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8 INCIDENTAL WORKS**8.01 SCOPE**

The works covered by this Section of the Specification comprise the construction of barbecues, mortared stone pitching and walls, rock filled wire mattresses, various categories of post and wire fencing, post and rail log barriers, log bollards, and other incidental works.

8.02 STANDARDS

Work carried out and testing performed under this Section of the Specification shall comply with the requirements of the following Standards to the extent that they are relevant and not overridden by the Specification.

Australian Standards

AS 1074	Steel Tubes and Tubulars
AS 1141	Methods of Sampling and Testing Aggregates
AS 1214	Hot Dip Galvanised Coatings on Threaded Fasteners
AS 1576	Scaffolding General Requirements
AS 1604	Timber – Preservative Treated – Sawn and Round
AS 2423	Galvanised Wire Fencing Products
AS 2758.1	Concrete Aggregates
AS 3706.1	General Requirements, Sampling, Conditioning, Basic Physical Properties and Statistical Analysis
AS 3706.3	Determination of Tearing Strength - Trapezoidal Method
AS 3706.4	Determination of Burst Strength - California Bearing Ratio (CBR) Plunger Method
AS 3706.9	Determination of Permittivity
AS 3972	Portland and Blended Cements
AS 4133.4.1	Method for Testing Rocks for Engineering Purposes – Rock Strength Test – Determination of Point Load Strength Index
AS 4506	Metal Finishing – Thermoset Powder Coatings
AS 4576	Guidelines for Scaffolding

Other relevant Standards applicable to concrete construction are listed in Section 15 of this Specification.

A Testing Authority shall be employed by the Contractor to carry out all testing. The Authority shall hold a current NATA (National Association of Testing Authorities) Registration for the relevant tests, and a copy of results shall be forwarded to the Superintendent without delay.

8.03 MORTARED STONE PITCHING**8.03.1 Materials****(i) Stone**

Stone for pitching shall be spalls or boulders of sound, durable material with a minimum face dimension of 200mm and at least one face dimension of 300mm. The minimum thickness of any stone measured normal to the pitched surface shall be the nominal thickness of the pitching.

Rock from all sources shall have, when tested in accordance with AS 4133.4.1 a point load strength greater than 1.0Mpa.

Stone from all sources shall not leach or stain mortar when in place. Any rock in which iron pyrites (FeS_2 - fool's gold) is visible will not be acceptable for use.

No rock shall be from a source known to have acid leaching or staining problems associated with the breakdown of iron pyrites (FeS_2).

For works requiring more than 5m^3 of rock further testing shall be carried out in accordance with AS 1141.22. Rock tested shall have the following properties:

- (a) A wet strength of at least 100 kN
- (b) A maximum wet/dry strength variation of less than or equal to 45.

The rock may be crushed by the testing authority so as to produce material suitable to test by AS 1141.22.

Hold Point 8.1

Process Hold:	Commencement of stone pitching works
Submission Details:	At least five (5) working days before the proposed commencement of stone pitching works the Contractor shall submit a sample of the rock and test results as appropriate.
Release of Hold Point:	The Superintendent will examine the sample and test results prior to authorising the release of Hold Point

(ii) Cement

Cement used in mortar shall be Type GP or Type GB to AS 3972.

(iii) Sand

The sand shall be clean and free from salts, organic matter or other impurities. Sand shall conform to AS 2758.1

(iv) Mortar

The mortar shall consist of 1 part of cement, 3 parts sand and sufficient water to produce a mix of a consistency suitable for the intended use. Mortar shall have a minimum characteristic compressive strength at 28 days of not less than 20 MPa.

8.03.2 Set Out

The Contractor shall set out the extent of the stone pitching as shown on the drawings. The extent of stone pitching and position of subsurface drains shall be marked out with pegs or paint for inspection by the Superintendent prior to commencement of work.

Hold Point 8.2

Process Hold: Commencement of stone pitching works

Submission Details: At least two (2) working days before the proposed commencement of stone pitching works the Contractor shall provide notification that the extent of stone pitching, subsurface drainage and bedding requirements are marked out on site.

Release of Hold Point: The Superintendent will inspect the proposed layout prior to authorising the release of Hold Point

8.03.3 Bedding

For stone pitching on slopes of 1 to 1 or greater, stones shall be embedded into a minimum 50mm thick concrete blinding layer of characteristic compressive strength of 20MPa at 28 days.

Stones on slopes less than 1 to 1.5, shall be firmly bedded and based on compacted earth. The stones shall be based at a depth of 75mm below the adjacent designed finished surface, at the foot of the pitching.

8.03.4 Joints

All interior voids between stones and earth bedding shall be filled with cement mortar as specified above.

Stone shall be random coursed.

8.03.5 Drainage

Where the pitching is more than 300mm high, install a continuous 100mm diameter slotted corrugated subsoil drainage pipe behind the pitching at the level of the finished ground level in front of the pitching. Discharge the subsoil drain to sumps, stormwater manholes or pipes or to the surface as specified.

Where the pitching is more than 300mm high, weepholes with a diameter of at least 50mm shall be provided at 3m centres horizontally and 2m centres vertically. The lowest row of weepholes shall be placed such that the outfall inverts shall be at the finished ground level in front of the pitching. Each weephole shall be connected directly to the subsoil drain.

Alternate rows of weep holes shall be staggered such that they are placed midway between the lower row of weep holes. Weep holes shall be uPVC pipes or similar. Geotextile shall be securely placed over end of the weep hole which is embedded in the stone pitching, where specified.

All weepholes shall be placed such that they fall towards the face of the stone pitching. For each weephole, a drainage plug comprising 2kg of 7mm drainage aggregate wrapped in geotextile, shall be embedded into the bedding material prior to placement of either the concrete blinding layer or the stones.

8.03.6 Finish

The finished pitching shall have a neat, clean surface free from mortar droppings.

The top of the pitching shall be finished to an even grade or vertical curve, variations along the back edge being filled in with mortar, so as to produce a surface suitable for use as a mowing strip.

