

Specification

1 GENERAL

1.1 Introduction

The whole of the works is to be executed in strict accordance with this Specification, the General Conditions of Contract, accompanying drawings and with any working drawings furnished as the work proceeds.

The Specification and drawings represent requirements and intentions of the Contract. Any other operations which may be reasonably inferred from these documents to form any part of the true intent and meaning of this Contract, although not specifically stated as such, will be deemed to have been included, and due allowance for their execution must be made.

The whole of the works hereinafter described shall include the supply of all materials, tools, plant, cartage, labour and all other things whether temporary or permanent, which may be necessary to carry out the work to the true intent and meaning of the specification.

Acknowledgement is made for the use of VicRoads specifications in the preparation of this specification. Where standard VicRoads specifications are included in the Contract, for "VicRoads", "Corporation" and "Municipality", read "Port Phillip City Council".

1.2 Description

The contract is for the construction of a pedestrian refuge along Inkerman Street.

The pedestrian refuge will be the combination of a painted median and raised median islands with landscaping.

Construction works will include all required line marking.

1.3 Location

The works are located on Inkerman Street in two sections:

1. St Kilda Road to Chapel Street, St Kilda
2. Hotham Street to Westbury Street, St Kilda West

2 PRELIMINARIES

2.1 Definitions

In the Contract, except where the context otherwise requires:

"Superintendent" shall mean the person as defined in the General Conditions.

"Principal" shall mean the person or entity as defined in the General Conditions.

“Works Supervisor” shall mean the authorised officer, or a delegated representative, of the Council empowered to carry out supervision and inspection of the Contractor’s work.

“Council” shall mean the Port Phillip City Council.

“Local Law” shall mean any local law made by the Council pursuant to the *Local Government Act 1989*.

“Council Assets” shall mean any item owned, leased or in the control of the Council.

“Emergency Call-out” shall mean any request or need to perform urgent work outside of normal working hours, to rectify a situation which has caused injury, damage, nuisance or affected public health or if not attended to has the potential to cause injury, damage, nuisance or affect public health.

“Customer Service” shall mean the provision of polite, positive and professional services to all customers.

“Trench” shall mean any horizontal or inclined way or opening commencing at and extending below the surface of the ground and open to the surface along its length, the length of which is not less than its depth and the width of which is less than its length and used or to be used for laying of pipe or cable, and includes all works and plant associated with the construction of such an opening.

2.2 General Conditions of Contract

The General Conditions of Contract AS2124-1992 shall be considered as part of this Specification. Annexures to the Australian Standard General Conditions of Contract are attached.

2.3 Form of Contract

The Contract shall be a Lump Sum Contract.

2.4 Sales Tax

~~Materials, plant and equipment purchased for incorporation in the Works are exempt from sales tax under the Sales Tax (Exemption and Classifications) Act. The Council will provide the relevant Tax Exemption certificate on request.~~

2.5 Application of GST

“**GST**” means a Goods and Services Tax authorised by “A New Tax System (Goods and Services) Act 1999” or otherwise.

“**Tax Invoice**” and **Taxable Supply** have the meaning set out in “A New Tax System (Goods and Services) Act 1999.”

The services nominated constitute a taxable supply. The contract sum/s agreed between the parties shall be considered to be GST inclusive. Claims for payment arising from this contract shall be rendered in the form of Tax Invoices.

Each party to the Contract warrants that at the Commencement Date it will be registered for GST and will remain registered throughout the period of the Contract.

The Contractor must in respect to a taxable supply (as defined in the GST Act), deliver to the Council a tax invoice, in accordance with Section 29-70 of the GST Act. The Contractor agrees that Council may on behalf of the Contractor lodge a recipient tax invoice for services performed or works carried out under this Contract.

2.6 Security Deposit

The conditions relating to security deposits that are set out in the General Conditions of Contract shall be observed. The amount of the security is as set out in the Annexure thereto. The total amount shall be held by the Council as security for the due performance of the Contract. Within one month after issue of the Final Certificate, Council shall return to the Contractor the security or such part of it as it is then holding, subject to the provisions of this Specification.

2.7 Insurances

Prior to the commencement of the work, the Contractor shall effect a Public Liability Insurance policy for a minimum of \$10,000,000.00 for the duration of the Contract, and shall have the policy extended to indemnify Council.

All employees engaged on the works under this Contract shall be insured to the full extent of the Contractor's liability under the *Accident Compensation Act 1985* and the *Accident (WorkCover Insurance) Act 1993*.

The Contractor shall agree to indemnify and keep indemnified and to hold harmless Council, its servants and agents and each of them from or against all actions, costs, claims, charges and expenses and damages whatsoever which may be brought or made or claimed against them or any of them arising out of or in relation to this Contract.

If insurances are not in order, works must not commence.

2.8 Payment

Payment shall be made on the basis of the Lump Sum set down against each item in the Schedule of Prices.

Pursuant to Clause 42.1 of the General Conditions of Contract, each of the Contractor's claims shall be numbered consecutively, shall be submitted to the Superintendent and shall be accompanied by an approved schedule giving the following particulars:

- (i) every item for which payment (in whole or part) is being claimed up to the date of the claim;
- (ii) the amount of payment being claimed in respect of each item;
- (iii) details of variations, if any issued by the Superintendent, with the amounts to be added or deducted. Each variations shall be identified by the numbers and title;
- (iv) a summary of daywork, if any, ordered by the Superintendent;
- (v) a summary grouped in the same manner as the Schedule of Prices showing the total gross value of work done to the date of claim for payment;

- (vi) the deduction in respect of retention monies, details being given where necessary;
- (vii) the resulting nett total amount claimed;
- (viii) the deduction in respect of amounts previously certified for payment; and
- (ix) the resulting amount claimed as payment due on the application

2.9 Compliance with Regulations and Local Laws

The Contractor and its employees and sub-contractors must abide by all laws, regulations, local laws or by-laws whilst carrying out the contracted duties detailed in this Specification.

2.10 Industrial

The Contractor shall comply with all relevant industrial legislation including industrial awards to which the Contractor is bound, ant certified agreements and/or enterprise flexibility arrangements to which the Contractor is party.

The Contract sum will be deemed to include the cost of all wages and other costs arising from the requirements of the awards, certified agreements and enterprise flexibility agreements to which it is bund, and no adjustment will be made to the contract on account of such requirements or any new matter introduced into an award, or any certified agreement or enterprise flexibility agreement.

The Contractor shall keep the Superintendent informed of any industrial matter which could affect the progress of the Works under the contract. The Contractor shall make no claim against the Council for any costs, loss, expense or damage arising from any industrial action, resulting in a strike, work stoppage, work ban or work limitations of any kind.

2.11 Disclosure of Information

Neither the Contractor nor any of his sub-contractors shall provide any information, document or article pertaining to the Works under this Contract for publication in any media without the written approval of the Council.

2.12 Complaints Handling

The Contractor shall receive and record complaints daily relating to the provision of the service, and attend to the complaints within twenty-four hours or sooner if they are urgent.

The Contractor shall attend a weekly inspection and shall provide a written report setting out all complaints and the action taken by the Contractor to rectify the complaints.

2.13 Contractor's staff and sub-contractors

The Contractor, Contractor's staff and subcontractors must at all times represent Council in a proper manner. All contact with the public must be courteous and co-operative.

The Contractor must have a clear customer focus when carrying out the Works and must be pro-active in managing the Works to eliminate any potential causes of complaints. The Contractor is the front line of the

Principal's customer service on this project and the Contractor's performance impacts greatly on the public's perception of the Council.

Therefore, the Contractor must carry out and complete Works in a manner that results in minimal inconvenience or impact on the customers, and preserves or enhances the Council's reputation with customers.

2.14 Facilities, vehicles and equipment

The Contractor must provide, operate and maintain the facilities, vehicles and equipment necessary for the proper performance of the required services.

Where vehicles, plant and equipment are involved with the conduct of the services, the Contractor must maintain a preventative maintenance plan for such equipment. This plan must be made available to the Superintendent on request.

2.15 Tree Protection

2.15.1 General

Trees and shrubs marked to be retained are to be adequately protected at all times from damage and if required, watered for the duration of the contract. Particular care shall be taken to avoid any damage to the roots, trunks and branches.

All trees for retention shall have protective fencing. This shall consist of 2400 mm long star pickets traversing the canopy/drip line of the tree and "ringlock" mesh or similar approved attached to each picket in the five locations. Corner pickets shall include diagonal bracing installed to ensure a rigid temporary structure.

