CHRISTCHURCH CITY COUNCIL

CONSTRUCTION STANDARD SPECIFICATION

PART 2 – EARTHWORKS

CSS: PART 2 2022

TABLE OF CONTENTS

APPENDICES

1 Compliance Requirements Checksheet

STANDARD DETAILS

Berm Construction	SD 201	Berm Construction

1 FOREWORD

This Specification forms Part 2 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 Standard (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

Each part of the Standard Specification includes those Standard Details (SD) relating to that 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 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 Standard 2022

https://www.ccc.govt.nz/consents-and-licences/construction-requirements/infrastructure-design-standards/download-the-ids/

NZS 4431: 1989	Code of practice for earth fill for residential development
NZS 8409: 2021	Management of agrichemicals
AS/NZS 3000:2018	Electrical installations - Selection of cables - Cables for alternating voltages up to and including 0.6/1 kV - Typical New Zealand installation conditions
AS/NZS 2032: 2006	Installation of PVC pipe systems
AS/NZS 2033: 2008	Installation of polyethylene pipe systems
AS/NZS 2845.3: 2020	Water supply - Backflow prevention devices - Field testing and maintenance of testable devices

Environment Canterbury Erosion and Sediment Control Toolbox for Canterbury
http://esccanterbury.co.nz

The New Zealand Building Code Handbook and Approved Documents

3 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.

4 PROTECTION OF NATURAL ASSETS AND HABITATS

Note that all work adjacent to and affecting natural assets and habitats shall be carried out in accordance with the requirements of CSS: Part 1 - General. Any works carried out in waterways, or in a waterway setback, shall be in accordance with the Environment Canterbury Erosion and Sediment Control Guidelines.

5 SITE CLEARANCE

Unless otherwise specified, all vegetation and material shall be cleared from the site, removed and disposed of in a safe and legal manner. Areas where planting is to take place shall be cleared of all building materials, rubble, stones and refuse including glass, plastic, concrete etc to the satisfaction of the Engineer.

Removal of existing vegetation with herbicide shall precede cultivation by at least 14 days, unless otherwise specified. Herbicide use shall conform to clause 6.0 – Pesticide, Herbicide and Fertiliser Application. It is recommended that rank growth be trimmed to a maximum height of 100mm and the area left until fresh regrowth is apparent prior to spraying. This will reduce required spray rates and enhance the effectiveness of the spraying.

Refer to CSS: Part 1 clause 20.0 Environmental Management Plan for works in HAIL sites.

5.1 Measurement of Work and Basis of Payment

Site Clearance shall be paid as a lump sum. This shall include the removal of all vegetation, disposal off site, payment of any disposal fees and spraying of vegetation, unless otherwise specified. The removal of trees shall be a separately scheduled item.

6 PESTICIDE, HERBICIDE AND FERTILISER APPLICATION

6.1 Scope of Work

This specification is for the use of pesticides, herbicides, and fertilisers and their application.

6.2 Safety

All pesticides and herbicides shall be applied in strict accordance with NZS 8409 "Code of practice for the management of agrichemicals" and the manufacturer's instructions. Where appropriate, use of pesticides and herbicides shall comply with the relevant Land and Water Regional Plan rule. Anything that does not meet the regional plan rules will need a resource consent from Environment Canterbury.

Prior to the commencement of work, the Contractor shall present proof to the Engineer, in the Contract Quality Plan, that supervisory staff hold a current advanced applicator's qualification and that all staff applying pesticides and herbicides hold a standard applicator's qualification.

6.3 Pesticides and Herbicides

Pesticides and herbicides shall be specified.

Use of herbicides shall be strictly controlled to prevent bank instability due to a lack of vegetation.

In general, herbicide shall not be used to control vegetation alongside waterways where the vegetation is maintained by the adjacent landowner. This particularly applies to private property, enhancement areas and road frontages.