8.03.7 Trench Crossings

Where the pitching is to be constructed over service trenches, a reinforced concrete footing shall be provided across the trench to the details shown on the drawings.

8.04 FENCING**8.04.1 General**

Three categories of fencing are specified in this Clause:

Type T	Temporary Protective Fence;
Type S	Stockproof Fence;
Type VS	Vermin and Stockproof Fence.

8.04.2 Materials**(i) Posts, Rails and Stays**

Posts, rails and stays shall be of treated . timber, galvanised steel tube, prefabricated, proprietary brand strainer post assemblies, star pickets or reinforced concrete as detailed.

Hold Point 8.3

Process Held:	Installation of prefabricated strainer post assemblies
Submission Details:	At least five (5) working days before the proposed commencement of fencing the Contractor shall submit a copy of technical specifications from the manufacturer of the proprietary brand of prefabricated strainer post assembly.
Release of Hold Point:	The Superintendent will inspect the documentation submitted prior to authorising the release of the Hold Point

(a) .Concrete posts

Corner posts shall be pre fabricated, proprietary brand pre-stressed concrete corner posts.

Intermediate posts shall be pre fabricated, proprietary brand pre-stressed concrete fence posts.

(b) Treated Timber

Treated timber posts and stays shall be sound *Pinus radiata*. They may be round or sawn.

Round timber shall be barked and trimmed and the ends cut square.

The slope of grain in sawn rectangular posts shall not exceed 1 in 10 over the length. Knots shall be tight, well spaced and shall not exceed 35mm in size.

Posts to be driven shall be square ended or blunt - pointed prior to treatment to a bevel angle not exceeding 30°.

Timber shall be CCA (copper-chrome-arsenic) pressure treated in accordance with AS 1604.

(c) Tubular Steel

Tubular steel posts, rails and stays shall be medium grade galvanised steel tube complying with the requirements of AS 1074.

Fittings shall be designed to prevent damage to tubes or galvanising. Tubes shall not be drilled.

Posts shall be fitted with a watertight galvanised cap.

(d) Droppers

Droppers shall be steel star pickets.

(e) Wire

Wire and wire netting shall be "standard" galvanised and shall comply with the requirements of AS 2423.

(f) Gates

(g) Gates shall be fabricated from galvanised steel tube to the dimensions detailed. They shall be suitably braced and, when included in a stock - or vermin-proof fence, shall be covered with 50mm mesh x 2.5mm diameter galvanised mesh or 1050mm x 4mm x 1.4mm galvanised netting. Fittings and Fasteners

All ferrous bolts, nuts, ties, staples and fittings shall be galvanised in accordance with AS 1214 or AS 1650 as appropriate.

8.04.3 General Fence Details

Table 8.1 itemises the usual requirements for fences in the various categories. Where alternative materials are used their structural performance and durability shall be at least equal to the itemised materials.

Table 8.1

Fence Type	Intermediate Posts	Intermediate Post Spacing (m)	Droppers	Dropper Spacing (m)	Wires	Wire Netting	Remarks
T	Star Picket	3	Nil	0	2 x 3.15 mm plain	Nil	100mm diameter minimum corner posts and concrete gate posts. Height 1.2m. Top wire threaded through pieces of white plastic tube.
S	Concrete	40	Star Picket	4	1 x 1.57 mm HT barbed 1 x 2.8 mm HT plain 2 x 2.5 mm MT "tie easy" plain	Concrete corner strainers and gate posts every 200m along fence line. Netting trenched in ground as detailed. NOTE: In-line	Concrete corner posts and gate posts and posts every 200m along fence line
VS	Concrete	40	Star Picket	4	2 x 1.57 mm HT barbed 1 x 2.8 mm HT plain 2 x 2.5 mm MT "tie easy" plain	1050mm wide x 40 mm openings x 1.4 mm diameter	Concrete corner strainers and gate posts every 200m along fence line. Netting trenched in ground as detailed. NOTE: In-line strainers shall be concrete.

8.04.4 Erection

Except in the case of fence Type T, clear and grub for a width of 1m on each side of fence lines as specified in Section 2 of this Specification.. Trim high spots and fill low spots as necessary to provide the clearances detailed.

Hold Point 8.4

Process Held:	Fencing, Type S and Type VS
Submission Details:	At least two (2) working days prior to the commencement of fencing the Contractor shall provide notification that the proposed alignment of fence, including position of corner posts and gates marked out on site.
Release of Hold Point:	The Superintendent will inspect the proposed layout prior to authorising the release of Hold Point

All posts shall be placed vertically, except in unusual locations where, if directed, the posts shall be set perpendicular to the ground surface. Set up posts so that tops bone uniformly between changes of grade or direction.

Provide strainers at changes of grade or direction and at maximum intervals of 200m.

Concrete intermediate posts shall be driven into the ground. In hard ground posts may be driven into auger holes provided they are firmly supported after driving.

Dispose of surplus spoil as specified in Section 2 of this Specification. .

8.04.5 Gates

Install gates of the types and sizes specified where detailed or directed. Gate posts shall be firmly set into the ground to the depth detailed. Each post shall be fitted with a strut. Tubular metal posts shall be set in concrete. At gateways in wire netting fences, a timber or concrete sill shall be set tightly between the posts and flush with the ground.

All gates shall be hung by suitable hinges securely attached to the gate posts. Each gate shall be fitted with a catch. For wire netting fences, gates shall be hung so as to be rabbit proof when closed.

Gates shall normally have 4 20m clear opening and shall be hung to swing freely through a 180° arc.

8.04.6 Ranger Gates (Vehicle Access Gates)

Ranger Gates shall be in accordance with this Specification and the drawings.

Gate posts shall be HD galvanised steel 100mm od x 4mm chs x 1630mm long set into a mass concrete footing 400mm diameter x 700mm deep but with 100mm of concrete beneath the buried end of the post. Posts shall be capped and caps spot- welded to posts in two locations. Posts shall be 4200mm apart. The gate shall be fabricated from HD galvanised steel 50mm od x 3.2mm chs and both the top and bottom rails shall be formed from continuous length of pipe. The top and bottom rails shall be braced with 16mm diameter galvanised ms rod as detailed with continuous fillet welds at each contact point.