2.15.2 Work near Trees

When any excavation is required in the vicinity of trees to be retained, hand excavation shall first be made to locate any roots. If directed by the Superintendent equipment shall be kept clear of trees and hand methods of excavation shall be adopted. Roots which are affected by the line of the proposed work shall be clean cut with a sharp saw for this purpose clear of the work before machine excavation commences. Removal of tree roots greater than 50 mm in diameter shall require prior approval of the Superintendent.

The areas within the drip line shall be kept free of all material, debris and plant. Materials shall not be leaned against trunks or stacked over the root zone.

Where works will affect the ability of the tree to obtain water, the Contractor will be responsible for the regular watering of all trees so affected for the duration of the Contract. All costs incurred in connection with protecting trees shall be included in the contract sum.

2.15.3 Penalties

If during the Contract period any trees are damaged, the Superintendent reserves the right to repair or replace trees as necessary, and the cost of doing so shall be borne by the Contractor.

If repair work is impractical, or is attempted and is rejected, the Contractor shall remove the tree and root system if directed, make good and either replace the tree with a replacement tree of the same species and similar size, or pay damage.

If replacement is not approved, the Contractor shall pay, for any tree removed pursuant to the above, damages assessed as the cost of replacement. If replacement with a smaller tree is permitted, pay damages shall be assessed as the difference between the replacement costs of the smaller and larger trees up to the limit specified.

Council Inspections

Any assistance required by the Council's supervisory staff in checking or measuring any phase of the works, shall be provided by the Contractor as part of the Contract.

2.16.1 Hold Points

Definition: Those points beyond which the work may not proceed without review by the Superintendent.

Hold points are listed in the Specification by the letters **HP** in the left margin and by **bold text print** or arise from non-conformances.

The review by the Superintendent of a hold point will not relieve the Contractor of responsibility for satisfactory execution or performance of the work.

Text that is bolded but not identified by the letters **HP** in the left margin is not a Hold Point. These are specified obligations on the Contractor requiring the review or approval of the Superintendent. They are bolded for ease of identification.

Twenty-four (24) hours notice is required prior to a hold point review. Failure to provide notice may result in a delay in the release of a hold point.

2.17 Defects Liability and Defects Liability Period

Clause 37 of the General Conditions of Contract refers to the Defects Liability Period.

The Defects Liability Period shall not commence until such time as the Council certifies that there is Practical Completion of all roads, drainage, earthworks, landscaping and associated works necessary for the satisfactory compliance of the Contract. The Defects Liability Period shall not be less than twelve (12) months from the date of Practical Completion, or as specified in Annexure A of the General Conditions of Contract.

During the Defects Liability Period, Council will arrange for routine municipal maintenance to commence, such as street cleaning and repair of damage by others. Such municipal maintenance shall not reduce the Contractor's responsibilities under this Contract for the timely remediation of any defects in the Works that may be identified by the Superintendent.

The Contractor shall provide a contact telephone number for use during the Defects Liability Period. This telephone number shall be manned during

normal business hours, and shall be monitored during non-business hours in a manner that ensures that the Contractor will respond to calls within two hours.

If the Contractor cannot be contacted, or if no response is received within two hours, the Principal may make its own arrangements to rectify the defect. The Principal's costs in doing so shall be deducted from monies owing to the Contractor.

In the event of an emergency, nothing in this clause shall over-ride the provisions of AS 2124-1992.

2.18 As Constructed Drawings

HP The Contractor shall, prior to Practical Completion, submit to the Superintendent one set of "As Constructed" drawings clearly notating changes of variance to the approved construction drawings that have occurred during the progress of the works. Notations shall be made on a clear set of drawings in red pen detailing variations to the original design and specified tolerances. The Superintendent will provide without charge one set of drawings on request.

3 QUALITY SYSTEM

3.1 The Quality System

The Contractor shall plan, develop and maintain a documented Quality System.

The quality system shall cover all work under the Contract and may incorporate safety and environmental management systems as set out in the following clauses.

The cost of compliance with these requirements shall be deemed to be included in the contract sum.

3.2 Quality System Documentation

The Contractor shall submit for consideration by the Superintendent the proposed Quality Plan within fourteen (14) days of the Date of Acceptance of Tender.

Any delay by the Contractor in obtaining the approval of the Quality Plan by the Superintendent shall be at the Contractor's expense and the Contractor shall not be entitled to any extension of time due to such delay unless the Superintendent has taken more than 14 days to reply to the Contractor's submission.

Works shall not commence until the Superintendent has approved in writing the Contractor's Quality Plan.

3.3 Quality Plan Requirements

The Contractor shall comply with the specified Australian Standards for Quality Systems. In addition the following requirements shall be satisfied:

- (a) Identification: the Contractor shall identify all test results with the precise locations to which they relate.
- (b) Traceability: such measures as are necessary to trace each product or service from receipt through construction.
- (c) Testing: the frequency of testing shall be adequate to demonstrate compliance with the Specification. In some instances the minimum frequency of testing is covered in the Specification.
- (d) Non-conformance: All non-conformances where the disposition of the non-conformance violates the contractual requirements are to be promptly reported to the Superintendent for agreement via non-conformance reports. Such non-conformances automatically create hold points.

Further, all non-conformance reports shall include:

- (i) the cause of the non-conformance;
 - (ii) the proposed method of rectifying the non-conformance; and
 - (iii) the proposed changes made to the work procedures to prevent a recurrence.
- (e) Design: Design of temporary works, handling details not specified on the drawings, effects of construction loads on the permanent works or any other design requirements specified in the Contract shall be controlled, including verification, in accordance with the Design Control requirements of AS/NZS ISO 9002.
 - (f) Audits: Audits carried out by the Contractor to comply with the requirements of the relevant quality system standard shall be conducted by a qualified auditor in accordance with Australian Standard AS 3911.1 "Guidelines for Auditing Quality Systems – Part 1: Auditing".

4 OCCUPATIONAL HEALTH AND SAFETY

4.1 General

The Council is obliged to provide and maintain, so far as is practicable, a working environment for its employees and members of the public that is safe and without risk to health.

The Contractor must itself, and must ensure that any sub-contractors of the Contractor, at all times identify and take all necessary precautions for the health and safety of all persons, including the Contractor's employees and sub-contractors, staff of the Council and members of the public, who may be affected by the performance of the services.

The Contractor must inform itself of all OH&S policies, procedures or measures implemented or adopted by the Council. The Contractor must comply with all such policies, procedures or measures.

The Contractor must immediately comply with any and all direction by the Superintendent relating to OH&S.

4.2 Legislative Compliance

The Contractor must –

- (a) comply with; and
- (b) ensure that its employees, sub-contractors and agents comply with –

any Acts, regulations, local laws, codes of practices and Australian Standards which are in any way applicable to OH&S and the performance of the services.

4.3 Contractor OH&S Management System

Pursuant to Clause 14.1 of the General Conditions of Contract, the Contractor must establish and implement an OH&S management system which ensures compliance with all duties of an employer under the *Occupational Health and Safety Act 2004* (**the OH&S Management System**).

The OH&S Management System must be:

- (a) submitted to the Superintendent for approval prior to the commencing works on-site; and
- (b) updated during each year of the contract term, and such updated OH&S Management System, submitted to the Superintendent for approval prior to each anniversary of the commencement date.

The Contractor must make any amendments to the OH&S Management System, or any update of the the OH&S Management System, submitted for approval of the Superintendent, which the Superintendent may direct.

The Contractor must implement the OH&S Management System or updated OH&S Management System, as the case may be, throughout the contract term.

The OH&S Management System must at least include:

- (i) the Contractor's OH&S policy and objectives;
- (ii) nomination of OH&S committee representatives;
- (iii) method / frequency of conducting OH&S meetings;
- (iv) the Contractor's organisational structure and responsibilities;
- (v) details of safe work practices and procedures to be implemented by the Contractor;
- (vi) the Contractor's OH&S training and induction;
- (vii) the Contractor's OH&S auditing and inspection procedures;
- (viii) the Contractor's OH&S consultation procedures;
- (ix) the Contractor's OH&S monitoring performance; and

- (x) the Contractor's assessment of all risks arising from its performance of its obligations under the Contract.

4.4 OHS Performance Monitoring

The Contractor shall, when requested by the Superintendent, provide evidence of the Contractor's ongoing implementation of the OH&S Management System. The Contractor must also provide the following information to the Superintendent monthly:

- (a) The number of 'lost time' injuries suffered by the Contractor's employees or sub-contractors;
- (b) The number of working days lost due to injury;
- (c) Current status of any injured personnel;
- (d) The status of the implementation and outcomes of corrective actions undertaken as a result of OH&S inspections and risk assessments; and.
- (e) The status of OH&S Management System audits undertaken by the Contractor.

