timber rails to be finished to 32x42mm and to have 2mm rounding to all edges.
8. Arm rests are optional, where specified.
9. Timber arm rests to be finished to 52x32mm and to have 2mm rounding to all edges

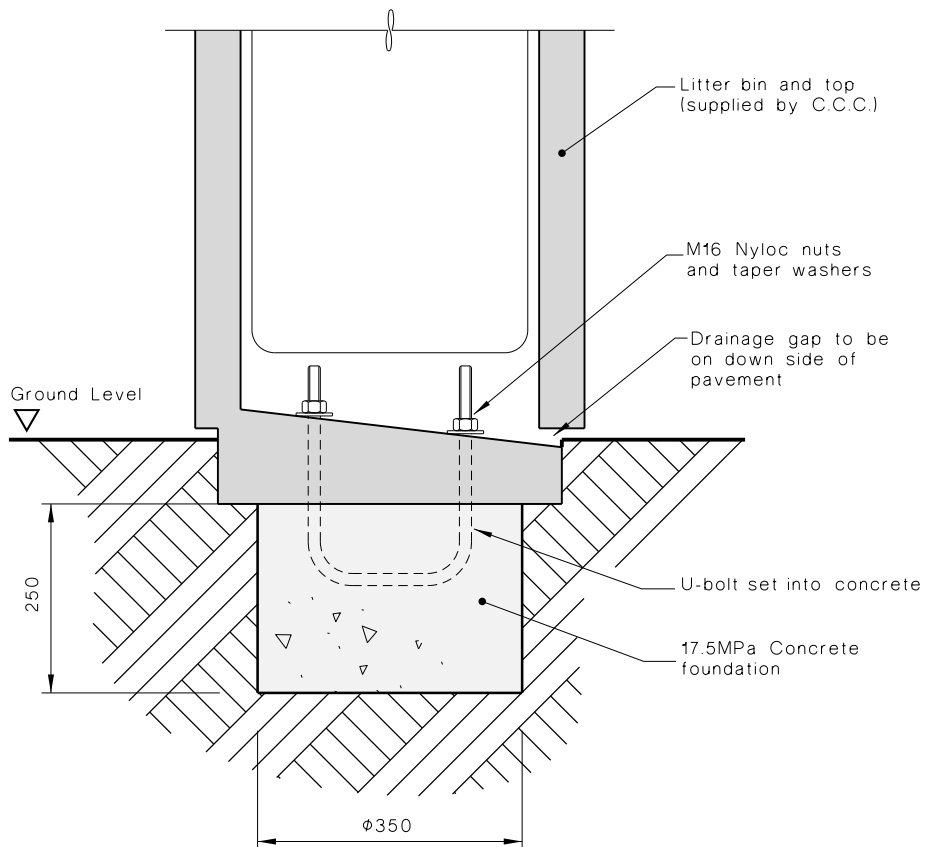
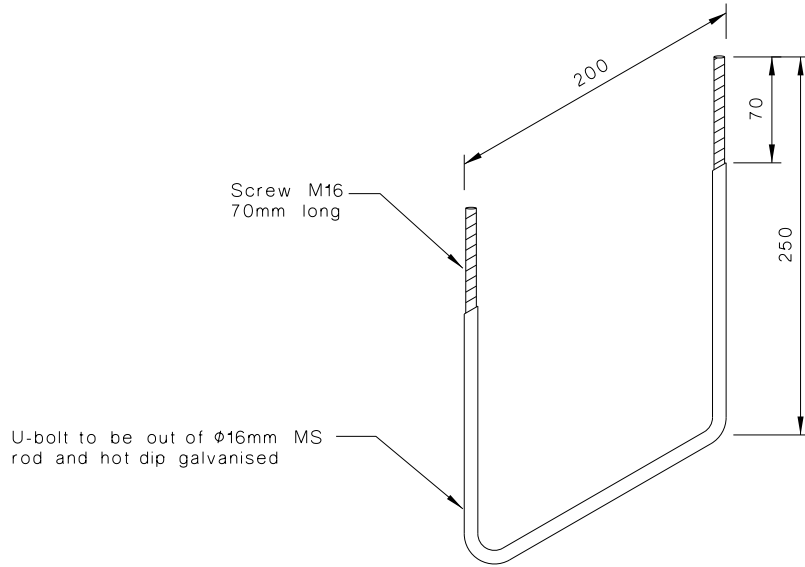
HALF FRONT ELEVATION