Attach gate to posts with heavy- duty gate hinges with fixed pins with continuous fillet welds at both gate and post. Install gate to swing freely through 90 degrees with the top rail horizontal.

The gate shall be capable of being locked. Fabricate a padlock guard as detailed using 100mm x 4mm thick shs continuously fillet welded to the post. Drill 24mm diameter hole to accept the locking pin. The lower padlock guard shall be positioned to act as a support or cradle for the top rail. Supply 20mm diameter x 140mm long

galvanised ms locking pin with two holes to accept padlocks as detailed. The top rail of the gate shall be fitted with a semicircular, 4mm thick galvanised locking pin latch, continuously fillet welded to the rail and predrilled to accept the locking pin.

Supply and fit two locks until the end of the Consolidation period. If during the construction or Consolidation period of the Contract a public authority requires one of its locks to be included in the locking pin the Contractor shall facilitate that inclusion.

Hold Point 8.5

Process Held:	Installation of Ranger Gate (Vehicle Access Gate)
Submissions Details:	At least two (2) working days prior to the proposed installation of Ranger Gate(s) the Contractor shall provide notification that the location(s) of the gate(s) is marked out on site.
Release of Hold Point:	The Superintendent will inspect the proposed location prior to authorising the release of the Hold Point

8.05 LOG BARRIERS

8.05.1 Post and Rail Log Barriers

Log barriers shall be made from *Pinus radiata* logs pressure treated as specified in Clause 8.04.2.

Posts shall be 150 ± 20 mm diameter and set 600mm in ground into a hole the diameter of the post plus 200mm. Backfilling shall be well worked concrete to minimum 550mm depth. Within the lower third of each post drill for and insert 12mm diameter x 230mm long steel rod. The concrete should be worked around the steel rod to ensure there is no voids formed beneath the steel rod.

Rails shall be 3600mm long x 150 ± 20 mm diameter and shall be bolted to posts with 12mm diameter galvanised bolts countersunk at head and nut. The clearance between the underside of the rails and the finished ground surface below shall be 375mm. Spaces between log barriers shall be 1m.

Adjust the length of several post and rail log barriers over a reasonable distance to match the barriers to the length to be fenced. The minimum length of a single barrier shall be 2500mm. The distance between barriers shall remain constant at 1m.

Hold Point 8.6

Process Held:	Installation of post and rail log barriers
Submission Details:	At least two (2) working days before the proposed installation of the post and rail log barriers the Contractor shall provide notification that the alignment of the post and rail log barriers is marked out on site.
Release of Hold Point:	The Superintendent will inspect the proposed alignment prior to authorising the release of the Hold Point

8.05.2 Log Bollards

Log bollards shall be made from fine sawn *Pinus radiata* pressure treated as specified in Clause 8.04.2. Posts shall be 1200mm long x 150mm x 150mm square or 1200mm long x 150mm diameter. Bollards shall be set 600mm into the ground into a hole the diameter of the post plus 200mm. Within the lower third of the post drill for and insert 12mm diameter x 230mm long steel rod. Backfilling shall be well worked concrete to a minimum of 550mm depth.

The top of the square bollards shall be cut to 45 degrees but the point removed to a blunt square 40mm x 40mm. The top circumference edge of the circular bollards shall be chamfered to 15mm radius.

Remove all saw excess, splintering or jagged pieces of timber, coarse sand if necessary, and leave the bollards safe and satisfactory for the purpose.

Bollards shall be placed vertically and the tops of the bollards shall smoothly follow the finished ground surface.

Hold Point 8.7

Process Held:	Installation of log bollards
Submission Details:	At least two (2) working days before the proposed installation of the log bollards the Contractor shall provide notification that the proposed alignment of log bollards is marked out on site.
Release of Hold Point:	The Superintendent will inspect the proposed alignment prior to authorising the release of the Hold Point

8.06 ELECTRIC BARBECUES**8.06.1 General**

Supply and install push button, coin free electric barbecues equal to D.A. Christie Pty Limited Model 5320/C/PB/ SBD with ACT .Government modifications.

The units shall be installed as twin barbecues in double housings where indicated on the drawing, and in accordance with the manufacturer's written instructions.

Hold Point 8.8

Process Held:	Supply of barbecue unit(s)
Submission details:	At least ten (10) working days before the proposed installation of the barbecue unit(s) the Contractor shall submit the manufacturer's technical specification and product information for the barbecue unit(s).
Release of Hold Point:	The Superintendent will inspect the submitted documentation prior to authorising the release of the Hold Point

8.06.2 Electricity Supply

All electrical work shall be carried out by a licensed electrician in accordance with the Electricity Supply Authority requirements.

The Contractor shall arrange with the Electricity Supply Authority for supply and connection of electricity to the fuse box within the barbecue unit and collect and install the electricity meter. Trenches shall be excavated to facilitate the installation of the electricity supply to all of the barbecues

The Contractor shall provide all drawings and locality plans and pay all fees and charges as required by the Electricity Supply Authority. Supply and lay HD orange coloured electrical conduit where shown on the drawings for electrical cables. Terminate the conduit as an upturn within the Electricity Supply Authority meter cubicle barbecue housing.

8.06.3 Waste Arrangements

The Contractor shall supply and place galvanised iron containers 320mm x 300mm x 180mm or similar acceptable receptacle to act as grease trays. Such a receptacle shall be placed under the centre of the hotplate frame to catch cooking fats and grease.

The concrete floor slabs shall be shaped to a central low point connected by a 100mm dia. PVC sewer pipe to the sewerage drainage pipe at the gully sump below the tap end of the unit to prevent accumulation of water in the unit.