6.4 Application

The Contractor shall ensure that no pollution of any watercourse or water supply occurs during spraying operations and shall be held responsible for any such pollution. The Contractor shall make good any damage caused by pollution, drift or excessive rates of application and shall be held responsible for any claims for compensation arising from their actions or omissions.

Before boom spraying of turf areas, the Contractor shall notify the Engineer, giving at least two days' notice of their first intention and eight hours of their final intention.

6.5 Notification and Signage

Further to NZS 8409 "Code of practice for the management of agrichemicals", signs shall have a surface area of 0.5m^2 and shall be white with black lettering. Lettering shall be 70mm high and shall say 'Park/area Closed for Turf/weed Spraying, for inquiries contact (Contractor's Name and 24 hour phone number)'.

Notification through newspapers, publicity leaflet drop or door-to-door notification is not required unless specified.

6.6 Measurement of Work and Basis of Payment

Pesticide, herbicide and fertiliser application will be measured per m^2, to the nearest m^2. Application shall include the provision of signage and staff monitoring of sprayed areas.

7 IRRIGATION

7.1 Scope of Work

This specification is for the supply and installation of irrigation reticulation.

7.2 Installation of Water Reticulation

All work shall be carried out in accordance with CSS: Part 4 – Water Supply unless otherwise specified.

7.3 Materials

On sloping sites, where sprinklers on the same line have an elevation difference of more than 300 mm, the sprinklers shall incorporate a built-in check valve.

All automatic valves shall be slow closing. For ease of maintenance, systems should preferably contain one brand of fittings.

Trenches shall be free from any objects that could compromise the bedding or endanger the integrity of the pipes.

7.3.1 Length of Open Trench

The Contractor shall not have more than 10 metres of trench open when offsite.

7.3.2 Bedding

Where specified, PVC-U pipes shall be laid on a minimum 50mm of specified bedding and shall be uniformly supported throughout their length.

7.3.3 Cover Over Pipes

The top of the pipe shall have not less than 300mm cover at all times, unless approved by the Engineer.

7.4 Cleanliness

Open pipes shall be blocked off each night after the day's work to prevent debris from entering the system.

7.5 Installation

7.5.1 Pipelaying

Pipe shall be installed within 300mm of the specified location and with the minimum specified cover.

7.5.2 Jointing

Cleaning fluid shall be used prior to gluing of PVC pipes and joints.

7.5.3 Fittings

Backflow preventers shall be installed in accordance with Section G12 AS1 (3.6.3 & 4) of the "New Zealand Building Code Handbook and Approved Documents".

All backflow preventers shall undergo a commissioning test in accordance with AS/NZS 2845.3 "Water supply - Backflow prevention devices - Field testing and maintenance" testing instructions at the time of installation. All tests shall be recorded, with the specified backflow preventer reference number, on Appendix G & H of AS/NZS 2845.3 and the results forwarded to the Engineer.

Sprinkler units shall be installed at the correct level in accordance with the manufacturer's specifications.

7.5.4 Surface Boxes

Surface boxes shall be firmly bedded and accurately positioned. The box shall protrude not more than 5mm above the surface and shall lie parallel to the plane of the finished surface. Solenoid valve boxes shall be buried with the lid a minimum of 75 mm below ground level.

7.5.5 Thrust Blocks

A concrete thrust block shall be constructed in accordance with CSS: Part 4 clause 12.5 – Thrust Blocks.

7.6 Wiring

All wiring shall comply with the AS/NZS 3000 "Electrical installations - Selection of cables Part 1.2: Cables for alternating voltages up to and including 0.6/1 kV - Typical New Zealand installation conditions".

Wire shall run in continuous lengths between the controller and the first valve and between valves. Wire joints shall be located in the valve boxes. All joints shall be adequately sealed against moisture penetration.

Wires shall be laid where possible below or beside the pipe reticulation system in a common trench. Sufficient wire shall be left at valves to enable future replacement of valves without the need for excessive jointing of wires.

