CHRISTCHURCH CITY COUNCIL

CONSTRUCTION STANDARD SPECIFICATION

PART 7 – LANDSCAPES

CSS: PART 7 2019

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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 most recently published versions of the following Parts:

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

2.0 RELATED DOCUMENTS

The latest versions of 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, except acts of parliament. Where this document is referred to in a contract, the requirements of that contract supersede the requirements of this specification.

Christchurch City Council Infrastructure Design Standards	https://www.ccc.govt.nz/consents-and-licences/construction-requirements/infrastructure-design-standards/download-the-ids/
Christchurch City Council Streamside Planting Guide	http://www.ccc.govt.nz/environment/water/waterways/waterway-restoration/
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. Recommendation

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

'Approved' in this document means:

- A material listed on the Approved Materials List, with a current Certificate Status and an Approval Status permitting that use;
- A Council-approved contractor authorised to do that specific work and listed on the relevant register;
- approved by the Engineer.

Schedules of approved materials and contractors can be found on the Christchurch City Council web page at:
www.ccc.govt.nz/consents-and-licences/construction-requirements/approved-materials-list/search/
www.ccc.govt.nz/consents-and-licences/construction-requirements/approved-contractors/

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

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

Landscape contractors shall be a member of the Registered Master Landscapers Association and/or hold the relevant horticultural qualifications and have proven experience and track record with similar projects. Acceptance of contractors shall be at the discretion of the Council, and contractors must be approved by the Council prior to works commencing.

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 do not have diseases, damage or structural defects.

4.2 Inspection and Acceptance

Acceptance of trees and plants shall be at the discretion of the Council.

The 'Tree Supply Inspection Form' appended shall be accurately used to certify that trees meet the requirements of this specification.

Where trees are not purchased by Council, the Supplier and the Purchaser/Contractor shall be responsible for their own quality control processes, and must ensure that trees and plant materials are of an acceptable quality as specified below.

Council recommends that trees be quality inspected by a Technician Arborist to ensure that trees comply with the required quality standards prior to planting.

In addition to any inspections and documentation, the Contractor shall be responsible for ensuring that trees are free of unacceptable defects at the time of planting.

Trees and plants that are not acceptable may be rejected by the Council following planting.

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 substantially free of pest or disease infestation.

- Injury

Trees shall show no substantial 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.

For tree stock 20L or less 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. Within container trees there shall be no evidence of movement of the stem within the rootball or evidence of large cracks within the rootball when the stem is

held at 25% of the height of the tree and rocked side to side. These tests shall be undertaken after any cane or other support 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 into maturity through formative pruning that promotes the tree's branching structure free from any major physical weaknesses. 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.

- Crown Symmetry

Crowns shall be free of co-dominant stems (multiple leaders). 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 tree 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, and some decurrent species may not have apical dominance and may have multiple leaders where true to type.

- 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 fails to produce interlocking wood grain at the branch apex and 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, Crataegus, Sorbus, Carpinus, and Fagus).

- 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 so they bond and continue to grow as one. 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 disease, pest infestation, decay and damage, and bends or twists that hinder plant development. Pruning shall be undertaken to internationally recognised horticultural standards, practices and procedures.

Container trees shall be weed free and moist.

- Root Direction

Tree roots shall grow in a generally outwards and downwards direction. Tree 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 gently lifted by the base of 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 or root ball.

- Height of Root Collar

The root collar shall be at or just below (i.e. $\leq$ 2 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 so they bond and continue to grow as one. 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 disease, damage and deformities that hinder plant development. 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. ≤ 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 costs related to tree or plant inspections are at the Contractor'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 for Council initiated projects shall be supplied by the Christchurch City Council's nursery, unless otherwise specified. For non-Council initiated projects, trees and plants may be supplied by the Christchurch City Council's nursery if sufficient stock is on hand. Where supplied by the Christchurch City Council, they have been pre-ordered and can be collected from the Nursery. All 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. 45L, and small grade plants 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, between the hours of 7.30am-3.45pm, telephone 941 6667 for small grade plants and telephone 941 7476 for open ground and container trees. The Contractor shall give at least twenty-four hours notice of the intended time of pick-up. Open ground trees will required a pre-agreed date for collection to allow adequate time for preparation.