The Contractor shall, when requested by the Superintendent, provide reports on OH&S inspections, audits or assessments undertaken during the Contract.

4.5 Incident Notification

If the Contractor is required by the *Occupational Health and Safety Regulations 2007*, or by any other Act or regulations, to give any notice of an accident occurring during the performance by the Contractor of its obligations under the contract, the Contractor shall, at the same time or as soon thereafter as possible in the circumstances, give a copy of the notice to the Principal.

The Contractor shall promptly notify the Principal of any accident, injury, property damage or environmental damage which occurs during the performance of the services. The Contractor must, within 3 days after any such incident, provide a report giving complete details of the incident, including:

- (a) results of investigations into its cause; and
- (b) any recommendations or strategies for future prevention.

4.6 Responding to and managing incidents

- (a) The Contractor must, at least 7 days prior to commencing works, supply to the Superintendent the name(s) and telephone number (s) of its nominated personnel for incident response and management. The nomination must ensure that a response will be available, 24 hours per day, 7 days a week, in the event of any incidents involving the works.
- (b) The Contractor's nominees must not use an answering machine on the nominated telephone contact numbers.
- (c) If the Contractor cannot be contacted, or if no response is received within two hours, the Principal may make its own arrangements to manage the

incident. The Principal's costs in doing so shall be deducted from monies owing to the Contractor.

4.7 Safety Audits

From time to time, the Principal or Superintendent may arrange for third party audits of the Contractor's operations to be conducted. Auditing will include, but not necessarily be limited to:

- Plant and Equipment
- Protection of Sites
- Work Methods
- Traffic Management

The Contractor shall allow access to all areas of the work, and all items of plant and equipment, to enable the audits to be conducted. Failure to provide such access will require the Superintendent to assume that there is a safety issue, and the Superintendent or his Representative/s or Inspector/s will direct that site or plant or equipment item (as applicable) to immediately cease operations.

The Contractor shall rectify any defect identified during an audit immediately, or within the time frame decided by the Superintendent. Failure to comply shall result in the Contractor being directed to either remove from the site any plant or equipment involved, or shut down the affected site, until such time as the defect is remedied.

The Contractor will be directed to remove from site any of his personnel that fail to comply with a direction to remedy defects.

The cost of the audits will be borne by the Principal. The cost to make good any defects identified as a result of the audit shall be borne by the Contractor. Costs associated with any delays caused by the time taken to remedy an identified defect, or direction to remove a person, plant or equipment item from site, shall be borne by the Contractor. No Extension of Time will be granted as a result of such delays.

4.8 Breaches of Safety Requirements

Where the Superintendent and/or his Representative deem that a work practice contravenes safe working requirements, then the Superintendent and/or his Representative may immediately suspend the works. All costs associated with such a suspension shall be borne by the Contractor, and no Extensions of Time will be granted.

In taking this action, it is the intention of the Principal to educate and enforce the need for the Contractor and his staff to take a serious approach to Occupational Health and Safety, and to reduce the safety risks associated with the works under this Contract. The Contractor is reminded that both the Principal and the Contractor could be held liable for any breach of the *Occupational Health and Safety Act 2004*.

In tendering for this Contract, the Contractor has undertaken to fully comply with safe work practices. It is therefore expected that all the Contractor's personnel will be fully trained in the requirements for, and use of, safety equipment and safe work practices. Therefore, there is no requirement for warnings to be given prior to suspension of works for contravention of the following:

- (a) Failure to correctly wear an approved safety helmet on a work site (mobile plant operators are only exempt from this requirement whilst located within the cabin of their vehicles).
- (b) Failure to correctly wear an approved safety vest on a work site within a road reserve. (mobile plant operators are only exempt from this requirement whilst located within the cabin of their vehicles)
- (c) Failure of Traffic Management Signage and Equipment to comply with the VicRoads Worksite Traffic Management (Roadworks Signing) Code of Practice.
- (d) Failure to adequately support an excavation.
- (e) Failure to adequately secure an unattended excavation.

4.9 Major Breaches of Health and Safety Requirements

If during the performance of works under the contract, the Superintendent informs the Contractor that it is the opinion of the Superintendent that the Contractor is either:

- Not conducting the work in compliance with the Safety Assurance Plan, health and safety management procedures, relevant legislation or health and safety procedures provided by the Principal from time to time, or:
- Conducting the work in such a way as to endanger the health and safety of any person

then the Contractor shall promptly remedy the breach of health and safety requirements.

The Superintendent may direct the Contractor to suspend the work until such time as the Contractor satisfies the Superintendent that the work can be resumed in a safe manner.

All costs associated with such a suspension shall be borne by the Contractor, and no Extensions of Time will be granted.

If the Contractor fails to rectify any breach of health and safety for which the work has been suspended, or if the Contractor's performance has involved recurring breaches of health and safety, this will constitute a substantial breach of contract. The Principal may therefore, at its option, terminate the Contract forthwith, and the Principal's liability shall be limited to payment for the work performed by the Contractor up to the time of termination or an earlier suspension of works.

5 ENVIRONMENTAL MANAGEMENT

5.1 General

The Contractor shall incorporate into the Quality System, a management system covering Environmental Management. The Environmental Management System shall include, but is not necessarily confined to, air pollution, water pollution, noise, waste, soil contamination, sediment control, waste minimisation and re-cycling and the preservation of habitat and identified historic and archaeological sites.

5.2 Environmental Plan

The Contractor shall submit for consideration by the Superintendent within 14 days of the Date of Acceptance of Tender, an Environmental Plan detailing the measures proposed by the Contractor to ensure its construction activities are undertaken in an environmentally and economically responsible manner.

The Contractor shall comply with the Environmental Plan approved by the Superintendent.

The Plan shall include, as a minimum, such matters as set out in the following clauses:

- The placement of site accommodation, toilets and storage compounds;
- The Contractor's vehicle access and areas where access is to be restricted;
- The enclosure or delineation of the site for safety;
- The protection of existing vegetation;
- Methods of dust control;
- Site drainage management measures;
- Control of discharges from and within the site;
- Methods of erosion control on the site;
- Methods of controlling surface runoff from the site and discharges to watercourses or drains so that they comply with EPA requirements; and
- A waste minimisation program to divert materials from the waste stream and place a strong emphasis on recycling.
- Environmental Plan Elements

5.3 Environmental Plan Elements

The following clauses outline the general requirements of environmental issues to provide guidance to the Contractor when preparing the Plan.

(a) Removal and Disposal of Rubbish

The Contractor must maintain the work site in a reasonably neat condition by regularly removing all rubbish and unused materials. Rubbish must be disposed of at a municipal landfill, or as otherwise approved by the Superintendent.

The Contractor must ensure that the Site is properly signed and barricaded to prevent unauthorised disposal of waste material and/or rubbish by either his staff, sub-contractors or others. Any rubbish and/or waste material so deposited is to be cleared from the Site immediately, at the Contractor's cost.

The Contractor is responsible for the removal and disposal of excess spoil from the Site, except where detailed by the Contract documents or Drawings, or where otherwise directed by the Superintendent.

(b) Noise Control

The Contractor shall conform with AS 2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition Sites". The Contractor shall avoid practices that lead to excessive noise and disturbance to site occupants and adjoining landowners and occupiers. Noise emanating from spoil dumping into trucks and from other machinery shall be minimised.

The Contractor is to conduct all Contract Works in residential areas, or in areas adjacent to and adversely affecting residential areas, between the hours of 7.00am and 5.30pm, unless otherwise required under the Contract. This does not apply to works

necessitated by an Emergency, or when the Superintendent specifically directs the Contractor otherwise.

The Contractor shall ensure that all noise emissions from the Contractor's Plant during operation are within the legislative and regulatory requirements.

Manual operations are not to be conducted at any times so as to cause a nuisance through excessive noise to the local community.

Machinery including jackhammers shall be silenced. Compressors shall be fitted with acoustic canopies to minimise noise levels. All machinery shall be kept properly greased.

All machinery used outside normal working hours, such as pumps, motors etc shall be electrically driven or otherwise fully silenced.

(c) Minimising Mud and Dust

The Contractor shall adopt practices that ensure that the dust and mud associated with the Works are minimised.

The Contractor shall immediately rectify any complaint from adjoining landowners and occupiers concerning disturbance, dust and mud. The cost of resolving complaints and cleaning up (where required) shall be borne by the Contractor.