7.7 As-Built Records

The Contractor shall ensure that any electrical wiring that is not installed concurrently in the water trench is picked up.

This pickup shall occur in accordance with CSS: Part 4 clause 20.0 – As-Built Records and IDS: Part 12 – As-Built Records.

7.8 Backfill

The Contractor shall notify the Engineer 24 hours prior to commencing backfilling. Backfill shall be in accordance with CSS: Part 1 - General, including compaction. Backfill shall be the specified imported material, unless the Engineer approves the use of the excavated material as backfill.

7.8.1 Bedding

Bedding shall be placed to a depth of 100mm over the pipe, where specified.

7.8.2 Metallic Detector Tape

A metallic detector tape, printed with the words "Water Pipe Below", shall be laid 150 to 250 mm below the finished surface over the installed pipe, where specified.

7.8.3 Restoration

In lawn areas a minimum 150mm of topsoil shall be placed to cover the trench. The trench shall be sown with the specified lawn seed and established in accordance with CSS: Part 7 - Landscapes. The finished grassed surface shall be in accordance with the requirements of clause 9.0 – Topsoil Placement.

The trench may be overfilled at construction to allow for settlement. The criteria set out in clause 9.5 – Topsoiling and Cultivation will therefore only apply to depressions at this stage.

In other areas metalcourses, final surfacing and the finished surface shall be in accordance with the requirements of CSS: Part 6 - Roads.

7.9 Operation of the Irrigation System

The Contractor shall provide the Engineer with an operating manual for the controller and operating instructions for the complete irrigation system.

7.10 Measurement of Work and Basis of Payment

Irrigation shall be paid as a lump sum unless otherwise specified.

7.10.1 As Built Records

There will be no additional payment for the provision of as-built records.

7.10.2 Operation of the Irrigation System

There will be no payment for the provision of instruction in the operation of the irrigation system.

8 EARTHWORKS

8.1 Scope of Work

This specification is for excavation, filling and grading prior to placement of topsoil in accordance with the following specification.

8.2 Site Management

The Contractor shall carry out the works to prevent water contamination, protect the existing subsoil structures and prevent excessive soil structural damage and avoid creating a dust nuisance. The Contractor shall restrict earthmoving machinery and stockpiles to areas and routes agreed with the Engineer. Full restoration of trafficked routes and stockpile sites shall be carried out at the completion of the works.

This clause shall be read in conjunction with CSS: Part 1 - General, particularly clause 20.0 - Environmental Management Plan. If the requirement to adhere to relevant Regional and District Council Rules and/or Consents cannot be met, the Contractor may obtain resource consent for these works, at their cost.

The Contractor shall use alternative plant, alter the mode of operation and/or cease operations where pugging, sponging or plasticity of the site's soils occurs. Earthworks shall not be carried out if the weather conditions are unsuitable. Work involving soil handling must not continue during rain, drizzle or any other free water conditions except for work within waterways or excavations below groundwater.

The Contractor shall protect all cut and fill surfaces for the duration of the contract and defects liability period. Excessive waterlogging of surface materials and the concentration of stormwater over sloped batters shall be prevented. If necessary the Contractor shall immediately make good, at their cost, any erosion/slumping that occurs as a consequence of the weather or from stream flows in waterway works.

8.3 Topsoil Stripping

Unless otherwise specified existing topsoil and peat shall remain the property of the Principal.

The Contractor shall determine the topsoil depth prior to stripping. Topsoil shall be stripped from all earthwork areas in a separate operation and handled and stockpiled separately to avoid contamination with subgrade or unsuitable materials.

8.4 Excavation

Excavation shall be as specified. Excavation beyond the limits specified shall be made good in accordance with the Engineer's requirements and at the Contractor's cost.

It is the Contractor's responsibility to ensure they fully understand the extent of any earthworks required. The Contractor shall check the specification for any site-specific requirements.