The Contractor shall check the trees and plants at the nursery at the time of collection or upon delivery 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 as specified are thoroughly watered before they are transported from the nursery. Once trees and plants leave the nursery they are the responsibility of the Contractor unless otherwise agreed by the Engineer.

5.3 Transportation and Storage

All tree and plant material shall be carefully packed and protected during transport to the site to prevent damage. Where the tree is too long for the transportation vehicle the tops shall be rested against a padded "H" frame or similar to prevent damage occurring. 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 moist.

The delivery destination for the plants should have space with adequate storage conditions and provision for a suitable remote staging area for plants and other supplies.

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 from plants supplied by the Christchurch City Council's nursery must be returned to the 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 31 August (the planting season for trees). Planting may only occur outside these times with the approval of the Engineer.

Depending upon seasonal conditions, these dates may vary as instructed by the Engineer (for example planting trees from 1 May could be more suitable than early April). The Contractor shall cooperate with this.

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 the final locations of trees as the planting proceeds. The Contractor shall cooperate with this.

6.4 Container Trees

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

Balled and container grown trees 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 damaged during container removal or planting.

If trees are slightly pot bound the roots shall be loosened, pruned and spread out to ensure a natural and healthy growth pattern. Roots shall not be exposed to the sun or wind.

Trees that are found to have excessively pot bound and/or girdling, inadequate, damaged or otherwise defective root systems that cannot be mitigated at the time of planting shall be rejected.

6.5 Transplanted Trees

Transplanted trees shall be handled in accordance with a site specific methodology that is approved by the Engineer for the transplanting and re-establishment of the specified trees.

6.6 Tree Pit

Tree pits must be designed and constructed in association with the site and geotechnical conditions to ensure that the soil quality, volume, depth and drainage will be appropriate for successful tree establishment and long term tree growth and development.

Where existing site conditions will support long term tree growth and development, tree pits shall be at least two times the width of the root ball to be planted, with a depth of 1.5 times the depth of the root ball. Where required the bottom of the pit shall be forked over to an additional depth of 300mm to facilitate root penetration, air movement and free drainage. Backfill and site soil below the rootball shall be compacted using body weight or hand tamping to prevent post planting settlement. See SD 702 sheets 1 or 2 for standard installation details.

Backfill soil is to be unscreened topsoil lightly compacted by bodyweight, or specified tree pit soil mix. In some situations the existing site soil may be suitable for use where approved by the Engineer.

Where existing site conditions are unlikely to support long term tree growth and development, site specific tree pit design will be required (e.g. including increased soil volumes, drainage, etc).

When the tree pits are located in the street environment, the pit shall be square. When the tree pits are located in a park or reserve, the pit shall be round unless otherwise specified by the Engineer.

6.6.1 Tree Pits (hard surface areas)

Tree pits in hard surface areas such as urban streetscape areas shall be constructed as specified by the Engineer.

6.7 Planting

Trees shall be set upright in the centre of the pit at such a depth that the top of the root crown (buttress flair) is level with the surrounding ground surface within the tree pit. 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 pruned using sharp secateurs.

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. The tree shall be rejected where girdling roots constrict the vascular tissue in a stem and where their removal, or other defects that cannot be mitigated would compromise future growth patterns and/or structural integrity.

Loose roots shall be spread out in a radial fashion and the pit progressively backfilled with approved backfill soil, 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 and carefully.

Where specified, soil conditioners and/or fertilisers shall be applied as per the manufactures specifications and thoroughly mixed with the backfill soil prior to planting.

Each tree shall be watered thoroughly immediately 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. An Establishment Programme shall be produced by the Contractor and submitted to the Engineer for approval as part of the Contract Quality Plan.

The Establishment Programme shall be for a period of at least 24 months following practical completion acceptance, unless otherwise specified. Establishment tasks will mainly consist of monitoring moisture levels and the condition of the trees and plants, watering as and when required, replenishment of mulch including mulch matting, repair of support systems, weed control and other remedial actions, and producing Monthly Establishment Reports.

The acceptance criteria set out below is to be used to assess the trees throughout the establishment period. The Contractor shall be responsible for monitoring and reporting on the condition of the trees, and making recommendations for remedial works and provisions for replacement planting (within the specified tree planting season) as and where required.