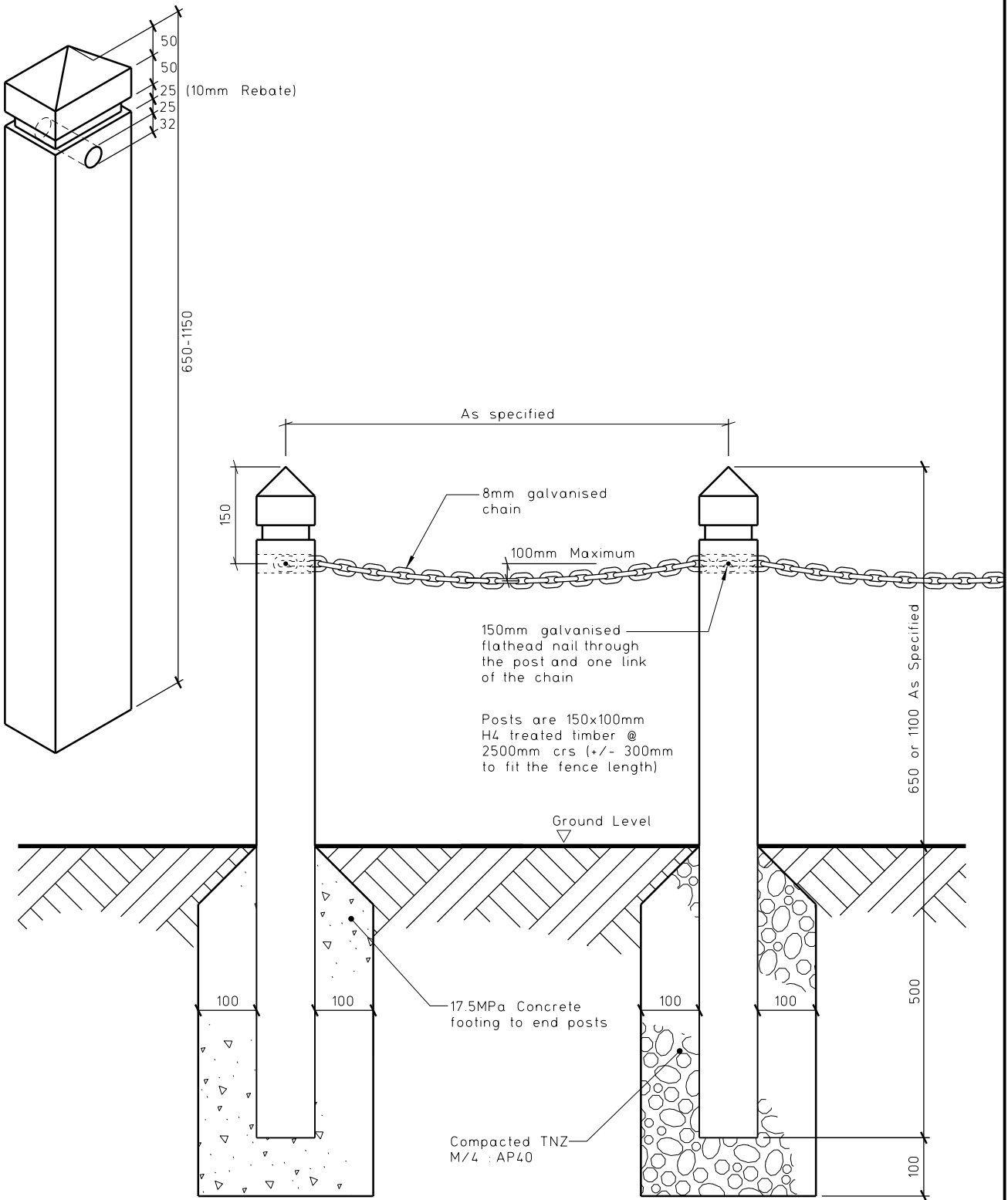
FOUNDATION PLAN

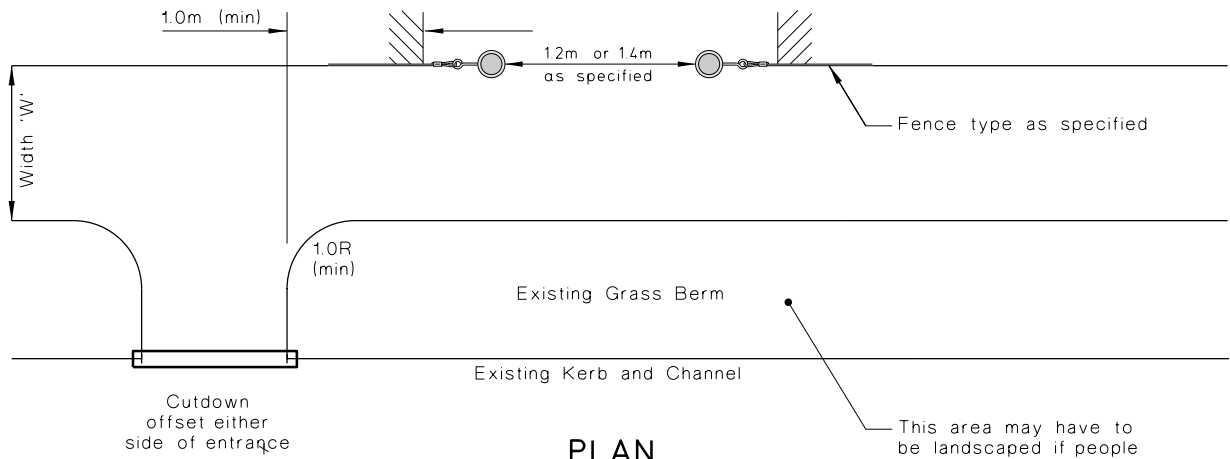


FOUNDATION DETAIL



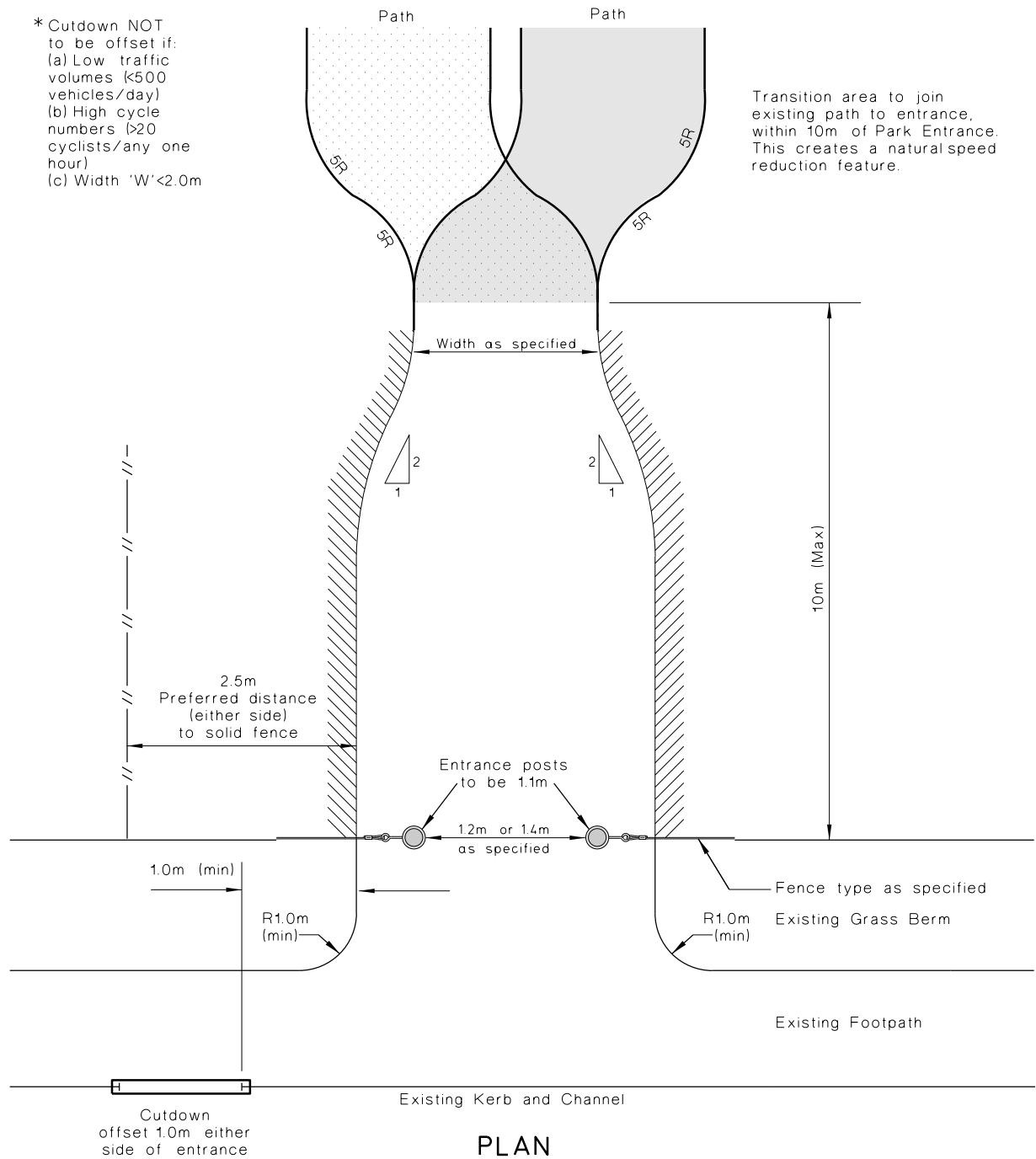




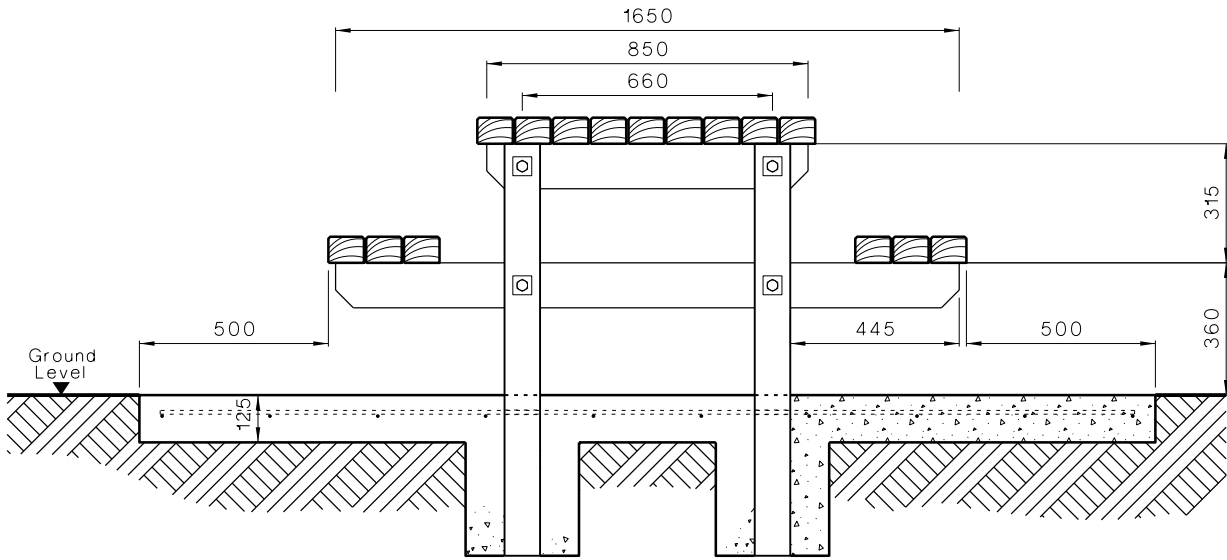


PLAN

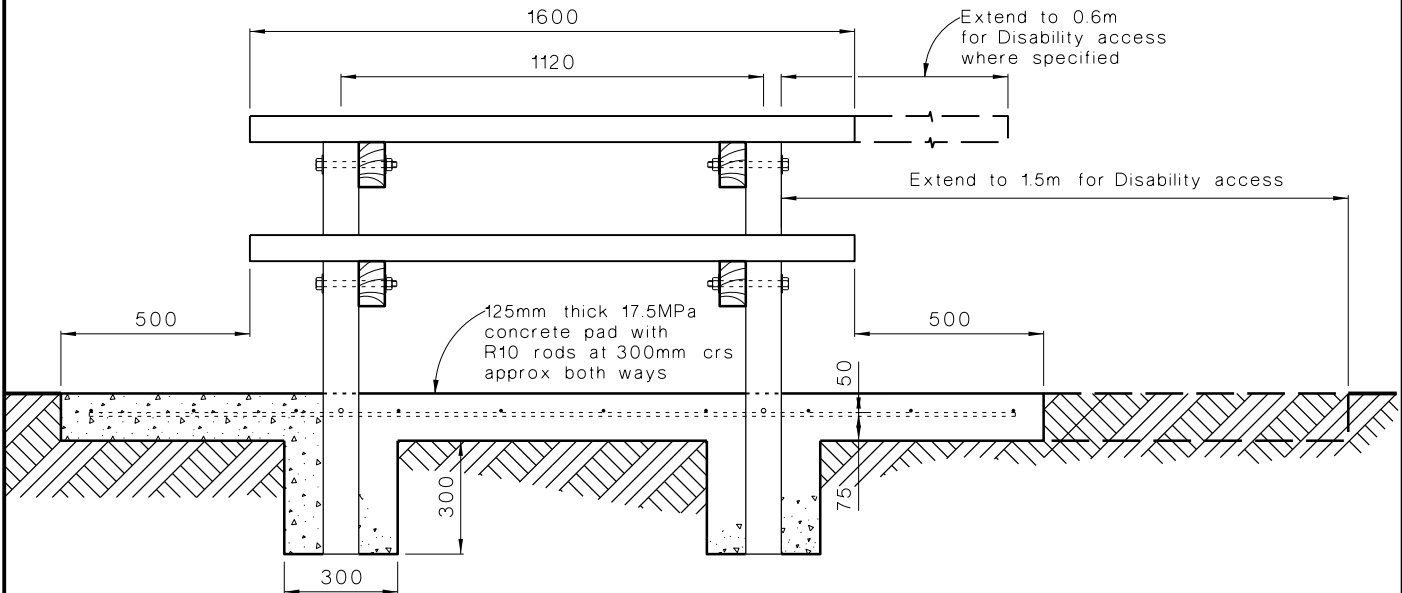
\* Cutdown NOT to be offset if:  
 (a) Low traffic volumes (<500 vehicles/day)  
 (b) High cycle numbers (>20 cyclists/any one hour)  
 (c) Width 'W' < 2.0m



PLAN



SIDE ELEVATION



FRONT ELEVATION

Notes:

1. All timber to be H4 treated (non-corrosive type)
2. All timber to be gauged with the top and seat members to have 5mm chamfer to top edges
3. Top and seating timber to be from 100x75mm with 6mm gaps between
4. Supports to be from 125x75mm timber
5. Legs to be from 100x100mm timber
6. Bolts to be G.M.S.M16 with 50x50x3mm G.M.S. washer under both heads and nuts
7. Concrete slab to be 125mm thick 17.5MPa with R10 rods at 300mm crs approx both ways



Painting Specification:

E-Mac Drinking fountain colour to be Resene Karaka 1G015 unless otherwise specified.