No stripping or stockpiling shall be undertaken without the approval of the Engineer.

Works within water or below the water table may require short term stockpiling of saturated material to allow drying before placement as fill or trucking to waste.

Proposed topsoiled areas in existing carriageways (or otherwise unsuitable material) shall be excavated down to natural or suitable ground where possible, but total excavations (for construction plus undercut) shall not exceed 225mm in lawn areas, 600mm in plant beds and up to a depth of 1000mm for tree pits. The subgrade must also allow adequate drainage; therefore impermeable soils below these levels shall be ripped or broken.

Where granular road construction metals still exist below these levels, the Contractor shall inform the Engineer. The Engineer may instruct the Contractor to remove the remaining road construction metals and rip to 500mm depth, or add silt loam material, which shall be mixed to the full depth of the metals to ensure planting areas above are not excessively drained.

Where underground services are put at risk by subsoil ripping, the ripping shall not be undertaken.

Where the excavation for new berm is within existing sealed areas the seal shall be cut prior to excavation and battens shall be installed along the edge of the sealed area. Battens and any repairs to the sealed area shall be carried out in accordance with CSS: Part 6 - Roads.

8.5 Unsuitable Foundations

The Contractor shall advise the Engineer of any areas considered unsuitable as foundations. These may include former dump areas, within drain inverts, under

heavy vegetation, behind timbering or redundant metalcourses under proposed landscape areas. The Engineer may order the removal of these unsuitable foundations.

8.6 Springs

Should any springs be uncovered during excavation work, they shall be protected and the Engineer notified.

8.7 Filling

All controlled filling shall be carried out in accordance with NZS 4431 "Code of practice for earth fill for residential development" section 8 'Construction Procedures' excluding requirements for 'Revegetation' (clause 8.5), which shall be specified.

Technical responsibilities, choice of and quality control of filling material, inspection and control of filling and final certification shall be as specified.

Prior to placing uncontrolled fill over pasture, the existing grass shall be cut as short as possible and clippings removed.

8.8 Grading

Final formation shall be regular, pleasing to the eye, within the specified tolerances of the levels shown, unless otherwise required.

Grades not otherwise indicated on the plans shall generally be even, flowing slopes between paths, kerbs and other points. All grading and shaping of land shall provide effective surface drainage.

For grass slopes where mowing maintenance will be required there shall be a maximum gradient of 19%.

Minor shaping may be required to soften and naturalise the landscape, beyond the specified engineering profiles. Final shaping works shall ensure that there is a smooth transition between changes in slope to ensure that on-going lawn mowing maintenance is not compromised. The Contractor shall co-operate fully in implementing final shaping works.

8.9 Measurement of Work and Basis of Payment

Quantities scheduled are solid measure based on contours, longitudinal sections and cross-sections. No allowance has been or will be made for bulking or saturation of cut material. Stockpiling of saturated material prior to placement or disposal and minor shaping shall be included in the rates. Any major reshaping ordered shall be treated as a variation.

Payment shall be per lump sum for total cut and fill items 8.9.3, 8.9.4 and 8.9.5. The Contractor shall satisfy themselves that the quantities proposed for cut and fill items are correct prior to formal contract agreement or other agreed period.

Truck measure will not be accepted as proof of variation of quantities.

8.9.1 Site Management

Site management shall be paid as a lump sum where specified, otherwise site management shall be included in the rates for the relevant items being constructed. The rate shall include any measures necessary under 'Water Contamination and Control' and 'Dust Nuisance' and shall cover the period from the commencement of the work until the issue of the Defects Liability Certificate.

There will be no additional payment for restrictions imposed on the Contractor under clause 8.2 – Site Management.

No increased payment shall be granted for extensions of time due to weather conditions but a pro-rata payment may be approved where variations sought by the Engineer specifically require an extended period of site management.