A Monthly Establishment Report on tree/plant condition and establishment works undertaken shall be submitted to the Engineer within five days of the end of each month. A sample Landscape Construction Establishment Checklist is shown in the appendices. Information to be provided in this report is set out in clause 14.0 - Establishment.

6.9 Acceptance Criteria

The Contractor shall be responsible for ensuring that trees are free of unacceptable defects at the time of planting and maintained to an acceptable standard for the duration of the establishment period.

Trees shall:

- be healthy with no evidence of decline, defects or damage (e.g. dead/dying/diseased foliage/tips/branches, poor canopy shape, density or discoloured foliage that is uncharacteristic of healthy trees of the species, pests and diseases, poor/excessive pruning, structural defects, decay, mechanical damage, poor trunk taper, broken/fractured trunks, branches or roots)
- be located as specified
- be upright and firm in the ground
- have the top of the root crown (buttress flair) level with the surrounding ground surface within the tree pit
- be able to support themselves in an upright position without the use of canes or stakes
- be securely staked as specified where applicable
- have mulch as specified
- have tree pits that are free of weeds, litter and debris

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 and/or soil conditioner, tree planting and mulching of tree pits only. Excavation and filling of tree pits is paid separately.

Where a tree is not acceptable, all costs relating to the removal and replacement of the tree including replacement tree supply and establishment shall be at the Contractor's expense.

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.

The establishment of trees that require replacement at the end of the Defects Liability period or during the planting season immediately prior to the end of the Defects Liability period shall be at the Contractor's expense and for the duration of the specified establishment period (typically 24 months), unless the reason for replacement is through no fault of the Contractor. Where trees are not established by the Contractor, the costs will be at Council's unit rates. Costs will include but not be limited to removing defective trees, supply of replacement trees, planting, staking, mulching, tree establishment, and associated traffic management where applicable.

7.0 PLANTING OF SHRUBS, GROUNDCOVER 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 for shrubs, groundcover and wetland plants). 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 approved backfill soil, 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.

The plant holes shall be 25-50mm shallower than the root ball and the part of the root ball exposed shall be covered with a thin layer of soil.

Any waterway riparian planting shall be in accordance with the Streamside Planting Guide.

7.9 Establishment

Works to achieve establishment of the plants shall be carried out by the Contractor, in accordance with clause 14.0 - Establishment. An Establishment Programme shall be produced by the Contractor and submitted to the Engineer for approval as part of the Contract Quality Plan.

The Establishment Programme will mainly consist of watering, replenishment of mulch including mulch matting. This 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 Landscape Construction Establishment Checklist is shown in the appendices. Information to be provided in this report is set out in clause 14.0 - Establishment.

7.10 Acceptance Criteria

The Contractor shall be responsible for ensuring that plants are free of unacceptable defects at the time of planting and for the duration of the establishment period.

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.

Where a plant is not acceptable, all costs relating to the removal and replacement of the plant including replacement plant supply and establishment shall be at the Contractor's expense.

7.11.2 Additional Subgrade Modification

Additional subgrade modification shall be per m^2 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^2 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.

The establishment of plants that require replacement at the end of the Defects Liability period shall be at the Contractor's expense.

The establishment of plants that require replacement at the end of the Defects Liability period or during the planting season immediately prior to the end of the Defects Liability period shall be at the Contractor's expense and for the duration of the specified establishment period (typically 24 months), unless the reason for replacement is through no fault of the Contractor. Where plants are not established by the Contractor, the costs will be at Council's unit rates. Costs will include but not be limited to removing defective plants, supply of replacement plants, planting, mulching, establishment, and associated traffic management where applicable.

8.0 MULCHING

8.1 Scope of Work

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

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.

Where applicable, 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.

Where necessary, compacted soil shall be aerated by gently forking the soil in advance of the mulch application to improve drainage and limit prolong waterlogging on sites that make trees more susceptible to certain pathogens (such as Phytophthora spp.).

8.3 Mulch

Mulch shall be as specified.

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

The surface of the mulch shall be even and free of hollows.

The Contractor shall identify the origin of the mulch supplied. Materials derived from plant species that have naturally occurring toxicity should be composted for at least a month, preferably at a high temperature (c. 60 ºC), in order to make them innocuous. High-temperature composting should also be used to kill pests and pathogens.