Control measures must be implemented to prevent mud or dust from wheels and tracks of construction equipment being carried onto roads, paved streets, footpaths and the like. Mud accidentally deposited on paved surfaces shall be removed immediately by the Contractor. It must not be washed into the drainage system without the express written permission of the relevant municipality or the responsible authority.

(d) Disposal of Contaminants

The Contractor shall properly dispose of all solid, liquid and gaseous contaminants in accordance with all statutory and contractual requirements.

Gaseous contaminants shall be discharged in a manner that complies with the State Environment Protection Policy for the Air Environment.

Liquid contaminants to be disposed to stormwater must comply with the requirements of the State Environment Protection Policy for the Waters of Victoria. Liquid contaminants to be disposed to sewer must first be approved by South East Water Limited, and shall be contained in approved vessels for disposal at approved sites.

The Contractor shall dispose of solid contaminants by removal from site to an appropriate municipal landfill, or registered private landfill, which is licensed to accept the contaminant.

(e) Control of Ground Vibrations

All construction plant and equipment shall be operated without causing undue ground vibration.

For work near existing buildings, structures and underground services, construction methods shall be adopted which will minimise ground vibrations.

The Contractor shall bear all costs associated with any claim for damages resulting from the effects of ground vibration directly caused by the Contractor's construction methods. The cost of such damage shall be in addition to damage caused by other actions attributed to the Contractor's work.

(f) Preventing Damage to Vegetation

The Contractor must take all care to avoid damaging any shrubs, bushes, trees or other significant vegetation, during the works. This includes actions such as:

- Keep area within drip free line of all equipment, building materials and debris. Do not lean materials, equipment or debris against trunks and avoid piling under tree canopies.
- Fencing off vegetation to keep machinery away and tying back stems and branches to keep them out of the path of machinery.
- Do not carry out cut and fill operations within the drip line of any trees to be retained other than those specifically nominated on the final grading. Should the Contractor deem it necessary to carry out cut and fill operations within the drip line of any tree to be retained, the written approval of the Superintendent must be obtained prior to any such works being undertaken.
- Do not rip out the roots of any plant. Obtain the Superintendent's permission for removal of tree roots greater than 40mm in diameter.
- Trees in more than 300mm of fill shall be provided with a breathing layer around the collar of the tree.
- When excavations are carried out in the vicinity of trees to be retained, use hand excavation to locate any roots. Do not cut roots exceeding 40mm diameter unless permitted. Clean cut with a sharp saw any roots that need to be removed before commencing machine excavation. Do not use an axe to cut roots. Seal tree root cuts with "Steriprune" or equivalent approved tree wound sealant.
- Recording the location of, then transplanting and maintaining, small significant trees/shrubs etc, and replacing and re-establishing them as near as possible to their original location after completion of works.
- Providing landowners with advanced potted trees/shrubs to compensate for trees that had to be removed and could not be successfully re-established.
- Should any trees nominated to be retained are removed or damaged by the Contractor, damage shall be applied in accordance with the following formula and shall be deducted from the Contract Sum.

Three hundred dollars (\$300.00) per 25mm diameter of trunk or any branch removed up to a maximum of ten thousand dollars (\$10,000.00) per tree. The diameter of the trunk shall be measured 1200mm above the base of the tree or in the case of the branch, 1200mm above the base of the branch.

- All tree surgery shall be approved by the Superintendent. Tree surgery will be carried out by a qualified arborist at full cost to the Contractor. The Contractor is to allow for this cost in his tender.
- The Contractor shall make good any damage to tree crown or root systems as soon as possible by an approved Tree Surgeon. When a tree has been damaged to such an extent that it must be removed, the Contractor shall at no variation to the contract, provide a new suitable approved tree, as directed by the Superintendent.

(g) Control of Sediment Pollution

The Contractor shall implement sediment control measures to minimise the impact of contaminated stormwater on the environment. If contaminated stormwater enters a

drainage line or stormwater drainage system, it will eventually discharge into, and pollute, a waterway or marine environment.

The proposed sediment controls must take into account the nature of the site. Factors such as rainfall patterns, soil type and topography need to be considered when selecting the appropriate control measure.

Careful pre-planning to prevent erosion and sediment control will result in many on-site advantages in addition to protecting the environment.

In order to comply with these requirements and with the emission limits for waste discharges to water specified in State Environment Protection Policy (Waters of Victoria), the Contractor shall:

- Comply with the requirements of the following EPA documents. (These documents can be downloaded from www.epa.vic.gov.au.)
 - Environmental Guidelines for Major Construction Sites.
 - Construction Techniques for Sediment Pollution Control.
- Ensure that the concentration of suspended solids and turbidity in waters pumped into the drainage system do not exceed the emission limits for waste discharges to water as specified in Schedule E of the *State Environment Protection Policy (Waters of Victoria)*. To achieve this it may be necessary to:
 - Adequately plan, install and maintain the sediment control of the construction site and ensure that construction activities such as excavating and dewatering do not result in turbid water entering drainage networks.
 - Implement daily monitoring of the turbidity of water pumped directly to a natural waterway or a drainage system discharging to a natural waterway.
 - Supervise all pumping and implement precautions to minimise the turbidity of pumped water.
- Adopt practices to ensure that turbid water shall not enter the drainage systems. Suggested practices could include, but are not limited to:
 - Construction of detention basins and settling ponds particularly on larger sites.
 - Discharge of silt laden waters onto vegetated areas of suitable size and slope to filter out suspended silts.
 - Where land is not available or suitable for settling ponds and/or vegetated filter strips, then silt laden water may need to be subject to a specifically designed physical filtration and/or chemical flocculation system to remove suspended silts.
- Advise the Superintendent of the proposed method prior to commencing construction. Suggested options / methods that the Contractor may use to achieve the measures are as follows:

(Note: These options / methods only present a few of what is available and the Contractor may use others that exist. The Superintendent will need to approve any such options / methods that the Contractor decides to use)

- *Temporary culvert/side entry pit entry:*
Planks of timber around culverts/side entry pits with either or both geotextile, gravel behind timber to allow water to pass through, but retain the silt.
 - *Silt fences:*
Fabric filter (geotextile) reinforced with mesh and crushed rock.
 - *Side entry pits:*
Plug side entry pits and discharge into pit, then dispose of at sites where other controls have been installed. This may require transportation of water off site.
 - *Baffle tanks:*
Site baffle tanks designed to manage the site flows.
- Stockpiles of spoil and materials are to be kept to a minimum as well as being located clear of footpaths and street channels.

Other steps that may be necessary to prevent sediment from these stockpiles entering the drainage system would be the use of such options as:

- Tarpaulins or plastic sheeting over the stockpiles.
 - Storage bins.
 - Use of timber toe boards around the stockpiles.
- Use suitable methods on construction sites when dewatering and road cleaning / jetting.
 - DO NOT use hay bales as the only sediment control in residential streets.

If all known on-site treatment methods are unsuitable or impracticable, then turbid and silt laden water must be removed by tankers for treatment and disposed at an appropriate wastewater treatment facility.

6 EXAMINATION AND TESTING OF MATERIALS AND WORKS

6.1 Description

This section covers some of the requirements for examination and testing of materials and work associated with the Contract. Particular examination and testing requirements are separately specified in the relevant sections of this Specification.

6.2 Testing Costs

All testing costs are to be borne by the Contractor.

6.3 Examination and Testing

6.3.1 General

The Contractor shall be responsible for carrying out all examination and testing of materials and work under the Contract in accordance with the requirements of this Specification.

Unless otherwise specified, materials and workmanship shall comply with the relevant Australian Standards.

6.3.2 Allowance for Testing in Construction Program

The Contractor shall make allowance in the construction program for the time necessary to arrange for and carry out examination and testing of materials and works.

6.3.3 Notification

Where inspection of materials or work by the Superintendent is specified as a hold point (HP), or where a hold point is created by a non-conformance, at least 24 hours notice of testing and/or inspection shall be given to the Superintendent.

6.3.4 Tests

Unless otherwise specified, all tests shall be undertaken in accordance with the appropriate VicRoads Codes of Practice and Standards Australia test methods as current at the time of performance of the tests. Unless otherwise specified, all off-site tests shall be conducted by experienced testing officers in a laboratory accredited by the National Association of Testing Authorities (NATA) for the test methods used under the Contract and all tests shall be endorsed in accordance with the NATA registration for that laboratory.

For materials sampling, the Contractor may nominate a Certified Construction Materials Tester certified and registered by NATA for the sampling involved.