Visible steel form work surfaces to be painted to the following specification:

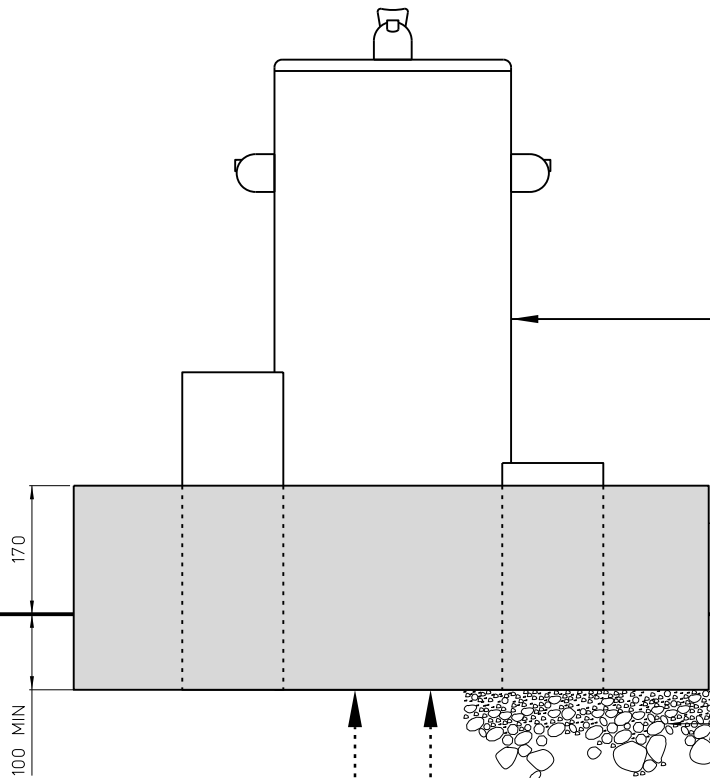
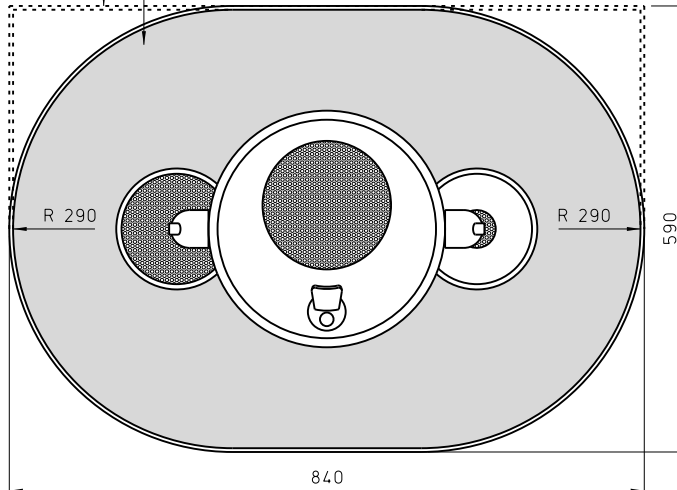
- Surface preparation - Non-Ferrous Metals (Resene data sheet D89)
- 1st coat - Armourcote 510 (Resene data sheet RA40)
- 2nd coat - Vinyl Etch (Resene data sheet RA31)
- 3rd coat - \*Pigmented Uracryl 403 (Resene data sheet RA56)
- 4th coat - Clear Uracryl 403 (Resene data sheet RA56)

\*Colour to be Resene Karaka 1G015 unless otherwise specified.

All painting to be carried out to ensure no paint splashes & over runs occur on other surfaces.

Concrete top to have a U3 trowelled finish

Concrete base to be squared off if located next to a wall



Drinking fountain to be supplied & installed by E-Mac Enterprises LTD. Ph (03) 377-3897

270x5mm steel form work (left insitu) with welds single bevel butt & ground flush. Hot dip galvanised after fabrication concrete foundation to be 20MPa at 28 days

Ex. Ground level

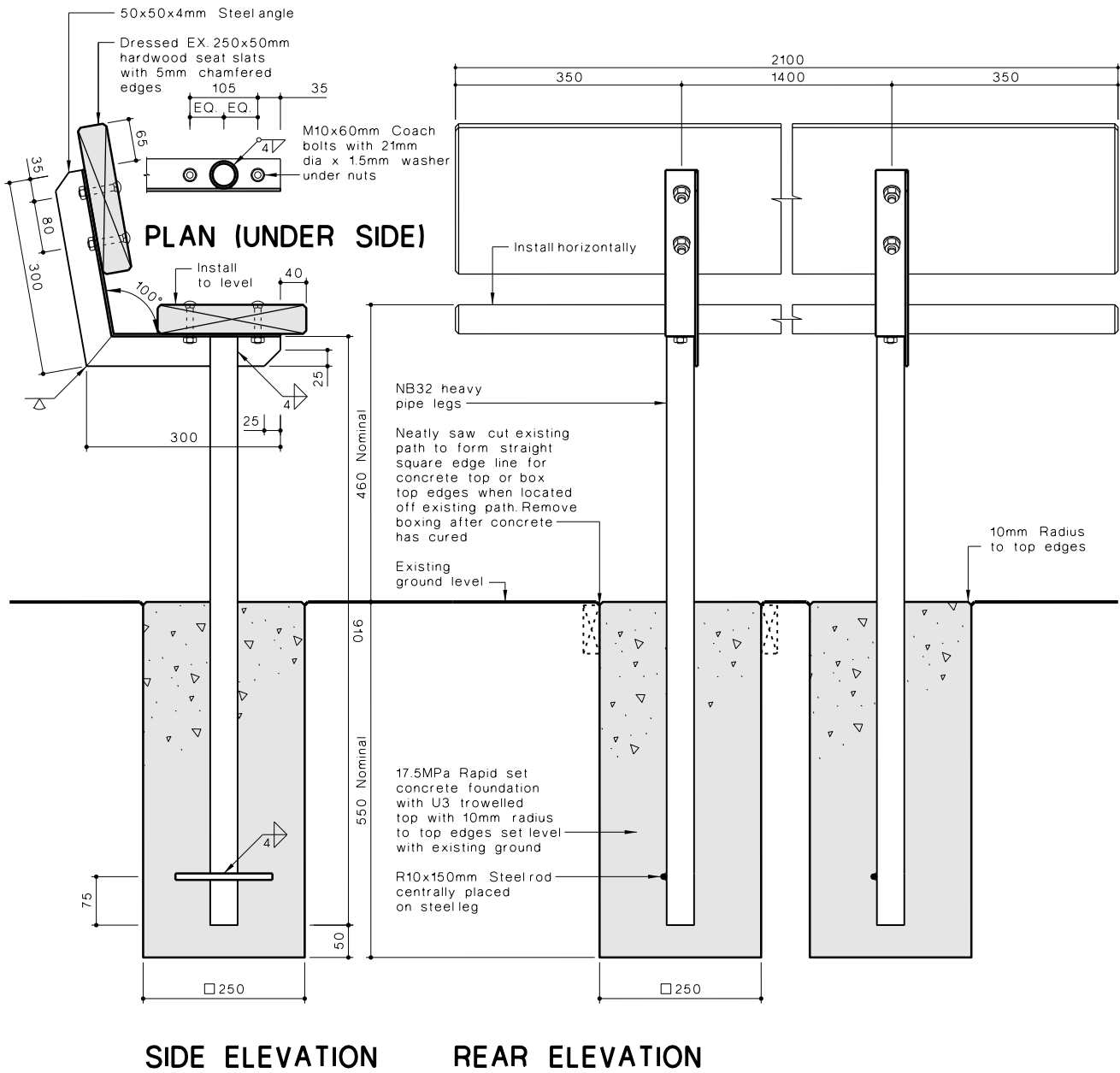
Foundation to be seated on solid bearing material. Excavate & back fill with AP40 compacted in layers not exceeding 250mm thick as required.