Materials that cannot be detoxified, including those that have been contaminated by herbicides or other chemicals or in contact with a primary pathogen such as Phytophthora, shall not be used for mulching. Materials that have the potential for regrowth or the spread or weed species shall also not be used.

Mulch to tree pits in reserves shall be placed radially from the trunk of the tree to the diameter in the table. Mulch to tree pits in streets shall be spread to cover a square to the dimensions in the table.

Tree Size	Mulch Width Streets	Mulch Diameter Parks
25-45 litre	750mm	2000mm
100 litre	750mm	2000mm
150 litre	1800mm	2000mm
320 litre	2700mm	2700mm

Where the tree pit's mulch outside edge is within 300mm of the kerb or path, extend the mulch to that edge.

Mulch shall not touch the stems of plants. For plants a small circle shall be cleared (diameter of 50mm minimum) around the stem to avoid stem rot. For tress mulch shall be pulled back to 100mm off the trunk to prevent collar rot.

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

Topsoil shall not be present in the mulch during placement, planting or weeding.

Organic aggregate (e.g. wood chip, bark, etc) mulch shall not be placed below the flood levels of waterways or within regularly inundated tidal margins.

8.3.2 Wool Mulch Matting and Other Matting Type Mulches

Wool mulch matting and other matting type mulches shall be 100% biodegradable unless otherwise specified.

Unless specified otherwise, wool mulch matting and other matting type mulches shall be installed and maintained as outlined below:

Rolls shall be laid across the slope and pegged down with specified fixings. Fixings shall be at least 200mm long and shall be spaced at a minimum of 1.0m centres. The soil conditions and gradient may require

fixings 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 1m x 1m square mats shall be placed around individual plants. A fixing shall peg down these mats in each corner.

Repeat applications of wool mulch matting and other matting type mulches will be required, where the product is damaged, deteriorates or is otherwise not effective throughout the duration of the contract, including the Defects Liability Period.

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.

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 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, Other Matting Type Mulches, and Cardboard or Paper Mats

Wool Mulch, Other Matting Type Mulches, and paper or cardboard mats shall be in place, provide the specified coverage and be securely pegged down at Practical Completion, during the Defects Liability Period and at the issue of the Defects Liability Certificate.

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^2, to the nearest m^2. 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 and Other Matting Type Mulches

Wool mulch and other matting type mulches shall be paid by m^2, to the nearest m^2. 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 supply, 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, free of knots and other structural defects, 50mm x 50mm dimension, uniform in appearance, straight and finished to a uniform height. Stakes shall be driven into the ground outside the rootball to a depth sufficient to support the tree, shall be upright and immoveable.

All tree ties shall be jute (Hessian) to allow minor swaying movement without chafing of the stems and to allow the natural development of supportive 'reaction/adaptive wood' and a strong and even connection/transition to the supporting root system. Other tree ties shall be approved by the Engineer 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 800mm.

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 installed where trees are planted in close proximity to underground power cables, and shall be supplied and installed in accordance with SD 704 and IDS Part 10 Table 2 – Root barrier clearances, reproduced below. Each barrier shall be impermeable to penetration by roots and a minimum of 0.5mm thick.

The clearance between the tree and the cable of at least 2.0m for 400v cables and of at least 3.0m for 11kv cables shall be maintained where root barriers are not used.

When planting in closer proximity to 400v and 11,000v cables:

- A tree root barrier shall be installed within the minimum 1.0m clearance between the tree and the cables.
- The 3.0 metre continuous root barrier shall be placed centrally to the tree, as far as possible away from the tree (typically not within the tree pit) and a minimum of 300mm distance from the underground cables.
- The root barrier shall be at least 600mm deep.

IDS Part 10 Table 2 – Root barrier clearances 2018

Clearances from cable (to barrier) to tree				
Cable voltage (kV)	66	33	11	0.4
Minimum tree clearance without barrier (m)	5.0	5.0	3.0	2.0
Minimum tree clearance with barrier (m)	2.5	2.5	1.0	1.0
Minimum cable to barrier clearance (m)	2.0	2.0	0.3	0.3

The installation of root barrier may also be required in other locations 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 GRATES

11.1 Scope of Work

This specification is for the supply and installation of 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.

11.3 Measurement of Work and Basis for Payment

Tree grates and grate foundations 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 25.0 - 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^2, to the nearest m^2 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^2.