6.3.5 Test Results

The Contractor shall submit to the Superintendent a summary of testing undertaken at intervals not exceeding one month or more frequently if requested by the Superintendent. The summary shall include details of all tests undertaken, the result of each test and sufficient additional information to demonstrate that the specified minimum frequency of testing is being complied with.

6.3.6 Calibration

All test equipment used for tests, carried out in accordance with subclause 6.3.4 above shall be calibrated by a laboratory accredited by NATA for the particular calibration method.

Commencement of Works

The Contractor shall not commence work on site before objective evidence to the existence of Public Liability insurance and Workcover conforming to the requirements of the General Conditions of Contract has been provided to the Superintendent, and the Quality Plan, Health and Safety Plan and the Environmental Plan has been submitted to the Superintendent for review.

Any delays in commencement of work caused by this requirement will not be grounds for an extension of time for completion of the Works or any part thereof, nor shall it form the basis of any claim for additional payment.

Notification and Communication

Unless otherwise specified, the Contractor shall give:

- (a) seven (7) clear working days notice to the Superintendent in writing prior to commencing works of this Contract.
- (b) seven (7) clear working days notice to all abutting and affected property occupiers, in writing, prior to commencing works of this Contract.

Site Establishment

The Contractor shall erect, for his own use, such buildings, compounds, sanitary accommodation and associated services as are required for the supervision and construction of the Works.

Litter shall be placed in rubbish containers. Fuel oil and other pollutants shall not be discharged onto the ground or into drains. Spillage shall be contained and removed from site.

At the completion of the Works, these facilities will remain the property of the Contractor and shall be removed, or disposed of, and the area left tidy to the satisfaction of the Superintendent.

7.2.1 Site Accommodation and Facilities

The Contractor shall, within the Contractor's Area, provide site accommodation and facilities complying with, but not necessarily limited to the requirements set out in paragraph (b) below for themselves and sub-contractor. All expenses incurred in providing and maintaining such accommodation and facilities shall be deemed to have been included in the Contract Price.

The site accommodation and facilities provided by the Contractor shall include:

- (i) the Contractor's site offices;
- (ii) a fully equipped sick bay; and
- (iii) all weather access and parking facilities adequate for the Contractor's and his sub-contractor's workforce.

7.2.2 First Aid and Medical Facilities

The Contractor shall in all respects be fully responsible for the provision of first aid services to his staff and workforce, including the transport of injured personnel to hospital or other appropriate accommodation as and when required.

The provision of first aid shall be in accordance with the Code of Practice for First Aid in the Workplace.

The Contractor shall provide notices giving the names and telephone numbers of at least two (2) medical doctors practicing in the vicinity of the Site and the telephone numbers of the local ambulance. These notices shall be prominently displayed adjacent to each telephone to be used on the Site during construction.

7.2.3 Water Supply

Unless provided for elsewhere in the Contract Documents, the Contractor shall make its own arrangements with the relevant water supply company or authority for the provision of a water supply point near the Site and shall pay all costs associated with the provision of the water supply and the use of the water throughout the term of the Contract.

The Contractor shall be responsible for the reticulation of the water supply from the point of supply to all points of the Site.

7.2.4 Electricity Supply

The Principal has no reticulated power supply available for use by the Contractor at the site.

The Contractor shall make its own arrangements for the supply of electric power to the Site for its own use and shall pay all charges for the installation and use of electric power.

All costs associated with the supply and use of electric power for construction purposes shall be deemed to be included in the Contract Sum.

All electrical installations carried out by the Contractor shall comply in all respects with AS3000, the Code of Practice for Temporary Electrical Installations for Buildings and Construction Sites and the requirement of the local electricity supply retailer.

If necessary to prevent damage to the Works or delays to the Date of Practical Completion the Contractor shall make provision for an on-site generator which shall be suitable silenced. The provision and use of this plant shall comply with all current regulations and Codes of Practices and shall be at no extra cost to the Principal.

Any pumps used for dewatering between the hours of 6:00 pm and 8:00 am shall be electrically driven to minimize noise in residential areas.

7.2.5 Telecommunications

The Contractor shall make its own arrangements for the provision of its telecommunications requirements.

The Contractor shall be deemed to have satisfied itself that any mobile telecommunication device operates satisfactorily over the whole of the Site.

The Contractor shall make due allowance for the amount of time required to provide fixed telecommunications at the Site as no extension to the Date of Practical Completion will be allowed on the basis of any claimed delay.

7.2.6 Sanitary Provisions

The Contractor must comply with the Code of Practice titled Building and Construction Workplaces issued by Health and Safety Authority Organisation, Victoria.

The Contractor shall provide suitable and approved sanitary accommodation for persons employed on the works, as approved by Council's Environmental Health Coordinator. The Contractor shall pay all associated fees and charges.

The Contractor must, at its own cost, provide toilet and adequate wash facilities for its personnel and that of its sub-contractors. These facilities shall be connected to a storage tank, or other facility approved by the Superintendent, which shall have a minimum of 14 days storage capacity and shall be located in a place approved by the Superintendent.

The Contractor shall provide watertight refuse bins for use by its workforce.

The Contractor shall arrange for the removal of all sewage from the holding tank and for all garbage and refuse to be collected at regular intervals and disposed of at approved and lawful locations outside the work Site.

The Contractor is warned of the danger and loss caused by interference with the conductors, insulators or structures on the transmission lines of the appropriate power company. No blasting or clearing operations shall be carried out in the vicinity of such lines, or any other Authorities mains, without adequate precautions being taken to prevent possible damage. The power company, or any other Authority, has the power to recover damages from the person(s) responsible for such loss or damage.

Security of the Site

The Contractor shall provide at its own cost security for the Site and the Works, its construction facilities, and plant and equipment associated with the work under the Contract.

The Contractor shall erect security fencing and lockable gates around the Contractor's Area and, where practicable to do so, around the Works Site and shall maintain the fence and gates in good condition to exclude unauthorised entry into the Works Site.

Plant and equipment left unattended on the Site shall be securely locked to prevent their operation or removal by unauthorised persons. All plant and equipment operated by hydraulic mechanisms must be lowered to the ground or lowered to their normal resting positions when not in use. Material shall also be secured by the Contractor to prevent their removal by unauthorised persons. In the event of any loss or damage the Council will not be held responsible.

The Contractor is fully responsible for the safe keeping of materials, plant and equipment supplied by the Principal to the Contractor. Losses due to theft or vandalism or damage to the Principal's materials and plant and equipment shall be repaired or replaced by the Contractor.

7.4 Tidy Work Sites

Pursuant to Clause 38 of the General Conditions of Contract, the Contractor shall during the construction of the Works keep the Site and the Works free of litter and rubbish and, on completion of the Works, the Contractor shall remove from the Site and all other areas utilised by it for the purposes of the Contract, all plant, structures, temporary fences and gates, temporary access roads and hard standing, rubbish, unused materials construction facilities, and other materials belonging to the Contractor or used under

direction, and leave the Site and such other areas clean and tidy to the satisfaction of the Superintendent. In disposing of such rubbish and other materials the Contractor shall not dispose of them on land under the control of the Principal without the written approval of the Superintendent.

Excavated materials shall not be stockpiled on sealed road surfaces, or in kerb and channels, or road table drains.

Only quantities of quarry products sufficient for the day's work shall be stockpiled on site. Stockpiles shall be kept neat at all times, and particular care must be taken to ensure that stockpiles:

- Cannot be washed into drains or water courses
- Are not sited on lawns or another areas that would otherwise be unaffected by the works.

Footpaths and pedestrian walkways are kept free of all materials at all times. Any materials spilt shall immediately be swept or otherwise cleaned off the path.

All rubbish, excess spoil and cut/pruned vegetation must be removed from site to an approved disposal site before the conclusion of work each day. The refuse and debris and any other surplus material shall become the property of the Contractor once it has left the Site and must be disposed of in a lawful manner.

The Contractor shall after the removal of all debris, surplus material, Temporary Works and Constructional Plant restore the Site and all other areas utilised by it by filling, shaping, or levelling to a stable, free draining state and planting an approved species of grass or other finish as appropriate, to the satisfaction of the Superintendent.

7.5 High Visibility Jackets

All personnel, including supervisors, surveyors, labourers and plant operators, shall wear fluorescent red/orange day/night high visibility traffic jackets properly fastened at all times.

8 PROGRAM AND PROGRESS

8.1 Construction Program

For the purpose of this Clause, "construction program" means a program in the format of an activity oriented, critical path network that shows how the Contractor proposes to complete the Works or any separable part of the Works within the period or by the respective dates for Practical Completion.