8.9.2 Topsoil Stripping

Topsoil stripping shall be paid by m^2, to the nearest m^2. The rate shall include excavation and stockpiling where necessary.

8.9.3 Cut to Waste

Cut to waste shall be measured by the m^3 solid volume excavated, to the nearest m^3, and shall be paid by lump sum, as detailed above. The rate shall include any dewatering or drainage control necessary, excavation and disposal off site.

Stumps encountered shall be considered part of the cut to waste material and shall not be cause for additional payment.

8.9.4 Cut to Fill

Cut to fill shall be measured by the m^3 solid volume placed, to the nearest m^3, and shall be paid by lump sum, as detailed above. The rate shall include any dewatering or drainage control necessary, excavation, stockpiling where necessary, scarification of underlying or intermediate layers of fill, placement to design levels in layers, compaction and minor shaping where required.

Cut to stockpile shall also include transport.

8.9.5 Imported Fill

Imported fill shall be paid by the m^3 solid volume placed, to the nearest m^3. The rate shall include any dewatering or drainage control necessary, excavation, supply, placement to design levels, compaction and minor shaping where required.

8.9.6 Unsuitable Foundations

The excavation of unsuitable foundations shall be paid per m^3 solid volume of excavation approved, to the nearest m^3, and shall include disposal.

Measurement of excavation for unsuitable foundations shall be by using the agreed dimensions.

Extra excavation of road metal (unsuitable foundations) under berms, plant beds and tree pits shall be paid by the m^3 as above or by m^2 excavated to the specified depth, as scheduled. Excavation shall include the disposal of the excavated material.

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

8.9.7 Testing

Testing of fill materials that show compliance with the specified requirements shall be paid as specified.

8.9.8 Excavation of Plant Beds

Excavation of plant beds shall be paid per m^2 excavated to the specified depth, to the nearest m^2. Excavation shall include the disposal of the excavated material.

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

8.9.9 Excavation of Tree Pits

Excavation of tree pits shall be included in the rate for topsoil placement to tree pits. Excavation shall include the disposal of the excavated material.

As bituminous materials may require disposal separately from other hardfill, the excavation and disposal of this material is scheduled separately.

9 TOPSOIL PLACEMENT

9.1 Scope of Work

This specification is for the preparation of the subgrade, the placement of recovered or imported topsoil or structural soil and cultivation prior to planting or sowing.

9.2 Ripping, Cultivation and Scarifying

Once subgrade levels are formed, soil areas shall be ripped to 500mm depth unless a lesser depth of cultivation is specified. Impermeable surfaces below landscape areas shall be ripped or cored to facilitate drainage. Areas that will be filled in accordance with NZS 4431 "Code of practice for earth fill for residential development" shall not be ripped.

Ripping and cultivation should generally conform to the contours of the land. Ripped areas shall be scarified to facilitate bonding of the growing medium and the subgrade.

Care shall be taken not to disturb the roots of plants that are to be retained.

The Engineer shall inspect the subgrade prior to placing of topsoil.

9.3 Preparation of Existing Landscape or Grassed Areas for New Lawn

Spray the specified herbicide to achieve total vegetation kill in accordance with clause 6.0 – Pesticide, Herbicide and Fertiliser Application. Where existing topsoil is of sufficient depth and quality, cultivate to an even depth of 75mm in berms and 100mm elsewhere to produce a fine tilth and an even surface.

Topdress any hollows with topsoil prior to seedbed preparation and sowing.

Where existing topsoil is of a substandard quality or is non-existent, a topsoil layer shall be provided to the specified depth.

9.4 Preparation of Existing Landscape or Grassed Areas for New Planting Beds

Spray the specified herbicide to achieve total vegetation kill in accordance with clause 6.0 – Pesticide, Herbicide and Fertiliser Application. Where existing topsoil is of sufficient depth and quality, cultivate to an even depth of 200mm to produce a fine tilth and an even surface.