12mm DIA MINIMUM COLD WATER FEED CENTRALLY PLACED IN BASE TERMINATE AT GROUND LEVEL READY FOR E-MAC INDUSTRIES TO CONNECT TO DRINKING FOUNTAIN.

65mm DIA PVC WASTE CENTRALLY PLACED IN BASE TERMINATE AT GROUND LEVEL READY FOR E-MAC INDUSTRIES TO CONNECT TO DRINKING FOUNTAIN.

# SPECIFICATION:

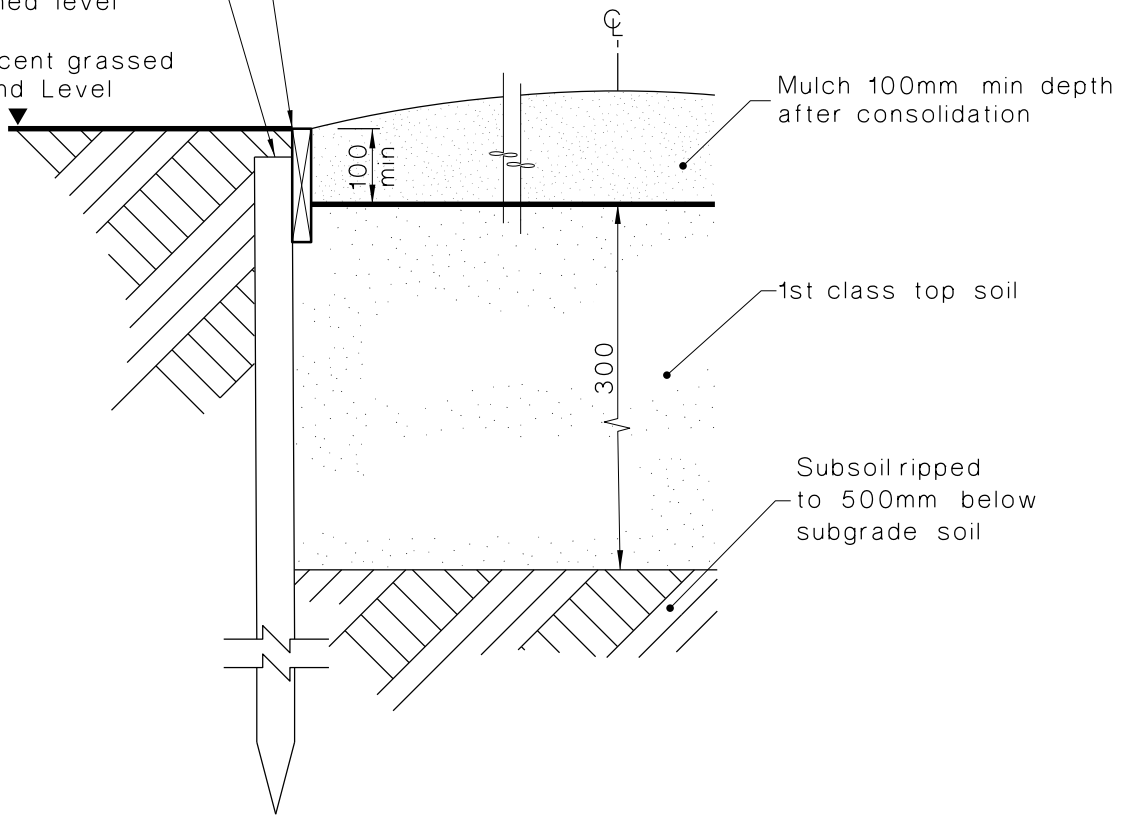
1. GALVANISING:
  - a. All steel fixings to be hot dip galvanised.
  - b. Supports shall be hot dip galvanised after fabrication, with all blow holes located so as not to allow water (rain/washing down) to enter the frame. Blowholes shall be located in non-visible locations wherever possible.
  - c. Hot dip galvanising shall be in accordance with NZS 4680.
  - d. All hot dip galvanising defects shall be repaired by hot zinc metal spray.
2. FOUNDATIONS:
  - a. Contractor to verify locations of all underground services before excavating.
3. TIMBER:
  - a. Timber seat slats to be from a sustainable source approved by CCC.
  - b. All timber to be seasoned and dried to a moisture content of between 12-16%



150x25mm H4 timber battens with 50x50x600mm H4 timber pegs at 1m crs max.