The program shall be computer based using "Microsoft Project" or an alternative computer program approved by the Superintendent. It shall be in sufficient detail to demonstrate any entitlement that the Contractor may from time to time claim to have pursuant to the General Conditions of Contract and be capable of providing reports which are able to identify the following features in acceptable formats:

- (i) detailed activities with corresponding duration in days;
- (ii) activity dependencies;

- (iii) critical path activities identified for the Works and any separable parts of the Works;
- (iv) total and free floats;
- (v) plant and labour resources planned for each activity;
- (vi) tests and inspections;
- (vii) dates for approvals required from Port Phillip City Council, material supplies, or equipment supplies which the Contractor nominates as necessary to maintain the program and which are to be provided by others;
- (viii) milestones which identify significant events including completion of separable parts;
- (ix) as constructed details.

The Contractor must ensure that there is no disruption to service users at the time of commencement of the contract and must provide a construction program to the Superintendent at least seven days prior to the commencement of the Works which outlines the steps above as well as the steps which will be taken to ensure a smooth transition. This program must address tasks between contract award and commencement, the time required after award to complete preparations required and milestone schedule for tasks planned in the initial operating phase.

8.2 Estimated Cash Flow

The Contractor shall submit an estimated cash flow with the Construction Program. This cash flow shall be revised and submitted with each and every amendment to the Construction Program.

8.3 Review of Submitted Program

If the Superintendent considers that the submitted construction program or any subsequent revision thereto does not show sufficient details, or is impractical, or does not comply with the requirements of the Contract, or will not result in completion of the Works by the relevant Date for Practical Completion, the Superintendent may direct the Contractor to resubmit to the Superintendent an amended construction program within seven (7) days for further review.

Should the submitted construction program provide for completion of the Works in advance of the relevant times for Practical Completion and the Superintendent does not direct the Contractor to supply an amended construction program, then the Contractor may proceed to prosecute the work in accordance with the submitted construction program at the Contractor's own risk.

8.4 Review of Progress

At generally fortnightly intervals unless agreed otherwise, the Contractor and the Superintendent shall together review the progress of the work under the Contract in comparison with the Reviewed Construction Program. Where required by the Superintendent, such review will be conducted as a site meeting between representatives of the Council and the Contractor held generally monthly or at shorter intervals as decided by the Superintendent.

Reviews held as site meetings shall be chaired by the Superintendent or the Superintendent's nominated representative and minutes prepared and distributed to the Superintendent and the Contractor within fourteen (14) days of the meeting.

8.5 Updating and Reporting on Construction Program

The Contractor shall maintain a complete record of the construction program and its changes on both computer disk and hardcopy, throughout the contract.

The Contractor shall submit to the Superintendent updated construction programs:

- at intervals not exceeding one (1) month during the Contract; or
- within fourteen (14) days of any change to the critical path for the Works or any separable parts of the Works.

Within seven (7) days of a request to do so from the Superintendent, the Contractor shall submit an explanation in writing of delays in execution of the work under the Contract in comparison with the construction program.

Updated construction programs shall provide the same level of detail as the original Construction Program and shall:

- be accompanied by a statement of the reasons for changes from the previously submitted Construction Program;
- incorporate all extensions of time which have previously been granted or allowed up to that time by the Superintendent;
- be accompanied by a statement of any claims for extensions of time which have previously been notified by the Contractor in respect of which the Superintendent is yet to determine.

8.6 Rate of Progress

Where the Superintendent at any time considers that the rate of progress is insufficient to ensure completion of the Works by the relevant Date for Practical Completion, the Superintendent may direct the Contractor to submit within fourteen (14) days written details of the intended procedure for the execution of the remainder of the work under the Contract.

In the event of the Contractor failing to execute the remainder of the work in accordance with the written procedure, the Superintendent shall have full power to complete the work in such manner as the Superintendent may think fit at the sole risk and expense of the Contractor.

8.7 Adverse Weather Conditions

Time lost due to adverse weather conditions is defined for the purpose of this Contract as time lost due to wet weather, fog, excessively hot, excessively cold and/or dangerously windy conditions and to the effects of these adverse weather conditions, eg wet site conditions following rain.

When wet weather delays the progress of the works resulting in a claim for extension of time, the Contractor shall notify the Superintendent immediately of any time lost due to adverse weather conditions and shall confirm such notification in writing within 7 days. This confirmation shall provide details of the nature and extent of delays and the construction activities affected.

The Superintendent, if satisfied that the Contractor has taken reasonable steps to minimise the period of delay, shall record when the delay was reported and an assessment of the delay claimed. This record will form the basis of the Superintendent awarding an extension of time.

Only delays affecting critical activities will be considered as time lost due to adverse weather conditions.

9.1 Normal Hours of Work

Pursuant to Clause 32 of the General Conditions of Contract, the Contractor's working hours at the Site shall be restricted to the hours between 7.00 a.m. and 5.30 p.m. Monday to Friday inclusive, but excluding statutory public holidays and Industry Award Rostered Days Off.

No work other than routine maintenance on the Contractor's plant will be permitted on Saturdays, Sundays, public holidays and Industry Rostered Days Off without prior written approval of the Superintendent. Such maintenance work shall only be carried out between the hours of 8.00 a.m. and 4.00 p.m. Any routine maintenance shall be carried out and in such fashion as not to cause any spillage of any material and shall be limited to minor maintenance such as that normally carried out to equipment on a daily basis. No servicing or repair of equipment shall be undertaken on site without the express permission of the Superintendent.

9.2 Construction Work Outside Normal Hours

If the Contractor desires to carry out the works outside the normal working hours, he shall make a written request to the Superintendent (in a format acceptable to the Superintendent) to carry out construction works outside normal working hours. The request must be delivered to the Superintendent no later than 12:00 noon on the preceding Thursday. Providing inspection services can be made available, the Superintendent may grant written permission. The Contractor shall pay in full, for time beyond the normal working hours, all wages and/or salaries of supervising personnel.

On the last normal day prior to an extended weekend, the following activities must be completed no later than 4:00 pm:

- All construction works must be completed, shafts and trenches backfilled, road openings adequately sealed using premix.
- All safety requirements (including, but not limited to, barriers and road signage) must be in place.
- All environmental protection requirements must be in place. This includes, but is not limited to, ensuring all silt traps are maintained and working correctly, and all drainage systems (both natural and man made) are protected against sediment entry.
- All efforts must be pursued to remove any unused stockpiles of quarry products, topsoil or excavated material off site. However if this is not possible, then stockpiles must be appropriately barricaded, and secured in accordance with EPA guidelines to ensure sediments do not enter drainage systems.

9.3 Co-Operation

The Council reserves the right to perform works or award other contracts for works on or adjacent to the site. The Contractor shall co-operate with all other contractors and other work forces so as to avoid delay or hindrance to their work and to ensure that all work is performed expeditiously.

9.4 Blasting

Blasting shall not be undertaken in the execution of the work under the Contract without the written approval of the Superintendent.

9.5 Setting out Works

Pursuant to Clause 28 of the Conditions of Contract AS2124-1992, the Contractor shall be completely responsible for the setting out of works and the accuracy of lines and levels, and shall provide themselves with all necessary appliances such as dumpy levels, spirit levels, straight edges, boning rods, measuring tapes, templates, etc., and these shall be available for use at all times during the works

The Contractor shall employ an approved competent and experienced surveyor to set out the works on the Contractor's behalf. The surveyor shall be a practicing survey specialist with formal qualifications in surveying. In circumstances where it is necessary to set out the works using cadastral information, the surveyor shall be a licensed surveyor.

Bench marks and/or permanent survey marks are located as shown on the plans. Any survey marks disturbed marks as a result of the Contractor's works/activities shall be replaced by a licensed surveyor at the Contractor's expense.

Any benchmarks, including temporary bench marks, set out by the Contractor's surveyor shall not be placed within the "No Go Zone" (as defined by the Chief Electrical Inspector) of electricity supply authority assets.

The Contractor shall, when setting out the works and during construction, report to the Superintendent any apparent inconsistency or mistake or error between the set out and data supplied by Port Phillip City Council, and shall not proceed with further construction works without the authority of the Superintendent.

9.5.1 Protection of Survey Pegs

Before any works commence the Contractor shall identify the location of all survey pegs, including survey marks, bench marks and level pegs. During the course of the Works, the Contractor shall make every endeavour to maintain survey pegs so long as the ground beneath them are not required to be cut away to complete the works.

Where survey pegs are to be removed with excavations or covered over, offset pegs shall be placed in position suitable for checking the location of the Works until survey pegs can be replaced.