Where existing topsoil is of a substandard quality or is non-existent, a topsoil layer shall be provided to the specified depth.

9.5 Topsoiling and Cultivation

New lawn shall incorporate a minimum of 75mm consolidated thickness of first grade topsoil, unless specified otherwise. Planting beds shall incorporate a minimum of 300mm consolidated thickness of first grade topsoil, unless specified otherwise. No topsoil placement shall occur without the approval of the Engineer.

Formed subgrades shall not hold water. Stones or other debris greater than 30mm in any dimension and present on the surface shall be removed from site, unless otherwise approved.

The mixed material shall have a consistent appearance. The soil when moist shall be able to be cored to a depth of 200mm in lawn areas and to a depth of 500mm in planted areas, using a 25mm diameter hand held soil sampler.

9.5.1 Berms

Topsoil and subgrade placement and treatment shall be in accordance with SD 201 for lawn areas.

9.5.2 Tree Pits and Planting Beds

Topsoil and subgrade placement and treatment shall be in accordance with SD 721 for planting beds or SD 702 for tree pits.

9.5.3 Trees in Structural Soil

Structural soil shall be laid with a compacted air void percentage range of 23-30%.

Care shall be taken when placing the material that the fines are evenly distributed throughout the material

9.6 Finishing

Grades shall generally be even and flowing between paths, kerbs and other points. All grading and shaping of land shall provide effective surface drainage. The surface shall be finished with a smooth and uniform surface free of obvious hollows and humps. The topsoil shall be evenly and moderately consolidated to prevent subsequent settlement, without undue compaction.

Minor shaping may be required to soften and naturalise the waterway, beyond the specified engineering profiles. The Contractor shall co-operate fully in implementing final shaping works.

9.6.1 Waterways and Swales

Final formation and shaping shall be regular, pleasing to the eye and within 100mm of the levels shown, at Practical Completion, during the defects liability period and at the issue of the Defects Liability Certificate, unless otherwise directed.

9.6.2 Lawn in Amenity Areas and Playing Fields

The gap, under a 3m straight-edge placed anywhere on the re-levelled surface shall not exceed 20mm at Practical Completion, during the defects liability period and at the issue of the Defects Liability Certificate.

Areas at the boundary of the re-contoured area shall be graded to allow the finished surface to be married smoothly and naturally into the existing ground levels.

9.6.3 Berms

Final formation shall be +10mm, -0mm of the specified levels, at Practical Completion, during the defects liability period and at the issue of the Defects Liability Certificate.

9.6.4 Tree Pits and Planting Beds

Final formation shall be within +0mm, -20mm of the specified levels, at Practical Completion, during the defects liability period and at the issue of the Defects Liability Certificate.

9.7 Measurement of Work and Basis of Payment

9.7.1 Topsoil Placement

Topsoil placement shall be paid by m^2, to the nearest m^2, formed to the specified depth. The rate shall include ripping, cultivation, supply or transport from on-site stockpiles, testing if required, placing, consolidation, scarifying and shaping.

9.7.2 Second Class Topsoil

Second class topsoil shall be measured by m^3 solid volume placed, to the nearest m^3. The rate shall include supply or transport from on-site stockpiles, testing if required, placing, compaction and trimming.

9.7.3 Preparation of Existing Landscape or Grassed Areas for New Lawn

Preparation shall be paid under the repair of existing lawn and shall include spraying with herbicide and cultivation. Imported topsoil and disposal of surplus material shall be paid by m^3 solid volume, to the nearest m^3.

9.7.4 Preparation of Existing Landscape or Grassed Areas for New Planting Beds

Preparation shall be paid by m^2, to the nearest m^2 and shall include spraying with herbicide and cultivation.

9.7.5 Tree Pits

Tree pits shall be paid per pit and shall include excavation and disposal of spoil, ripping, cultivation, supply of compost or soil conditioners, supply of topsoil or transport from on-site stockpiles, placing, consolidation and shaping.