Peg 25mm below finished level

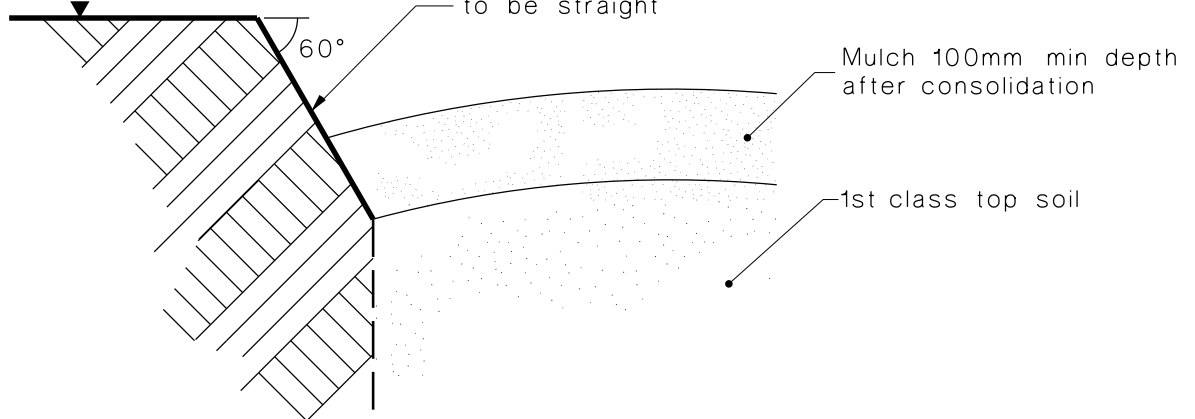
Adjacent grassed ground Level



### BATTEN EDGE

Adjacent grassed ground Level

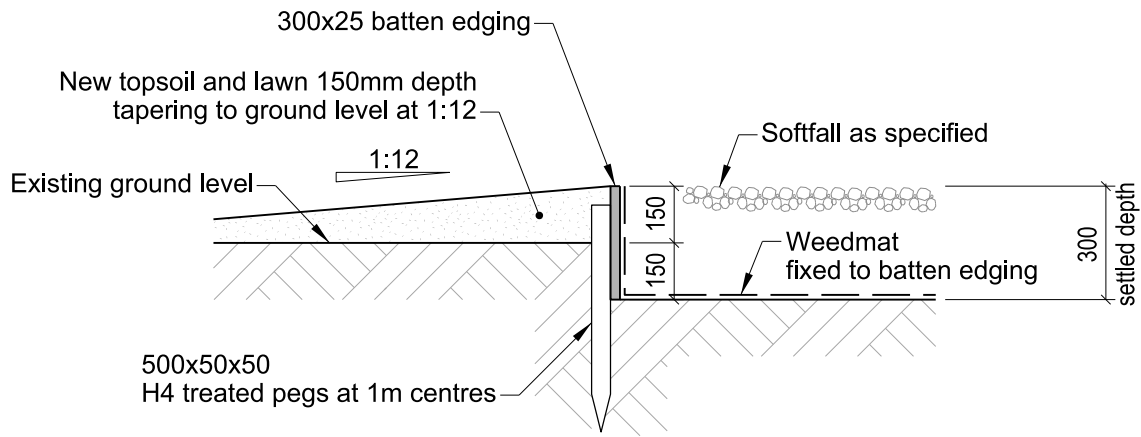
Smooth cut face top edge line to be straight



### CUT EDGE TO PLANT BED ADJACENT TO TURF

NOTES:

- 1. Refer to SD609 for plant bed/landscaping adjacent to footpath.



### IN-GROUND RETAINING EDGE

**NOTE:**

- 1) Replace edging with two 300x10mm battens where required to allow for curves.
- 2) Lawn may be replaced by a plant bed.

200x50mm H4 treated timber fixed to piles and edge batten with galvanised nails. Chamfer top edges to 5mm radius.

250x50mm H4 treated timber fixed to piles with M12 coach screws at 1m centres

Existing ground level

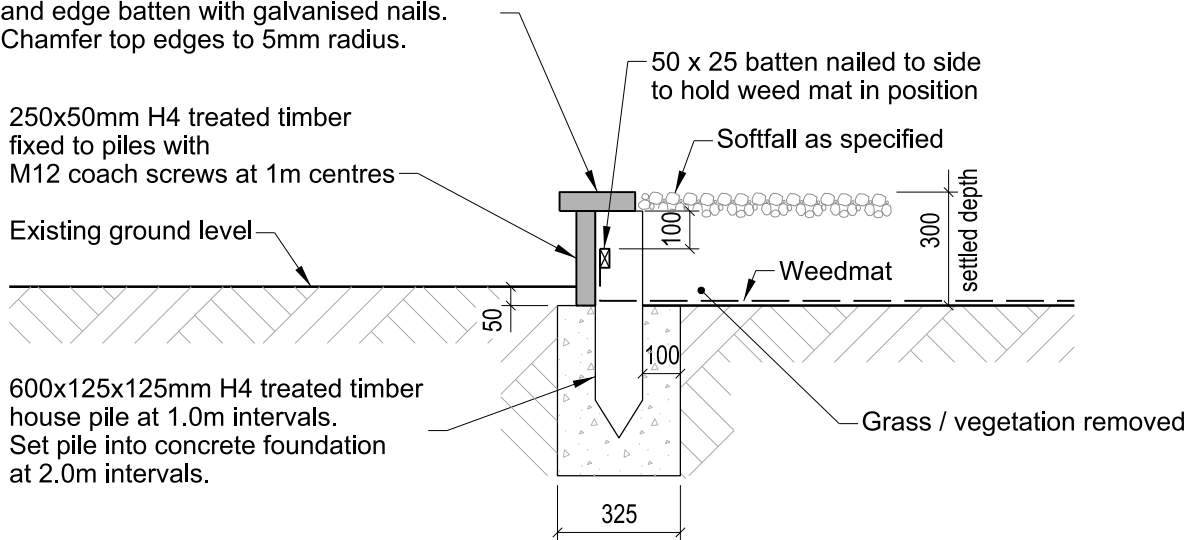
600x125x125mm H4 treated timber house pile at 1.0m intervals. Set pile into concrete foundation at 2.0m intervals.