During construction, the Contractor shall maintain identifying markers to indicate survey and offset peg locations. Markers shall be clear and able to be observed whilst operating construction equipment. Markers shall be placed adjacent to, and so as not to disturb, each survey peg within the Works zone.

Survey and offset peg markers shall be approved by the Superintendent. White stakes or star pickets with coloured plastic tape, or similar, clearly visible above adjacent obstructions, may be used. All survey pegs disturbed during construction shall be replaced by the Contractor prior to practical completion of the Works.

During clearing and grubbing operations, care shall be taken not to disturb any bench marks, survey or level pegs. Any survey pegs lost as a result of the Contractor's carelessness shall be replaced at the Contractor's expense.

9.6 Public Utilities and Services

The locations of various underground structures, services and other property as shown on the Drawings are believed to be correct but do not purport to be absolutely so. The Drawings have been provided for the information of the Contractor but shall not be used as if the structures, services or the property will be found exactly as plotted or that they are complete or accurate. The Principal does not warrant the correctness of such information.

Prior to commencing works of this Contract, the Contractor shall obtain all relevant information from the appropriate Authorities concerning the location of any water, sewerage or gas mains, storm water drains, electric power, telecommunication lines (either above or below the ground), which may be affected by the works of this Contract.

The Contractor shall be responsible for any damage, which has been caused by any works or operations under his control to any water, sewerage or gas mains, or any main, cable or pole of the electricity or telecommunication supply.

The Contractor shall, where any damage has occurred to services, notify the Superintendent and also the responsible authority concerned, and make all arrangements for any necessary repairs. The Contractor shall have no claim against Council for any delay, loss or inconvenience that may be caused by any such damage.

The Contractor shall make provision for the sealing and removal of unused services, for the cutting, sealing and reconnection of any services temporarily requiring attention, and shall ensure that all leaks and defects in any services are stopped and repaired before construction proceeds or recommence, all as approved by the responsible authority.

All fire plugs, valve boxes, manhole covers and other miscellaneous covers are to be set by the Contractor to match the finished surface levels in compliance with typical details. The Contractor shall arrange with the appropriate service authority for the adjustment of all covers, and all associated costs are deemed to be included in the tender price.

The Contractor is warned of the danger and loss caused by interference with the conductors, insulators or structures on the transmission lines of the appropriate power company. No blasting or clearing operations shall be carried out in the vicinity of such lines, or any other Authorities mains, without adequate precautions being taken to prevent possible damage. The power company, or any other Authority, has the power to recover damages from the person(s) responsible for such loss or damage.

The Contractor shall at all times keep all water main cocks and fire fighting plugs and hydrants free from obstruction. Should it be necessary to temporarily dump spoil or other material over Authorities' surface fittings, the Contractor shall mark the position of these fittings conspicuously.

9.7 Maintenance

The Contractor shall maintain the works of this Contract to the satisfaction of the Superintendent for the Defects Liability Period set out in Annexure A to the General Conditions of Contract, after practical completion of the work.

If at the end of the maintenance period, the necessary maintenance work has not been carried out to the satisfaction of the Superintendent, the Port Phillip City Council shall have the right to, and will complete, the necessary maintenance work at the expense of the Contractor.

10.1 Inspection of Property

Prior to the commencement of work, the Superintendent may arrange for a joint inspection of land and buildings adjacent to the site, to be made by representatives of the Council, and the Contractor. The condition of the land and buildings will be recorded for comparison purposes after the completion of the Contract period.

Any damage caused to the land and building due to the Contractor's use of inappropriate methods or negligence will be the responsibility of the Contractor.

10.2 Work in Private Property

The Contractor shall not, without the written consent of the owner, interfere with any public or private property or improvements except in accordance with this Contract, and shall protect and maintain, free from injury or interference, any structure or any private or public service or other property liable to be damaged by the works of the Contract.

Where the works include any item or items which make it necessary to go into or through private property as, for example, the installation of drains through private property, the Contractor shall take all possible precautions to prevent the property or improvements being damaged, and to avoid (as far as possible) any inconvenience to residents and the public. Under no circumstances shall soil or other materials be heaped or allowed to fall and remain against buildings or fences without the written consent of the owner, and then only provided that adequate precautions are taken for the protection and safety of those fences and/or buildings.

The Contractor shall be responsible for any damage done by themselves, his servants, employees or agents, or by any plant or equipment used or connected with the work in any way, whether owned by the Contractor or not, on or to any private or public property.

The Contractor shall (at his own expense), as soon as the progress of works permits, repair and restore any structure, service or property damaged in any way to the like order and condition in which it was before such damage. The Contractor shall provide (at his own expense) any materials and/or labour, which are required for the satisfactory reinstatement of same.

The repairs may be made by the party controlling the structure, service or property, and the cost of such repairs may be deducted from the monies due or which may from time to time become due to the Contractor. The Contractor shall also be liable for any loss or damage, which may result from such damage or interference to any structure, service or property and for any claim arising from delay in repairing and restoring it.

All roads, channels, paths, drives, yards or other places used in connection with the work shall be kept free of unnecessary obstruction whilst the work is proceeding, and left tidy on completion to the satisfaction of the Superintendent.

Where work is to be done in a sewerage or drainage easement, drainage reserve, or any other reservation or easement through private property, the Contractor will normally be required to confine his operations to the width allowed in such easement reserves or reservation. Any concessions the Contractor may require (apart from the said easement), and particularly in regard to access, must be obtained by him from the property owners or other parties concerned at his own expense entirely.

Approved slip panels are to be provided by the Contractor in all fences crossed by such easement or reserves. If required, provision must be made for livestock to have access at all times to any creek, or to land on each side of the easement.

Property shall include all buildings or structures, fences, services or drains, crops or growth of vegetables, cattle, horses, or livestock and vehicles.

10.3 Clearances from Landowners and Occupiers

Where the construction of any works has required the Contractor to go into or through private property the Contractor shall, prior to the expiration of the maintenance period, obtain from the owner or owners involved written advice that the Contractor has reinstated the parts of their property affected to their satisfaction.

In cases of dispute between owners concerned and the Contractor, the matter shall be referred to the Superintendent for decision, and whose decision shall be final and binding on the Contractor.

11 PROVISION FOR TRAFFIC

11.1 Definitions

Work Zone

The length of roadway within the Contract limit of the Works as specified.

Work Area

The specific area where work is being carried out as defined in the Contract.

Side Track

A temporary roadway constructed within the road reserve to carry traffic around the Works or Work Zone.

Traffic Detour

A detour of traffic away from the Work Zone or the Works via alternative roads or streets.

11.2 General

This Clause covers requirements where the Contractor is solely responsible for traffic management.

Unless specified otherwise, the Contractor shall make provisions for traffic, including pedestrian, in accordance with this section and the relevant parts of the VicRoads Worksite Traffic Management (Roadworks Signing) Code of Practice, hereinafter referred to as the Code, or Australian Standard AS 1742.3 – Manual of Uniform Traffic Control devices. The Contractor shall make such provision for traffic notwithstanding anything contained in the General Conditions of Contract and without derogating in any way from the Contractor's obligations pursuant to the General Conditions of Contract and in particular from the Contractor's obligations pursuant to Clause "Protection of People and Property" of the General Conditions of Contract.

The Contractor shall submit, before commencing any part of the work, a Traffic Management Plan providing details of the proposed provisions for traffic to be provided during the Contract for review and approval by the Superintendent.

Should circumstances arise which are not adequately covered in this section, the Contractor shall submit alternative proposals to the Superintendent for review and approval prior to works proceeding.

Works shall not commence or continue at any location until all appropriate signs and devices such as lamps, barricades, traffic control apparatus and the like are in place, side tracks have been constructed where required and line marking completed where required.

At all times when the Contractor's employees are on site, the Contractor shall render immediate assistance without charge to any person whose lawful passage through a work area may be obstructed or made difficult by or as a result of the Contractor's operations.

Unless otherwise approved, when work is not being performed on the site, traffic shall not be carried through that works zone or works area on side tracks, detours or part widths of the existing pavement.

11.3 Contractor's Representatives

On commencement of the Works, the Contractor shall advise the Superintendent in writing of the names, addresses and telephone numbers of employees who can be contacted in any emergency which may require repairs to the Works under the Contract or the replacement or maintenance of signs and devices.

Any proposed changes of representatives, together with their contact telephone numbers or addresses shall be notified promptly to the Superintendent, prior to the change, and confirmed in writing to the Superintendent.

11.4 Care of Areas Used by Traffic

Both during and at the end of each day's work, the Contractor shall be responsible for ensuring that the pavement and shoulders used by traffic within the Work Area, and all other areas within the Work Zone where the Contractor has undertaken work, are in a safe and trafficable condition.