9.7.6 Plant Beds

Plant beds shall be paid per m^2, to the nearest m^2, and shall include ripping, cultivation, supply of compost or soil conditioners where specified, supply of topsoil or transport from on-site stockpiles, placing to the specified depth, consolidation and shaping.

9.7.7 Structural Soil

Structural soil shall be paid per m^3 and shall include excavation and disposal of spoil, ripping, cultivation, supply of structural soil, placing, consolidation and shaping.

10 PLACED STONE TO PROVIDE FACING, EROSION CONTROL OR AMENITY VALUE

10.1 Scope of Work

This specification is for the supply and placement of aggregate and stone or rock to form facings, to provide erosion control for waterways or to provide amenity value as part of land development.

10.2 Materials

Rock type shall be as specified. Stone shall conform to the dimensions as specified. All aggregate shall meet the requirements of CSS: Part 1 - General.

The Engineer shall approve all rock (stone) prior to its placement.

10.3 Placement

Larger rocks shall be placed at the base of the formation. Smaller rocks shall be placed to close voids and prevent loss of backfill. Each placed rock shall be stable, secure and well interlocked with adjacent rocks. Interlock shall be achieved by ensuring rock-to-rock contact between clean surfaces free of gravel or other debris.

Rocks shall be placed with rounded faces outwards.

10.3.1 Facing

Rock facing shall form an interlocking surface with an undulating natural looking profile.

10.3.2 Dry Stone Walls

Dry stone walls shall be constructed on a 200mm minimum depth compacted layer of specified aggregate, unless otherwise specified.

Geotextiles and free draining backfill shall be placed where specified.

10.4 Measurement of Work and Basis of Payment

10.4.1 Stone

Stone shall be paid per m^3 solid measure, to the nearest $0.5m^3$, and shall include supply, sorting and placement unless otherwise specified.

10.4.2 Aggregate

Aggregate shall be paid per m^3 solid measure, to the nearest $0.5m^3$, and shall include supply, placement, compaction and trimming unless otherwise specified.

10.4.3 Geotextiles

Geotextiles shall be paid per m^2, to the nearest m^2, and shall include supply and placement.