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 25.0 - 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^2, to the nearest m^2, 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 saw cutting and for the installation of battens.

13.9.2 Repair of Existing Lawn

Repair of existing lawn shall be measured by the m^2, to the nearest m^2, 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^2, to the nearest m^2, and shall include preparation, sowing and establishment.

13.9.4 Swales

Swales shall be measured by the m^2, to the nearest m^2, 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.

Establishment shall be for a period of at least 24 months following practical completion acceptance, unless otherwise specified.

Establishment will mainly consist of monitoring moisture levels and the condition of the trees and plants, watering as and when required, replenishment of mulch including mulch matting, repair of support systems, 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 producing Monthly Establishment Reports of the works carried out under this clause.

The most important factors are providing adequate moisture, mulch coverage and support systems, and eliminating competition from other vegetation. Throughout the establishment period, the Contractor shall regularly visit the site as and when necessary, and carry out works required to ensure successful plant/tree establishment.

Details of the proposed methods and frequency of such activities, and the reporting of these, shall be set out in the Establishment Programme as outlined in the Contractor's Contract Quality Plan.

14.2 Watering

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 45L grade and 500mm from the trunk

for 100L grade trees. Moisture contents for trees above 100L 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 and surrounding soil. For 100L grade trees or larger, 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 may be required three times per week during summer months (October – March inclusive).

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

At the end of the defects liability period tree pits, mulched plant beds, unmulched revegetation zones, and wetlands shall be free of weeds. During the defects liability period the following shall apply unless otherwise approved by the Engineer.

14.3.1 Trees

Weed control shall be frequent enough to prevent weed species flowering and seeding. At no time shall any individual weed be larger than 100mm. Weeds that are 50mm or more 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 handover 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. Weeds that are 50mm or more 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.

The Contractor (herbicide users) shall follow the manufacturer's specifications and comply with all the herbicide instructions and directions on the label completely.

At handover all mulched plant beds shall be free of weeds.

14.3.3 Unmulched and Revegetation Zones

Weed control shall be frequent enough to prevent weed species flowering and seeding. Weeds shall not encroach within 0.5m of the centre of any plant. At no time shall any individual weed be larger than 250mm.

Weeds shall be controlled manually within this area unless otherwise approved by the Engineer. 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.

At handover all mulched plant beds shall be free of weeds.

14.3.4 Wetlands

Weed control shall be frequent enough to prevent weed species flowering and seeding. Weeds shall not encroach within 0.5m of the centre of any plant. At no time shall any individual weed be larger than 250mm.

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 $0.5m^3$ may be removed from site immediately.

At handover all wetlands shall be free of weeds.

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 (excluding trees), 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 or periods that favour pathogens

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 access ways and hard surfaces

14.6.2 Pruning of Trees

All tree pruning shall be undertaken by a qualified and experienced Works 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 and shall be documented in the Monthly Establishment Report.

14.7 Plant/Tree Vandalism, Losses and Replacement

14.7.1 Vandalism and Theft of Plants/Trees

Any plants and trees 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/trees shall be removed and replaced where instructed by the Engineer.

Plant or tree 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, trees or other landscape works lost due to theft, wilful damage or vandalism.

14.7.2 Losses

Where the Contractor has provided adequate establishment work, the Engineer may determine losses of a single species greater than 25% are due to extreme weather or other reasons outside of the Contractor's control, 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 establishment of plants and trees that require replacement at the end of the Defects Liability period or during the planting season immediately prior to the end of the Defects Liability period shall be at the Contractor's expense and for the duration of the specified establishment period (typically 24 months), unless the reason for replacement is through no fault of the Contractor.

Where plants/trees are not established by the Contractor, the costs will be at Council's unit rates. Costs will include but not be limited to removing defective plants/trees, supply of replacement plants/trees, planting, staking, mulching, tree establishment, and associated traffic management where applicable.

The Engineer may order replacement of plants/trees that require replacement through no fault of the Contractor.

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

14.8 Lawn Vandalism and Damage

The Contractor shall be responsible for any lawn/berm 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/tree/grassed area 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 plants/trees, landscape and grassed areas. A sample Landscape Construction Establishment Checklist form is shown in the appendices.

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

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

14.10 Measurement of Work and Basis of Payment

Establishment shall include watering, replenishment of mulch including mulch matting, repair of support systems, 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, 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^2 of plant bed per month.