50 x 25 batten nailed to side to hold weed mat in position

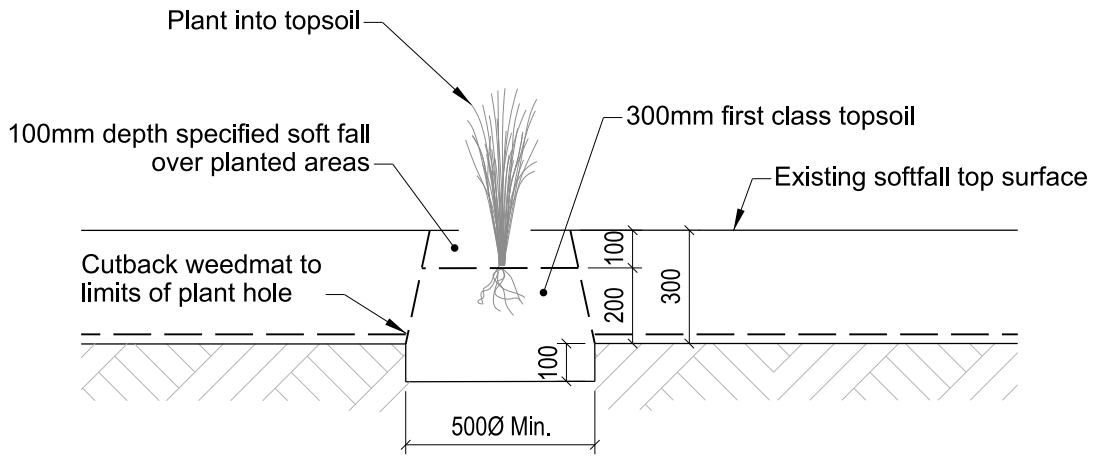
Softfall as specified

Weedmat

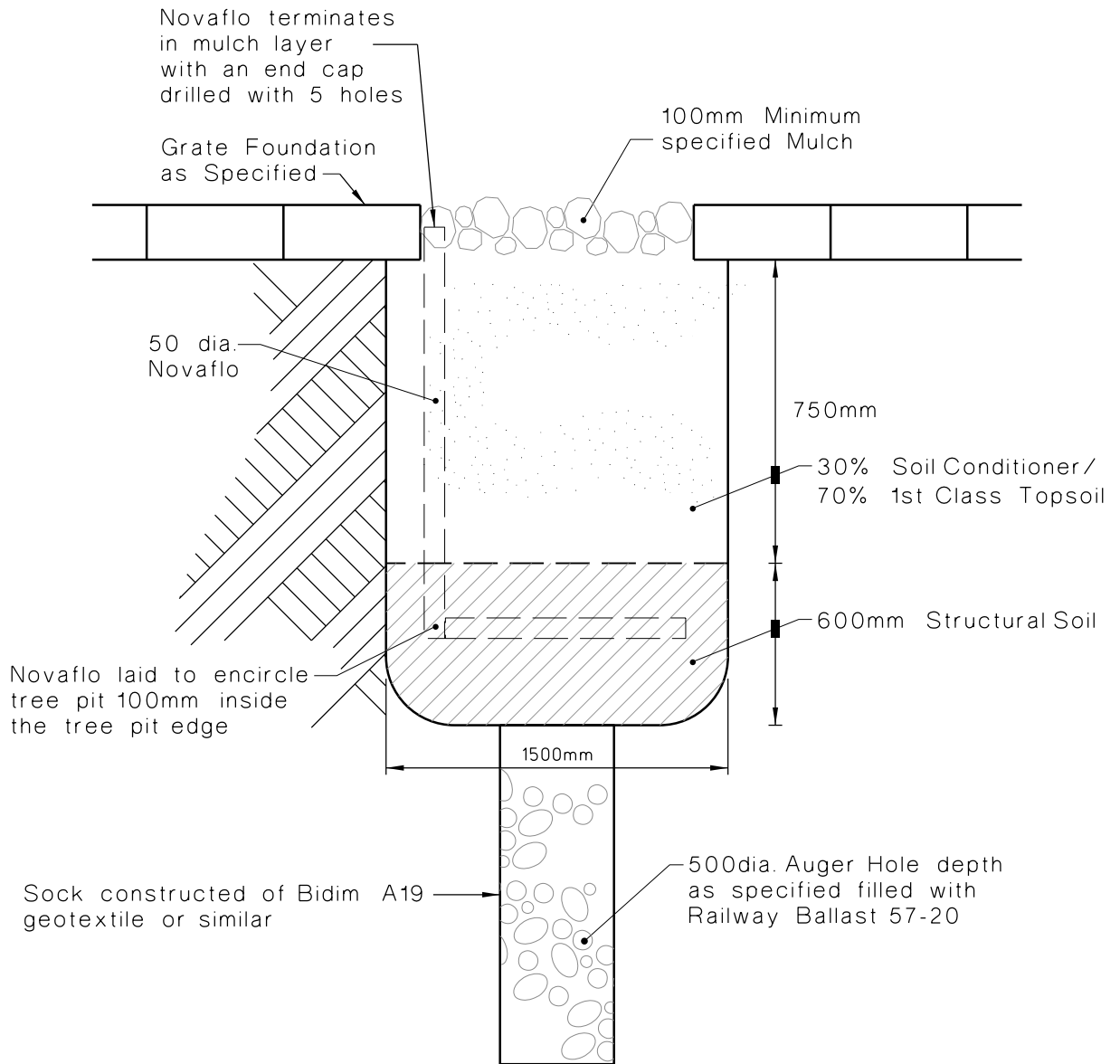
Grass / vegetation removed

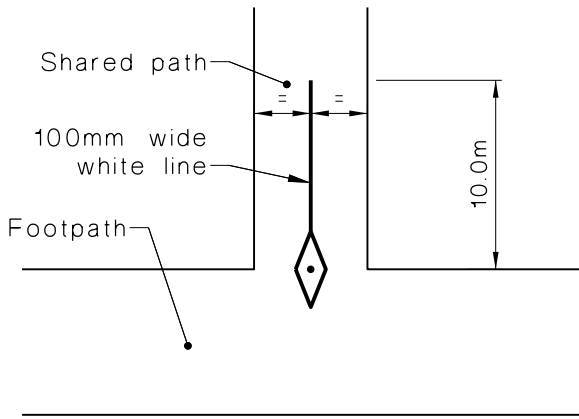


### TIMBER RETAINING EDGE

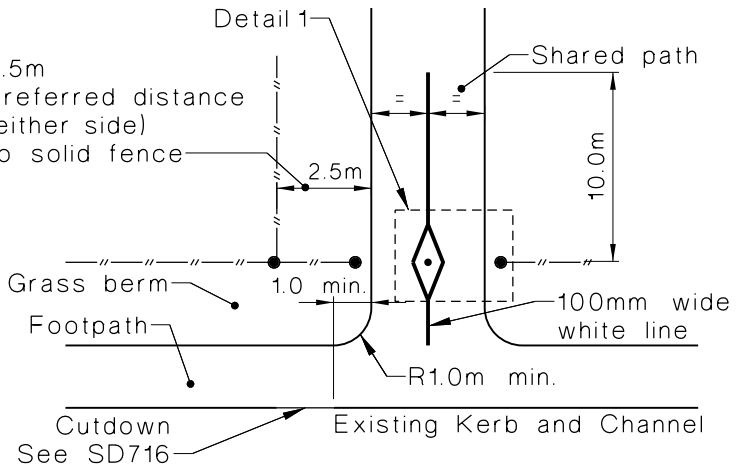


### PLANTING

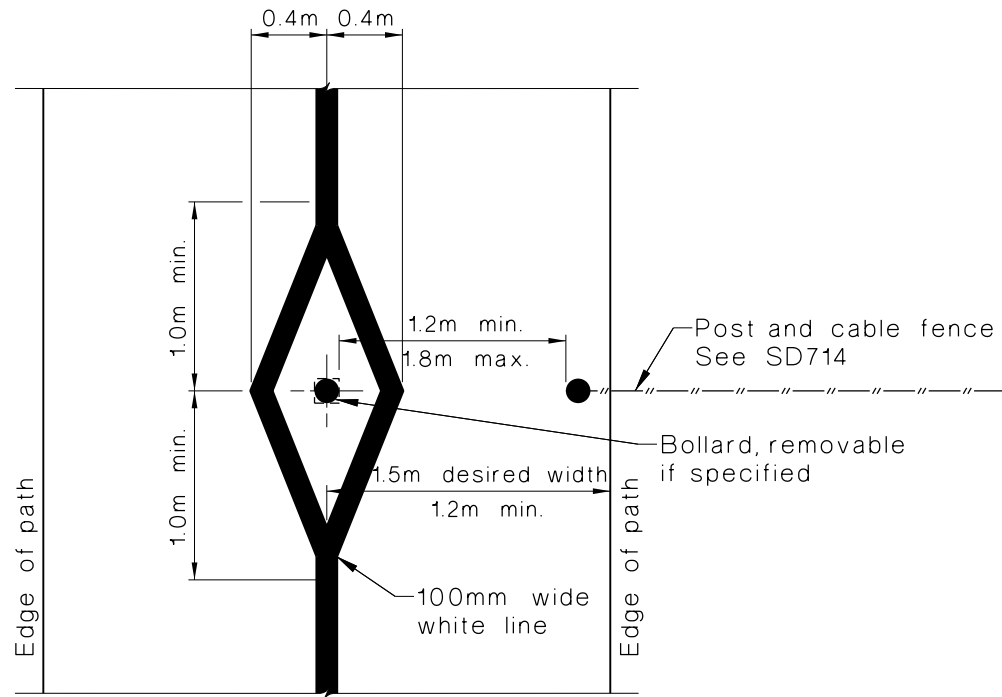




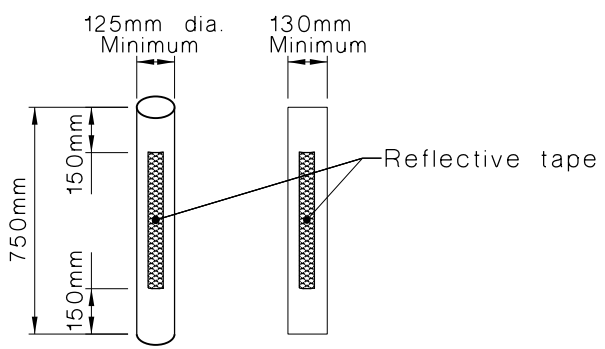
MARKING OF ENTRANCE AT FOOTPATH



PLAN OF ENTRANCE SET BACK FROM FOOTPATH

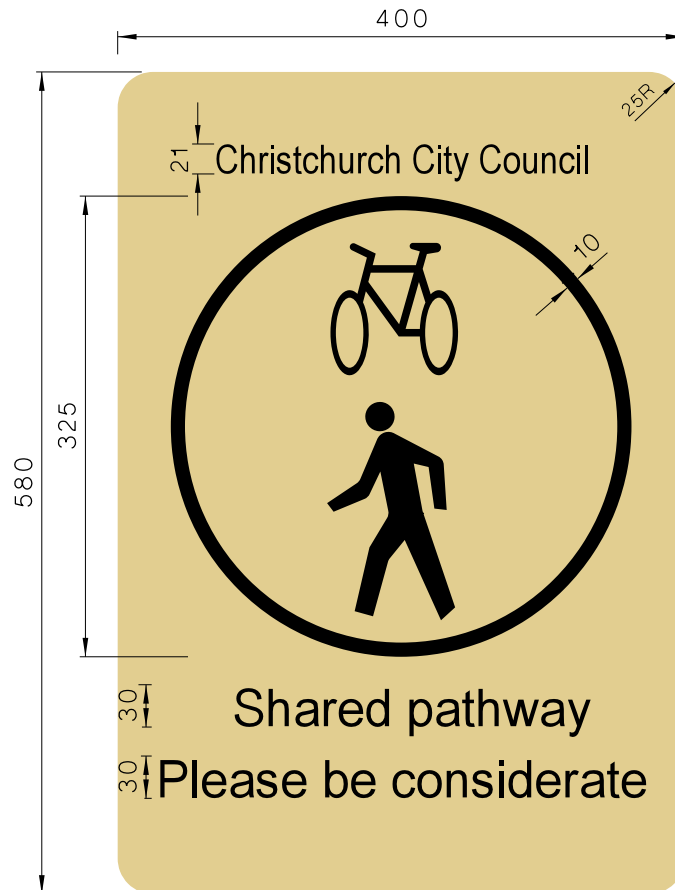


DETAIL 1



BOLLARDS

- NOTES:**
1. Use vandal resistant, weather resistant, low maintenance materials e.g. galv. steel, aluminium or H5 treated timber.
  2. Square bollards should be used only where signs are to be attached to the bollard.
  3. If Bollards are required to be removable, the method of fixing is to be approved by the Engineer.
  4. Bollard colour to be traffic signalpole yellow.
  5. Reflective tape to face direction of approach travel.



NOTES:

1. All measurements in millimetres.
2. All text & symbols to be 3M 'sapphire blue'.
3. Background to be Dulux 'fawn'.
4. All fonts to be Helvetica medium.
5. City Care have template for sign.
6. Mounting height 2300 to underside of sign.