The Contractor shall arrange with the Sewerage Authority to approve the extension of the sewer system to the position of the gully sump and provide all drawings, locality plans and pay all relevant fees and charges. The gully sump shall be connected to the sewer system in accordance with the Sewerage Authority regulations. A standard domestic size gully sump shall be constructed beneath the tap.

Hold Point 8.9

Process Held:	Installation of barbecue unit(s) including associated service arrangements
Submission Details:	At least two (2) working days before the proposed commencement of any excavation works associated with the barbecue unit(s) installation the Contractor shall provide notification that the location of barbecue unit(s) and associated services are marked out on site.
Release of Hold Point:	The Superintendent will inspect the set out on site and may require some amendments prior to authorising the release of the Hold Point

8.06.4 Water Supply

The Contractor shall arrange with the Water Authority to approve the extension of the water supply to the barbecues. Provide all drawings, locality plans etc, pay all fees and charges. Excavate above the main to allow for the water authority work and make good on completion. Collect and install a water meter and other fittings to the Water Authority requirements.

The Contractor shall supply and install copper pipe between the main and the barbecue tap. The pipe is to be concealed within the barbecue housing and the tap positioned at the end of the barbecue housing and above the gully sump. The Contractor is to ensure that the discharge from the tap enters at the centre of the gully sump without spillage or overspray onto the adjacent finished surfaces. The tap shall be a standard spring loaded operation model suitable for installation in a public place.

Hold Point 8.10

Process Held	Supply of vandal resistant tap(s) and fittings
Submission Details	At least ten (10) working days prior to proposed installation of the vandal resistant tap(s) and other fittings the Contractor shall submit a sample of the vandal resistant tap and details of the fittings to the Superintendent for approval.
Release of Hold Point	The Superintendent will inspect the sample and details before authorising the release of the Hold Point

8.06.5 Handover

The barbecue unit(s) shall be commissioned in accordance with the contract programme.

The Contractor shall be responsible for the cleanliness and hygiene of the barbecues at handover stage and shall make itself aware of the public health issues associated with barbecues in public open space/parkland areas.

8.06.6 Brickwork**(i) General**

Generally: the Contractor shall provide all necessary labour, materials, plant and services, to complete all brickwork as further specified and shown on drawings.

Bricks shall be protected from the weather until built into the platform and barbecue units by stacking them on planks or other supports free from contact with the ground and covering them with building paper, tarpaulins or other suitable materials arranged to permit free air circulation through stack.

In no circumstances shall bricks be wetted in any manner prior to laying in the platform and barbecue units and at the stoppage of work at any time the top of the brickwork shall be covered.

All brickwork shall be built true and plumb in stretcher bond. The courses shall be aligned and care shall be taken to keep the perpends correctly aligned. All joints shall be filled and well tooled. All courses shall be accurately constructed and the height of courses shall be checked by a gauge rod as the work rises.

The bonding of corners shall be such as will preserve symmetry in the appearance of the work.

All brickwork shall be protected where necessary to avoid damage during the building operations.

(ii) Mortar

Portland cement and hydrated lime shall be of fresh manufacture delivered to the site and protected from weather.

Mix mortar in the following proportions:

Cement : Lime : Sand 1:1:4

Provide the necessary materials and implements for this work. Sand shall be clean, sharp, pit sand free from deleterious matter. If lumps are present, or if the sand has consolidated after delivery to the site it must be put through wire gauze before adding to the mix.

Mortar shall be prepared in a mechanical mixer. The ingredients shall be carefully measured in the specified proportions. Mix each batch for not less than three (3) minutes and in such quantities as will be used up in no more than 30 minutes. Retention of mortar in the mixer for long periods by repeated addition of water and mixing

or re-tempering of mortar on the mortar board will not be acceptable. In every case, stale mortar must be discarded.

No additives shall be added to the mortar.

(iii) Items to be Built in

Build in all flashings, straps, bolts, ties, pipes, brackets frames etc. as the work proceeds.

Do all cutting, chasing, pointing, coring and general jobbing, required by this section of the Specification.

(iv) Cleaning of Brickwork

Remove dirt and mortar stains from brickwork with stiff brushes and water. Where necessary wire brushing may be used.

Hydrochloric acid shall not be used.

Timber and vegetable stains may be removed using oxalic acid. Make good any damage caused to other materials by these cleaning agents.

(v) Bricks

Unless otherwise specified bricks shall be first quality dark brown pressed clay bricks. The Contractor shall supply samples for the approval of the Superintendent prior to any deliveries of bricks to site.

Hold Point 8.11

Process Held:	Construction of brick barbecue unit(s)
Submission Details:	At least five (5) working days before the proposed commencement of brick barbecue construction the Contractor shall submit a sample of the bricks proposed for use
Release of Hold Point:	The Superintendent will inspect sample prior to authorising the release of the Hold Point

8.07 TIMBER EDGING

Timber edging shall be 50mm x 100mm sawn *Pinus radiata* or as otherwise indicated on the drawings and shall be C.C.A. (Copper-chrome-arsenic) pressure treated in accordance with AS 1604. Timber shall be placed on edge and secured to 50mm x 50mm chisel pointed pegs of the same timber. Pegs shall be driven on alternate sides of the edging at 2m maximum centres to a minimum depth of 400mm and with tops finished 25mm, below top of edging. Fix edging to each peg with two 90mm galvanised 'tek' screws driven from the edging into the pegs. The top of edging shall run true to finished surface levels.

Edging shall be saw cut as necessary to facilitate bending. The tightest radius for any curved edging shall be 1200mm and lengths of curved edging shall be fixed at both ends to pegs as specified above.

Each length of edging shall be fixed to at least four pegs and adjacent lengths shall butt neatly. The minimum length of timber for edging shall be 1200mm.

8.08 DECOMPOSED GRANITE GRAVEL PAVING

Decomposed granite gravel paving shall consist of naturally occurring granitic gravel material, free from vegetable matter and other adverse constituents, from an approved source of supply. The colour and quality of the gravel is to be approved by the Superintendent prior to supply.