14.10.3 Replacements
The supply and planting of replacement plants/trees 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.

15.0 RESERVE FENCING

15.1 Scope of Work

This specification is for the supply and installation of post and cable or post and chain fence. It shall include entrances where specified.

15.2 Construction

Fences shall comply with SD 714, SD 715 or SD 716, as specified.

15.3 Measurement of Work and Basis for Payment

Fences shall be paid per lineal metre, to the nearest metre. They shall include supply of all materials, footings, installation and restoration.

16.0 AS-BUILT RECORDS

The Contractor shall provide Council with as-built records to the requirements set out in CSS: Part 1 clause 5.0 – Quality Assurance.

LANDSCAPE CONSTRUCTION ESTABLISHMENT CHECKLIST (EXAMPLE)
(To be included as part of the Contractor's Monthly Establishment Reports)

Contract Name & No: _____

Site Name/Description: _____

Contractor: _____

Defects Liability Period: **From:** _____ **To:** _____

Date of Visit: _____ **Signed:** _____

Activity	Checked	Actions Required/Comments	Actions Completed
Watering			
Mulch			
Stakes/Ties			
Weed Control			
Litter Removal			
Turf/Lawn Management			
Other			

Issues Identified (e.g. Vandalism, Decline, Pests and Diseases, Losses and Damage and Likely Causes, etc)	
Details	
Action Taken	
Photographs	

COMPLIANCE REQUIREMENTS CHECKSHEET - LANDSCAPE

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
1		**SUPPLY OF PLANT MATERIALS**						
	Pt 7, 4.3	Trees	Inspect	Grade, species and provenance as specified. Healthy, vigorous and sturdy, well grown, prepared for planting, no evidence of decline, defects or damage.				
	Pt 7, 4.4	Plant Materials	Inspect	Grade, species and provenance as specified. Healthy, vigorous and sturdy, well rooted, no evidence of decline, defects or damage.				
2		**TRANSPORT OF PLANT MATERIALS**						
	Pt 7 5.2	Handling	Inspect	Handled with care, thoroughly watered.				
	Pt 7 5.3	Transportation	Inspect	Not damaged, stems, foliage and roots protected.				
	Pt 7 5.3	Storage	Inspect	Planted within 48 hours. Protected and watered for intervening period.				
3		**PLANTING TREES**						
	Pt 7 6.2	Timing	Inspect	Planted between 1/04 and 31/8, unless otherwise approved.				
	Pt 7 6.3	Planting positions	Inspect	Complies with plan.				
	Pt 7 6.4	Container trees	Inspect	Thoroughly moistened before planting.				
	Pt 7 6.5	Transplanted trees	Inspect	Complies with site specific methodology.				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 7 6.6	Tree pit construction	Inspect/ Measure	Dimensions and treatment appropriate for tree size and site conditions.				
	Pt 7 6.6	Installation	Inspect/ Measure	Complies with SD where applicable				
	Pt 7 6.6	Planting	Inspect	Rootball level with surrounding ground, roots spread and voids filled, tree firm, watered, staked and mulched.				
	Pt 7 6.9	Tree acceptance criteria	Inspect	Located as specified, upright, firmly in ground, self-supporting, healthy with no evidence of decline, defects or damage, staked where applicable.				
4		**PLANTING SHRUBS GROUNDCOVER, WETLAND PLANTS**						
	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 of 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	Located as specified, upright, firmly in ground, planted at correct levels, healthy with no evidence of decline, defects or damage.				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
5		**MULCHING**						
	Pt 7 8.2	Grass removal	Inspect	Remove by hand or standing dead.				
	Pt 7 8.2	Herbicide application	Inspect	Used only where specified, complies with CSS Part 2, sanding dead vegetation prior to mulch application.				
	Pt 7 8.3	Mulch material	Inspect/ Measure	Complies with applicable specification				
	Pt 7 8.3.1	Mulch placement	Inspect	+0mm, -25mm surrounding surface, 100mm depth, no topsoil present, organic aggregate not placed below flood or tide level.				
	Pt 7 8.3.1	Mulch placement to tree pits and plant beds	Measure	Consolidated depth of 100mm, to table dimensions.				
	Pt 7 8.3.1	Mulch placement to trees and plants	Measure	Clear of plant stems by 50mm, clear of tree trunks by 100mm.				
	Pt 7 8.3.2	Wool mulch matting and other mulch matting	Inspect/ Measure	100% biodegradable unless otherwise specified, located where specified, securely pegged down, 200mm long fixings at 1m centres, 100mm overlap, top edge on top.				
	Pt 7 8.3.3	Cardboard/paper	Inspect	Located where specified, securely pegged down, no herbicide under mats.				
	Pt 7 8.4	Surface boxes adjustment	Inspect	Complies with CSS Part 1, accessible, adjusted and repainted as specified.				
	Pt 7 8.5	Mulch acceptance criteria	Inspect	Complies with specification.				
6		**STAKING**						