COMPLIANCE REQUIREMENTS CHECKSHEET – EARTHWORKS

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
1		**SITE CLEARANCE**						
	Pt 2 5.0	Site clearance	Inspect	Site clear, planting areas approved by Engineer				
2		**PESTICIDE, HERBICIDE AND FERTILISER APPLICATION**						
	Pt 2 6.2	Safety	NZS 8409	All measures comply				
	Pt 2 6.3	Pesticide and herbicide materials	Inspect	Complies with specification				
	Pt 2 6.4	Application	Inspect	No pollution or damage				
	Pt 2 6.5	Signage	NZS 8409	All measures comply				
3		**IRRIGATION INSTALLATION**						
	Pt 2 7.2	Installation	Inspect	Complies with CSS Part 4				
	Pt 2 7.3	Irrigation materials	Inspect	Materials are ‘approved’				
	Pt 2 7.4.1	Trench excavation	Inspect	Open length under 10m when unattended				
	Pt 2 7.4.2	Bedding	Inspect	50mm of specified material under				
	Pt 2 7.4.3	Cover	Measure	Over 300mm				
	Pt 2 7.6.1	Pipe location	Measure	Within 300mm of design				
	Pt 2 7.6.2	Joints	Inspect	Cleaned before glued				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 2 7.6.3	Backflow preventer installation	Sec G12 Building Code	AS1 (3.6.3 & 4)				
	Pt 2 7.6.3	Backflow preventer installation	AS/NZS 2845.3	Commissioning test				
	Pt 2 7.6.3	Backflow preventer installation	AS/NZS 2845.3	Results forwarded to Engineer				
	Pt 2 7.6.3	Sprinkler installation	Inspect	Complies with manufacturer's specification				
	Pt 2 7.6.4	Surface box installation	Measure	Within 5mm of and parallel to finished surface				
	Pt 2 7.6.4	Solenoid box installation	Measure	Minimum 75mm below and parallel to finished surface				
	Pt 2 7.6.5	Thrust block installation	Inspect	soil capacity matches design				
	Pt 2 7.7	Wiring installation	AS/NZS 3000	Complies with standard				
	Pt 2 7.7	Wiring installation	Inspect	Wire joints in valve boxes and water tight				
	Pt 2 7.8	As-builts	Inspect	As-built records complied of all wiring				
	Pt 2 7.9	Backfilling	Inspect	24 hours notice to Engineer, complies with CSS Part 1				
	Pt 2 7.9.1	Bedding	Inspect	100mm material over, where specified				
	Pt 2 7.9.2	Detector tape	Inspect	150-250mm above pipe, where specified				
	Pt 2 7.9.3	Restoration - berm	Measure	150mm topsoil				
	Pt 2 7.9.3	Restoration - berm	Inspect	Berm complies with CSS Part 7				
	Pt 2 7.9.3	Restoration - other	Inspect	Complies with CSS Part 6				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 2 7.10	Operation	Inspect	Operating manual received				
4		**EARTHWORKS**						
	Pt 2 8.2	Site management	Inspect	Prevent damage to subsoil and soil structures				
	Pt 2 8.3	Topsoil`	Inspect	Topsoil shall be handled and stored separately				
	Pt 2 8.4	Excavation	Measure	Excavation shall be to design limits				
	Pt 2 8.7	Controlled filling	NZS 4431	Complies with standard				
	Pt 2 8.7	Fill material	*Specify*	Specify				
	Pt 2 8.8	Final formation	Measure	Specify				
5		**TOPSOIL PLACEMENT**						
	Pt 2 9.2	Subgrade preparation	Inspect	Subgrade ripped except controlled fill areas, Engineer approved, not holding water				
	Pt 2 9.3	Cultivation of existing for berm	Measure	75mm cultivated depth berm, 100mm elsewhere				
	Pt 2 9.4	Cultivation of existing for planting	Measure	200mm cultivated depth				
	Pt 2 9.5	Topsoil depths	Measure	75mm lawn, 300mm plant beds				
	Pt 2 9.5	Topsoil placement	Inspect	No stones or debris				
	Pt 2 9.5	Topsoil compaction	Measure	Core to 200mmin lawn, 500mm in plant beds				
	Pt 2 9.5.1	Berm construction	SD 201	Complies with specification				

ITEM	CSS REF	TASK	TEST STD/ DESCRIP	COMPLIANCE REQUIREMENTS	TEST FREQ.	PASS YES/NO	TEST BY	ACTIONS
	Pt 2 9.5.2	Plant bed construction	SD 721	Complies with specification				
	Pt 2 9.5.2	Tree pit construction	SD 701	Complies with specification				
	Pt 2 9.5.3	Trees in structural soil	Measure	Compacted air void percentage 23-30%				
	Pt 2 9.6.1	Finished shape – waterways, swales	Measure	±100mm of level				
	Pt 2 9.6.2	Finished shape – lawn	Measure	Max 20mm gap under 3m straightedge				
	Pt 2 9.6.3	Finished shape – berm	Measure	-0mm, +10mm of design level				
	Pt 2 9.6.4	Finished shape – tree pits and plant beds	Measure	+0mm, -20mm of design level				
6		**PLACED STONE**						
	Pt 2 10.2	Rock or stone Material	Inspect	Complies with specification				
	Pt 2 10.3.1	Facing placement	Inspect	Interlocking, natural, dense, voids minimised				
	Pt 2 10.3.2	Dry stone wall footing	Measure	200mm aggregate				
	Pt 2 10.3.2	Dry stone wall placement	Inspect	Constructed as specified				