The choice of granular subbase material shall be such that for material grading, 100% of material passes the 26.5mm sieve. The plasticity index shall be between 9 & 15 with a maximum liquid limit of 35.

The granular subbase shall be compacted to a minimum of 95% of the modified maximum dry density when tested in accordance with AS 1289.5.2.1.. The specified thickness shall be attained after compaction, and the surface shall grade evenly between design levels and have a clean even and neat appearance.

Unless otherwise specified the surface of the decomposed granite gravel pavement shall have a smooth evenly graded surface with a 10mm maximum departure from a 3m straightedge both ways.

Decomposed granite gravel shall be used only in areas with a gradient less than 5% or small areas where the likelihood of erosion or washouts is small.

The finished surface shall be free from stones exceeding 25mm in diameter.

8.09 TREE GRATES

All new trees in paved areas are to have cast iron tree grates. Unless otherwise detailed these shall be equal to Gatic No. 850. The grate shall be flush with pavement levels. The seating frame shall be securely bedded in mortar with the block header course. Backfill the grate with approved coarse granite gravel or porous aggregate and top up as required to prevent settlement of the grate. Install the grate in accordance with the manufacturers instructions.

Hold Point 8.12

Process Held:	Supply and placement of tree grates
Submission Details:	At least ten (10) working days prior to proposed installation of the tree grates the Contractor shall provide a sample and/or manufacturer's technical specification and promotional material of the tree grates.
Release of Hold Point:	The Superintendent will inspect the sample or materials prior to authorising the release of the Hold Point.

Root control barriers shall be installed at all tree planting located within paved areas in accordance with Clause 9.09.12 of this Specification.

8.10 TREE GUARDS

All new trees in paved areas are to have mild steel tree guards as detailed in the drawings. Bolts and nuts are to be hot dip galvanised and all other steelwork is to be treated with a powder coated finish to the requirements of AS 4506.

The bars are to be vertical when bolted to the tree grate.

Hold Point 8.13

Process Held:	Supply and placement of tree guards
Submission Details:	At least ten (10) working days prior to the proposed installation of the tree guards the Contractor shall submit shop drawings or a sample of the tree guard with technical specification and promotional material. The submission shall also include colour samples of the guards.
Release of Hold Point:	The Superintendent will inspect the sample and other material supplied prior to authorising the release of the Hold Point.

8.11 MORTARED STONE WALLS**8.11.1 Materials**

The stone, sand, cement and mortar requirements shall be in accordance with Clause 8.03 of this Specification.

Hold Point 8.14

Process Hold:	Commencement of mortared stone wall construction
Submission Details:	At least five (5) working days before the proposed commencement of mortared stone wall construction the Contractor shall submit a sample of the rock and test results as appropriate.
Release of Hold Point:	The Superintendent will examine the sample and test results prior to authorising the release of Hold Point

8.11.2 Set Out

The Contractor shall set out the extent of the mortared stone wall as shown on the drawings.

Hold Point 8.15

Process Held:	Commencement of mortared stone wall construction
Submission Details:	At least two (2) working days before the proposed commencement of mortared stone wall construction the Contractor shall provide notification that the alignment of the wall, subsurface drainage and foundation are marked out on site
Release of Hold Point:	The Superintendent will inspect the proposed layout prior to authorising the release of Hold Point

8.11.3 Earthworks

Earthworks and preparation of surfaces shall comply with Section 2 of this Specification. Subgrades shall be compacted to 95% of modified maximum dry density in accordance with AS 1289.5.2.1 for a minimum depth of 150mm. The Contractor shall manage the work so as to minimise the time from when the subgrade is exposed to when the blinding concrete is placed.

Where the mortared stone wall is to act as a retaining wall back filling shall be in accordance with Clause 2.06.5.

8.11.4 Wall Construction

The stones for the walls shall be set in mortar with all joints filled and the stones firmly bedded. The stones shall be randomly coursed with vertical joints staggered.

Stones to the visible faces of the wall shall be selected and placed so that the exposed face of each stone have a minimum dimension of 75mm and at least one dimension of 100mm. The outer faces of the stones shall be set flush to the approval of the Superintendent.

The vertical and horizontal tolerance on the position of the finished surface of the walls shall be ± 25 mm unless otherwise detailed.

The form of the wall shall have visually smooth continuous surfaces and lines free from abrupt changes.

The finished stonework shall have a neat clean surface free from mortar strains and droppings.

Where the mortared stone wall is to act as a retaining wall weepholes shall be in accordance with Clause 8.03.5 of this Specification.

Unless specified otherwise, a continuous 100mm diameter slotted subsoil drainage pipe shall be installed behind the wall at the level of the finished ground level in front of the wall. The pipe shall be discharged to stormwater sumps, manholes or pipes, or to the surface as appropriate.

Weepholes with minimum 50mm dia. shall be provided at 3m centres horizontally and 2m centres vertically. The lowest row of weepholes shall be placed such that the outfall inverts shall be at the finished ground level in front of the wall. Each weephole shall be connected directly to the subsoil drain.

All weepholes shall be placed such that they fall towards the face of the wall with a minimum grade of 1%. For each weephole, a drainage plug comprising 2kg of 7mm drainage aggregate wrapped in a suitable geotextile, shall be embedded into the bedding material prior to placement of either the concrete blinding layer or the stones.

8.12 ROCK FILLED WIRE MATTRESSES**8.12.1 Materials****(i) Mattresses**

Mattresses shall be flexible, woven, galvanised wire mesh boxes of dimensions as shown on the drawings. Where specified, the galvanised wire mesh shall be coated with PVC.

The boxes shall be divided into cells by diaphragms across the width of the unit and at not more than 1 m centres or as shown on the drawings.

Diaphragms may be formed by folding the base layer of a mattress, provided the bottom of each of the diaphragm halves is securely tied together so that the transmission of tensile forces in the mesh of the base layer is not impeded.