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 7 9.2	Tree stakes	Inspect/ Measure	Complies with specification and SD, or as otherwise specified.				
	Pt 7 9.3	Identification stakes	Inspect/ Measure	Installed at time of planting, untreated timber, under 1m.				
	Pt 7 9.4	Stem protector materials	Inspect/ Measure	150mm diameter, flexible corrugated perforated PVC pipe, to specified length.				
	Pt 7 9.4	Stem protectors - trees	Measure	300mm long, secured to ground.				
	Pt 7 9.4	Stem protectors - shrubs	Measure	200mm long, secured to ground.				
7		**ROOT BARRIERS**						
	Pt 7 10.2	Materials	Inspect/ Measure	Complies with SD 704, or as otherwise specified.				
	Pt 7 10.2	Installation	Inspect	Located and installed as specified.				
8		**TREE GRATES**						
	Pt 7 11.2	Construction	Inspect/ Measure	Complies with SD, or as otherwise specified.				
9		**TURF SUPPLY AND LAYING**						
	Pt 7 12.2	Turf materials	Inspect/ Measure	Good quality, weed free, +20mm thick, grass as specified, holds together.				
	Pt 7 12.3	Surface boxes adjustment	Inspect	Complies with CSS Part 1, accessible, adjusted and repainted as specified.				
	Pt 7 12.4	Laying	Inspect/ Measure	Stretcher bond pattern, on 25mm cultivated topsoil, with levelling soil underneath.				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 7 12.4	Laying	Inspect/ Measure	Laid within 36 hours of lifting, kept damp, fertilised prior to watering, watered until top 50mm of soil is wet.				
	Pt 7 12.6	Turf acceptance criteria	Inspect/ Measure	Even healthy sward, uniform 25mm – 50mm height, no hollows or stones, ground covered, no weeds.				
10		**SOWING LAWN**						
	Pt 7 13.2	Seed mixture	Inspect	Complies with specification. Certificate received, seed less than 12 months old.				
	Pt 7 13.3	Sowing weights	Inspect/ Measure	Uniform 30g/m^2 berm, high profile, 20g/m^2 other lawn, swale, 50kg/ha pasture.				
	Pt 7 13.3	Sowing method	Inspect/ Measure	Cultivated to 20mm, lightly consolidated, fertilised (excluding waterway areas), erosion avoided.				
	Pt 7 13.4	Hydroseeding materials	Inspect/ Measure	Complies with specification, +75% wood fibre.				
	Pt 7 13.4	Hydroseeding application	Inspect/ Measure	+5mm depth, 200kg/1000m2 berms, overspray removed promptly.				
	Pt 7 13.5	Surface boxes adjustment	Inspect	Complies with CSS Part 1, accessible, adjusted and repainted as specified.				
	Pt 7 13.7	Sown acceptance criteria - lawn	Inspect/ Measure	Even healthy sward, uniform 25mm – 50mm height, no hollows or stones, 90% ground covered, <10% weeds, bare areas <30mm diameter.				
	Pt 7 13.7	Sown acceptance criteria - swales	Inspect/ Measure	Even healthy sward, uniform 50mm – 150mm height, no hollows or stones, 90% ground covered, <10% weeds, bare areas <30mm diameter.				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
11		**ESTABLISHMENT**						
	Pt 7 14.2	Watering	Inspect/ Measure	Plants maintained in healthy condition. Tree soil have 20-30% average volumetric water content.				
	Pt 7 14.3.1	Weed control - trees	Inspect/ Measure	No flowering or seeding weeds. Control individual weeds under 100mm height or spread, <5 weeds/m^2 over 50mm height or spread. Herbicide use CSS: Part 2.compliant. Free of any weeds at handover.				
	Pt 7 14.3.2	Weed control – mulched plant beds	Inspect/ Measure	No flowering or seeding weeds. Control individual weeds under 100mm height or spread, <5 weeds/m^2 over 50mm height or spread. Herbicide use CSS: Part 2.compliant. No damage to plants. Free of any weeds at handover.				
	Pt 7 14.3.3	Weed control – unmulched planting	Inspect/ Measure	No flowering or seeding weeds. No weeds within 0.5m of plants. All weeds under 250mm height or spread. Area hand weeded, unless otherwise specified. No damage to plants. Free of any weeds at handover.				
	Pt 7 14.3.4	Weed control – wetlands	Inspect/ Measure	No flowering or seeding weeds. No weeds within 0.5m of plants. All weeds under 250mm height or spread, hand weeded within 1m of waterway. Natural meanders kept in channel. Vegetation left on river bank 24 hours. Free of any weeds at handover.				
	Pt 7 8.3	Mulch management	Inspect/ Measure	Decomposed tree chip, cambium grade bark, bark nuggets, crushed shell, other medium				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
				consolidated depth of 100mm, with specified clearance from stems/trunks.				
	Pt 7 8.3	Mulch management	Inspect/ Measure	Wool mulch matting and other matting type mulches reapplied where damaged or deteriorated around specimen trees and other area where specified.				
	Pt 7 9.0	Staking	Inspect	Stakes immovable and tree ties securely fastened, with no damage to trunks.				
	Pt 7 14.4	Pests and diseases	Inspect	Infestations reported promptly.				
	Pt 7 14.5	Rubbish and litter	Inspect	Landscape areas, tree pits, berms and swales free of rubbish and litter.				
	Pt 7 14.6	Pruning – shrubs/plants	Inspect	Shrubs/plants healthy, vigorous, not damaged, well-shaped, sight lines, signs clear.				
	Pt 7 14.6.2	Pruning – trees	inspect	Pruning to specified arboricultural standards, Arborist qualified and details provided in CQP.				
	Pt 7 14.7.1	Vandalism	Inspect	Reported promptly and recorded.				
	Pt 7 14.7.3	Replacements	Inspect	Specified trees/plants, within planting season.				
	Pt 7 13.7	Turf and Lawn Establishment	Inspect/ Measure	Even healthy sward, uniform 25mm – 50mm height, no hollows or stones, 90% ground covered, <10% non-specified grasses and weeds, bare areas <30mm diameter.				
	Pt 7 14.8	Lawn vandalism	Inspect	Reported promptly.				
	Pt 7 14.9	Establishment report	Inspect/ Measure	Accurate and adequate reporting detail, submitted within 5 days of end of month.				

TREE SUPPLY INSPECTION FORM

This form shall be completed prior to shipping and sent by the supplier to the purchaser/contractor. It must be signed off by both the supplier and purchaser/contractor before trees are planted.

Name and address of nursery supplier:		
Purchaser/Contractor:	Developer …….. Council □ Other (name) ……..	
Date of departure from nursery:		
Date of arrival in Christchurch:	To site ……. Other ……..	
Number of trees/plants sent:	Species:	Container volume: (Litre or PB)
Labelling of trees/plants correct:	Yes □ No □	

	YES	NO	is it correctable?	Details of corrections
Below ground assessment				
Roots free of damage / decay				
Root direction outwards, downwards				
Height of root collar correct				
Root ball free of circling roots				
Root collar free of girdling roots				
Above ground assessment				
Health and vigour acceptable				
Pest, diseases and injuries free				
Trunk free of damage				
Self-supporting				
Passed stem bending tests				
Pruning acceptable				
Apical dominance acceptable (typical of species)				
Crown symmetry acceptable				
Included bark absent/acceptable				
Trunk position in bag/pot acceptable				
Graft unions compatible				
Free of weeds				

Conformance with specification

Does the above assessment conform to the CSS: Part 7 Landscapes, clause 4.0 Supply of Tree and Plant Material? Yes □ No □

If no, please outline details: ……

Supplied by: (Name and signature of nursery inspector)	
Date:	
Accepted by: (Name and signature of purchaser/contractor)	
Date:	