Mattresses shall have a mesh size of 60 mm x 80 mm. For mattresses less than 350 mm thick the minimum diameter of mesh wire shall be 2.0 mm and the minimum diameter of galvanised selvedge wire shall be 2.4 mm. For mattresses with thickness between 350 mm and 550 mm, the minimum diameter of mesh wire shall be 2.4 mm and the minimum diameter of galvanised selvedge wire shall be 3.0 mm.

(ii) Selvedges

All edges of the mattresses, diaphragms and end panels shall be selvedged with a continuous wire.

The selvedging must be such that the mesh will not unravel and such that the strength of the connection between the selvedge wire and the mesh shall be equal to or greater than the breaking strength of the mesh.

(iii) Lacing and Connecting Wire

Lacing and connecting wire must be supplied with the mattresses and mesh panels to perform all the wiring operations to be carried out in construction of the mattresses. The minimum diameter of the wire (wire core in the case of PVC coated wires) shall be 2.2 mm.

(iv) Rockfill

Rockfill shall be dense, hard, durable and clean rock.

(a) Aggregate Wet/Dry Strength

Rock from all sources shall have, when tested in accordance with AS 1141.22, a wet strength of at least 100 kN and a maximum wet/dry strength variation of 45. The rock may be crushed by the testing authority so as to produce material suitable to test by AS 1141.22.

(b) Rock Strength

Rock from all sources shall have, when tested in accordance with AS 4133.4.1 a point load strength greater than 1.0Mpa.

(c) Size

The minimum rock size shall be 75 mm and the maximum rock size shall be two thirds of the thickness of the mattress or 250 mm, whichever is the lesser.

(d) Iron Pyrites

Stone from all sources shall not leach or stain mortar when in place. Any rock in which iron pyrites (FeS₂ - fool's gold) is visible will not be acceptable for use.

No rock shall be from a source known to have acid leaching or staining problems associated with the breakdown of iron pyrites (FeS₂).

Hold Point 8.16

Process Held:	Use of rockfill for rock filled wire mattresses
Submission Details:	At least ten (10) working days prior to the proposed commencement of rock filled wire mattress construction the Contractor shall submit details regarding the properties and source of the rock fill.
Release of Hold Point:	The Superintendent will inspect the sample and submitted documents for prior to authorising the release of Hold Point

8.12.2 Installation**(i) General**

Mattresses shall be assembled and installed in accordance with this Specification and the manufacturer's recommendations.

Any associated excavation shown in the drawings is to be carried out prior to the installation of the mattresses.

Excavated material shall be used in the construction of embankments or spoil in accordance with Section 2 of this Specification.

Hold Point 8.17

Process Held: Construction of rock filled wire mattresses

Submission Details: At least two (2) working days before the proposed commencement of rock filled wire mattress construction the Contractor shall provide notification that the alignment of the mattresses, any subsurface drainage and foundation are marked out on site

Release of Hold Point: The Superintendent will inspect the proposed layout prior to authorising the release of Hold Point

(ii) Assembly

Prior to assembly, the wire mesh shall be opened out flat on the ground and stretched to remove all kinks and bends.

The mattresses shall be assembled individually by raising the sides, ends and diaphragms, ensuring that all creases are in the correct position and that the tops of all four sides and the diaphragms are even. If the height of the sides is different the position of the diaphragms shall be adjusted so that the sides hinge-up on the thicker wire woven in the mesh.

The diaphragms are to be attached in place by twisting the short lengths of selvedge wire firmly over the tops of the sides. Helical wire connecting the diaphragm to the base is to be pulled out only enough to wire up the sides. Wiring shall be done as a continuous operation through each mesh in turn and securely tied off at the top. The ends of all lacing wires shall be turned to the inside of the mattress on completion of each lacing operation. Lacing wire must be used to lace up the four corners.

In all cases, lacing shall commence by twisting the end of the lacing wire around the selvedge/s. It shall then pass round the two edges being joined using alternative single and double loops through each mesh in turn and be securely tied off at the bottom. Tightness of the mesh and wiring is essential at all times.

(iii) Erection

Only assembled mattress or groups of mattresses shall be positioned in the structure, each mattress being securely laced to the surrounding ones along the perimeter.

When the mattress is laid on a slope steeper than 1 in 1.5 the upper edge shall be secured by galvanised star pickets driven a minimum of 900 mm into the ground at 1 m centres or as shown on the drawings.

(iv) Filling

Mechanical filling equipment may be used providing adequate precautions are taken to protect any PVC coating from abrasion during filling operations.

Filling materials shall be redistributed by hand to ensure all diaphragm compartments are fully filled and to produce a neat and level top surface.

Mattress units shall be overfilled by 25-50 mm above to allow for subsequent settlement.

(v) Final Lacing

Closing and lacing down of lids shall proceed as soon as practical after filling operations and certainly in the likelihood of storm flood during construction.

Lids shall be stretched tight over the filling with suitably designed closing tools and laced down securely through each mesh along all edges and diaphragms. The ends of all lacing wires shall be turned into the mattress on completion of all lacing operations.

8.12.3 Geotextile for Mattresses

Before laying out mattresses a filter fabric shall be placed between the wire cage and the material being protected or retained.

Unless otherwise specified the minimum overlap shall be 500mm. Sewing or other methods of jointing are not permitted.

Filter fabric shall be a non woven type with the following properties:

(a) Elongation

The maximum puncture strength when determined in accordance with AS3706.4 shall be equal to or greater than 30%.

(b) Grab Strength

The mean grab strength shall be greater than 900N determined in accordance with AS 2001.2.3 Method B

(c) Tear

Tear strength shall be greater than 350N determined in accordance with AS 3706.3.

(d) Filtration

The geotextile shall have a flow rate greater than or equal to 50 litres / m² /second and permittivity of greater than or equal to 0.5 / second determined in accordance with AS 3706.9.

8.13 CONFORMANCE CRITERIA

8.13.1 Mortared Stone Pitching and Walls and Rock Filled Wire Mattresses

Mortar for use in stone pitching and walls shall have a characteristic compressive strength at 28 days of 20MPa.

The vertical tolerance for the top level of stone wall or stone pitching shall be +/- 25mm. The horizontal tolerance of the thickness of stone walls shall be + unspecified, - 25mm.

The rock used for mortared stone pitching and walls shall meet the requirements of Clause 8.03.1(i) and for rock filled wire mattresses the requirements of Clause 8.12.1(iv).

8.13.2 Fencing, Post and Rail Log Barriers and Bollards

Where levels and / or an exact alignment are specified the vertical tolerance for the barrier or fence shall be +/- 25mm and the horizontal tolerance for the alignment of the barrier or fence shall be +/- 50mm.

8.13.3 Timber Edging

Timber edging shall be installed so as to not to present a trip hazard.

8.13.4 Decomposed Granite Gravel Paving

The decomposed granite gravel surface shall be finished to the tolerances specified for Base in Table 4.7.

For material property and compaction determination the granite gravel shall be divided into lots or discrete work areas. The Superintendent shall have the right to reject a lot which is visually non-homogeneous and/or non-representative.

The specified testing shall be taken at the random test locations established in each lot in accordance with the specified minimum testing frequency in Table 8.2.

When density tests are carried out on a lot, the number of results falling below the specified value shall not exceed the limits set out in Table 4.8.

8.13.5 Sampling and Testing

All sampling and testing of materials supplied and work carried out under this Clause of the Specification shall be performed in accordance with the relevant Australian Standards or as otherwise specified.

8.13.6 Frequency of Testing

For elements prescribed as requiring testing the frequency of testing shall be appropriate to verify conformity and shall not be less than that stated in Table 8.2. Where no minimum frequency of inspection or testing is stated, the Contractor shall nominate appropriate frequencies in their Inspection and Test Plan(s).

The Contractor shall include in the management review of the Quality System, a review of the appropriateness of the frequency of testing nominated in the Inspection and Test Plan(s). Such review shall take into account the frequency of nonconformance detected, including nonconformance remedied by simple reworking.

Table 8.2

Clause	Characteristic Analysed	Test Method	Minimum Frequency Of Testing
Stone Pitching, Stone Walls and Rock Filled Wire Mattresses			
8.03.1(i); 8.12.1(iii)	Point load strength index	AS4133.4.1	One (1) test per 5m ³ or per Contract which ever is greater or change in source
8.03.1(i); 8.12.1(iii)	Aggregate Wet Strength	AS1141.22	One (1) test per Contract greater than 5m ³ or change in source
8.03.1(i); 8.12.1(iii)	Wet/Dry Variation	AS1141.22	One (1) test per Contract greater than 5m ³ or change in source
8.13.1	Surface Level (where specified)	Survey	One (1) survey point per 5m of top of wall or mattress length (top mattress only) One (1) survey point per 25 m ² for stone pitching
Fencing, Post and Rail Log Barriers and Bollards			
8.04.4; 8.05.1; 8.05.2	Alignment and Level (where specified)	Survey	One (1) survey point per every change in direction and per 10m of fence or barrier
Decomposed Granite Gravel Paving			
8.08; Table 4.8	Compaction	AS 1289.5.2.1; AS 1289.5.4.1	One (1) test per lot
8.08; 4.03(ii); Table 4.4	Coarse Particle Distribution	AS1289.3.6.1	One (1) test per Contract or change in source
8.08; 4.03(ii); Table 4.4	Fine Particle Distribution	AS1289.3.6.3	One (1) test per Contract or change in source
8.08	Liquid Limit	AS1289.3.1.1	One (1) test per Contract or change in source
8.08	Plastic Limit (PI)	AS1289.3.3.1	One (1) test per Contract or change in source
8.08; Table4.7	Surface Level (where specified)	Survey	One (1) survey point per 25m ²
8.08	Surface trim	3m straight edge	One (1) test per 25m ²

8.13.7 Nonconforming work

A nonconformance report shall be submitted to the Superintendent for any nonconformance detected. Work shall not proceed on any nonconforming item until the Superintendent has approved the disposition for the nonconformance.

8.14 MEASUREMENT AND PAYMENT

Payment shall be made for the activities associated with completing the work detailed in this section of the Specification in accordance with Pay Items 803P1, 804P1-P3, 805P1-P2, 806P1, 807P1, 808P1, 809P1, 810P1, 811P1 and 812P1-P2 inclusive.

A lump sum price for any of these items shall not be accepted.

Components of an element of the project not shown on the drawings or specified, but which are obviously necessary as part of proper construction shall be considered as shown or specified and allowance shall be made for these components in the pay item.

Allowance shall be made in the pay items generally for all activities associated with the works including cutting to size, overlap, wastage, collection and disposal of off cuts, incidental construction debris, surplus materials and spoil generated by the operation and leaving the area neat and tidy, safe and suitable for its intended purpose.

If any pay item for which a quantity of work is listed in the Contract has not been priced by the Contractor, it shall be understood that due allowance has been made in the price of other pay items for the cost of the activity which has not been priced.

Pay Item 803P1 Mortared Stone Pitching

The unit of measurement shall be the face area of stone pitching completed.

This pay item shall include setout, preparation, supply of stone mortar and bedding materials, construction and cleaning of the stone pitching.

All works associated with the supply and installation of weep holes and subsoil drains including filter gravel and geotextile shall also be included in this pay item

Excavation and backfilling shall be paid for under the relevant pay item in Section 2 of this Specification.

Pay Item 804P1 Fencing

The unit of measurement shall be the linear metre of fence constructed.

This pay item shall include the supply and installation of all strainers, gate and corner posts, droppers, netting and wire, creek crossings, connection to existing fences, clearing and subsequently making good the alignment of the fence.

The rate for Temporary fence shall include provision for the removal of the fence and making good post holes, etc.

A separate pay item shall be included in the Contract for each fence type.

804P1.1	Fence Type T
804P1.2	Fence Type S
804P1.3	Fence Type VS

Pay Item 804P2 Removal of Existing Fences

The unit of measurement shall be the linear metre of fence removed

This pay item shall include the removal of gates, creek crossings, corner and/or strainer posts, making good connections with fences to remain, provision for making good all post holes, the collection of all materials and disposal off site.

Unless otherwise specified the materials removed shall become the property of the Contractor.

Pay Item 804P3 Gates

The unit of measurement shall be per gate installed.

This pay item shall include the supply of all hardware, fixing to gate post, fixing netting to gate, installation of sill log and the provision of a clear opening for the full operating arc of the gate.

The pay item for Ranger Gates (Vehicle Access Gates) shall include the supply and erection of the gate, including heavy galvanising of all weld and cut ends of pipe following fabrication. Allow for the supply and fitting of two appropriate locks for the duration of the contract period and their removal at the end of the construction period.

A separate pay item shall be included in the Contract for each gate type.

804P3.1	Ranger (Vehicle Access) gate
804P3.2	Pedestrian access gate

Pay Item 805P1 Post and Rail Log Barriers

The unit of measurement shall be the linear metre of post and rail log barriers constructed excluding gaps between barriers.

This pay item shall include the supply of all the materials, fabrication of the barriers, excavation of footing, supply, placement and working of concrete footings, alignment of barriers and maintaining a constant line and above ground clearance of the barriers.

Pay Item 805P2 Log Bollards

The unit of measurement shall be per bollard constructed.

This pay item shall include the supply of all materials, fabrication of the bollard, excavation for footing, supply, placement and working of the concrete footing, alignment of the bollards and maintaining a constant line and top level of the bollards.

Pay Item 807P1 Electric Barbecue Installation

The unit of measurement shall be per barbecue constructed.

This pay item shall include minor regrading to establish the site of the barbecue, excavation for the concrete slab, supply and erection of the barbecue unit and the removal of incidental construction debris and commissioning of the barbecue. The supply and incorporation of pipes, conduits, penetrations, and payment of any fees for connection of water, electricity and sewer is also to be included in this pay item.

Pay Item 808P1 Timber Edging

The unit of measurement shall be per linear metre of timber edge installed.

This pay item includes the trimming and preparation of the alignment of the edging, the supply, cutting to size and saw cutting to allow bending of the edging, the supply and placement of pegs and securing the edging with 'tek' screws.

Pay Item 809P1 Decomposed Granite Gravel

The unit of measurement shall be per square metre of surface treated.

This pay item includes the provision of samples and complying test results, the excavation/trimming of the area to accept the specified depth of material, box out around all edges, dispose of all excavated material, the supply and placement, compaction, topping up and levelling off to finish flush with all controlling or obligatory levels. Water surface to assist compaction as required.

Pay Item 810P1 Tree Grates

The unit of measurement shall be per grate installed.

This pay item shall include the provision of samples, supply and installation of the grate, preparation for the footing, forming up for the footing, supply and placement of concrete and the placement of the supporting frame to detail line and level.

Removal of visible construction, storage or transport marks on the grate or frame and adjustments as necessary to ensure grate and frame are flush with the adjacent levels, that the grate is square, stable, free of loose or rocking components and sits properly within its frame are also to be included in this pay item.

Pay item 810P2 Tree Guards

The unit of measurement shall be per guard installed.

Allow in the rate for the provision of shop drawings, material samples and/or colour samples as specified, the supply and/or fabrication and installation of the grate including all hardware and incidentals to achieve stable, vertical installation. Include all connection and fixing to grates or buried concrete blocks as detailed.

Pay Item 811P1 Mortared Stone Wall Foundation

The unit of measurement shall be the cubic metre of foundation.

The rate for this pay item shall include all activities associated with the setout, preparation, supply of materials and construction of the wall foundation.

Excavation and backfilling shall be paid for under the relevant item in Section 2 of this Specification.

Pay Item 811 P2 Mortared Stone Wall Face and Top

The unit of measurement shall be the square metre area of the wall face and wall top.

The rate for this pay item shall include all activities associated with the setout, preparation, supply of materials, construction and cleaning of the stone wall. All works associated with the supply and installation of weep holes and subsoil drains including filter gravel and geotextile shall also be included in this pay item

Excavation and backfilling shall be paid for under the relevant pay item in Section 2 of this Specification.

Pay Item 812P1 Rock Filled Wire Mattresses

The unit of measurement shall be the square metre of rock filled wire mattress determined from the top area of mattress of the completed work.

This pay item shall include the supply and installation of mattresses, rock filling, filter fabric and star pickets.

A separate pay item shall be included in the Contract for each mattress thickness.

812P1.1	170mm mattress thickness
812P1.2	230mm mattress thickness
812P1.3	300mm mattress thickness
812P1.4	500mm mattress thickness
812P1.5	1000mm mattress thickness

Pay Item 812P2 Excavation for Mattresses.

The unit of measurement shall be the cubic metre determined from the actual bank volume of excavation carried out.

This pay item shall include the excavation and incorporation or disposal of material, which is directly associated with the installation of mattresses.

8.15 SCHEDULE OF HOLD POINTS

Hold Points	Clause	Description
8.1	8.03.1	Stone for stone pitching works
8.2	8.03.2	Setout of stone pitching works
8.3	8.04.2	Prefabricated strainer post assemblies
8.4	8.04.4	Setout of fencing Type S and Type VS
8.5	8.04.6	Setout of Ranger Gates (Vehicle Access)
8.6	8.05.1	Setout of post and rail log barriers
8.7	8.05.2	Setout of log bollards
8.8	8.06.1	Details of electric barbecue unit(s)
8.9	8.06.3	Location and set out of barbecue(s) including associated service arrangements
8.10	8.06	Supply of vandal resistant tap(s) and other fittings
8.11	8.06.6	Supply of bricks for barbecue(s)
8.12	8.09	Supply of tree grates
8.13	8.10	Supply of tree guards
8.14	8.11.1	Stone for mortared stone wall
8.15	8.11.2	Setout of mortared stone walls
8.16	8.12.1	Stone for rock filled wire mattresses
8.17	8.12.2	Setout of rock filled wire mattresses