The Contractor shall immediately remove any material that has fallen on any travelled path, or road leading to/from the work site, as a result of the transportation of materials or other. The Contractor shall immediately remove any material stored or deposited near the travelled path that could constitute a hazard to traffic. Any soiling of adjacent road pavements, caused by vehicles or equipment engaged in these activities shall be immediately cleaned off by the Contractor, at his expense, and to the satisfaction of the Superintendent.

11.5 Signs and Devices

Unless otherwise specified, the contractor shall supply signs and devices required to complete the work covered by this section.

Signs and devices shall comply with the relevant sections of the Code together with the following additional requirements:

- (i) Pavement Markers

Pavement markers shall comply with the requirement of AS 1906, Retroreflective Materials and Devices for Road Traffic Control Purposes, Part 3 – Raised Pavement Markers (Retroreflective and Non Retroreflective). The adhesives used to fasten them to the pavement shall comply with the requirements of Section 853 of Vicroads Standard Specifications.

(ii) Retroreflective Sheeting

Retroreflective sheeting used on any sign or device shall comply with the requirements of AS 1906, Retroreflective Materials and Devices for Road Traffic Control Purposes, Part 1 – Retroreflective Materials, for Class 2 material, except that the coefficient of luminous intensity shall not be less than 50% of the values given in Table 2.2 of AS 1906 Part 1, for each designated colour when tested in the cleaned condition.

(iii) Signs

Dirty, illegible, damaged or faded signs shall not be used if there is any doubt that the message or intent of the sign is unclear or confusing to road users. The Contractor shall clean, replace or renew all signs as required to ensure legibility and luminous intensity.

11.6 Storage of Plant and Equipment

When not in use, the Contractor shall be responsible for the safe storage of plant and equipment clear of the travelled path. Wherever possible, plant and equipment shall be stored not less than 3 m from the edge of the traffic path. If it is not possible to provide such clearance, the plant and equipment shall be moved from the Works area to a suitable storage site or be protected by suitable signs, lights and devices.

11.7 Access to Side Roads and Abutting Property

Construction operations shall be conducted in such a manner as to minimise inconvenience to abutting property owners. Unless otherwise specified, access to properties and side roads shall be maintained at all times wherever practicable other than when the works present a traffic hazard or the work would suffer damage as a result of the passage of traffic.

Where the Contractor proposes to restrict access to abutting properties as a result of the Contractor's operations, the Contractor shall provide a minimum of 24 hours notice to the affected property owner/occupier.

Access shall not be denied to any abutting property outside the customary working hours.

11.8 Construction Operations Affecting Traffic

11.8.1 General

Unless otherwise specified, the Contractor shall so conduct the operations as to minimise obstruction and inconvenience to the public, and shall not have under construction any greater length or amount of work than can be managed properly with due regard to the convenience of the public.

Any intermingling of construction plant with traffic shall be kept to a minimum at all times.

Unless specified otherwise, the Contractor shall:

- (i) provide a minimum safe working width for the Contractor's construction plant plus an absolute minimum clearance to the edge of traffic path of 1.2 m;

- (ii) provide a minimum one way clear travel path width of traffic of not less than 3.5 m for one-way operation and 7 m for two-way operation;
- (iii) not work on any part of a carriageway during peak traffic flows unless such work is conducted that it does not cause any additional delays to traffic than if the work was not done;
- (iv) locate the longitudinal joint(s) for pavement construction and/or cold planing works at either the traffic lane line(s) or at the centre of the traffic lane(s) or as specified in Section 19 – Hot Mix Asphalt for asphalt paving.

11.8.2 Earthworks and Pavement Construction

Unless otherwise approved by the Superintendent, earthworks and pavement construction shall proceed only in areas clear of travelled paths and footpaths.

Where construction is being carried out over part of the carriageway width, the following conditions shall apply:

- (i) steps or batters within 1.5 m of the travelled path of the carriageway shall be delineated as specified in the Code. Where the step or batter forms a drop in level of more than 200 mm at a slope steeper than 1 in 6, barricades shall be used in addition to delineation.
- (ii) where the level difference in the form of a step or batter of less than 80 mm and is between the travelled paths, such step or batter shall be removed before the close of work each day and the full width of carriageway made available to traffic overnight. The removal of such step or batter shall be effected by shaping to a crossfall not steeper than 1 in 10.
- (iii) Unless otherwise specified, prior to the close of work each day all steps between layers of unbound pavement material being placed shall be tapered to a slope not steeper than 1 in 10.

11.8.3 Footpaths and Pedestrian Walkways

Unless otherwise specified, temporary footpaths or pedestrian walkways within the work zone shall be not less than 1.5 m wide, shall have a firm, even and free draining surface and shall be free from steps and obstructions.

11.9 Side Tracks, Detours and Road Closures

11.9.1 Side Tracks

HP Traffic shall not be diverted on to any side track until permission to use such side track has been given by the Superintendent.

11.9.2 Detours

Unless otherwise specified, traffic shall not be detoured on to roads outside the work zones.

11.9.3 Road Closures (refer to VicRoads Traffic Management Note No. 10 “Procedure for Planning Road Closures”)

General

Good planning and notification of road and lane closures should result in minimal interruption to traffic on the route. It should also result in better co-ordination with other

events, avoiding situations (for example) where traffic is blocked or constrained on adjacent routes at the same time.

Traffic Management Plan

The Contractor shall submit for consideration by the Superintendent the Traffic Management Plan fourteen (14) days prior to works commencing on site.

All procedures for any road closures must be included in the Traffic Management Plan. The Traffic Management Plan must be thorough as the impact on traffic in the area due to a closure of the road or section of the road is extremely high. The plan must set out an appropriate schedule of works to minimise the impact on the residents in the area, as well as the road users.

The plan must take into account the available traffic capacity, possible alternative routes, time of day when the closure can best be undertaken, traffic signal changes, need for publicity, appropriate VMS signage and other issues.

Notification

For works on VicRoads declared roads, at least two weeks notice before the road closure is to take place, the Traffic Control and Communications Centre (TCCC) is to be advised by creating a Work/Event Report on the Real Time Traffic Information Database. This provides adequate time for the road closure to be included in the VicRoads Roadworks bulletin. On the day or night of the works, the Contractor must notify the Superintendent and the TCCC of implementation time and completion of the closure and advise of the expected duration and any adverse impacts on traffic. Details of each closure for all major works must then be entered by the TCCC staff in the Real Time Traffic Information Database.

Advertisements should also be placed in the print media for all works which could cause a significant disruption to traffic. The number of times that advertisements are repeated is dependent on the likely impact of the closure.

A letter drop should also take place to all commercial and residential premises adjacent to, or affected by, any significant works explaining why the works are required and detailing the closures, their times and duration. Residents will also need to be advised in writing at least 7 days prior to the reconstruction of their driveways, so that they are aware entry into their property will be limited and that they must seek alternative car parking in the area.

Advance notification of impending works is to be provided by use of Variable Message Signs (VMS) at strategic locations in advance of the work site, at least 7 days prior to the closures. At the time of closure, signs including VMS (where appropriate) are to be located at points that allow motorists to take alternative routes in accordance with the Traffic Management Plan.

Monitoring During Closure

Wet weather, incidents on adjacent routes, or unforeseen events may result in a decrease in the available traffic capacity in the area resulting in longer delays. The Superintendent should ensure that the closure and the traffic operations are regularly reviewed and that consideration is given to taking remedial action where necessary if the traffic delays are greater than 10 minutes.

Any change to the closure is to be checked against the provisions of the Code and the TCCC should be notified.

11.9.4 Restoration

Prior to the issue of the Final Certificate, unless otherwise specified, detours and side tracks used or constructed during the Contract shall be restored to the condition existing at the time of commencement of the work under the Contract. Where the Contractor is responsible for the restoration of detours and side tracks the Contractor shall produce from the local authorities or landowners concerned clearances in writing stating that such detours and side tracks have been restored to their satisfaction.

11.10 11.10 Use and Care of Roads

The Contractor shall be responsible for repair of damage caused to any roads, bridges or other structures by transporting material under the Contract. The Contractor is advised that the Port Phillip City Council and municipal councils have power under their respective Acts to recover the cost of repair of damage to roads. If requested by the Superintendent, the Contractor shall submit clearances from municipal and other authorities concerned before the Final Certificate is issued.

In respect of repair of damage to roads, the Contractor will be deemed when tendering:

- (c) to have inspected the roads used for transport;
- (d) to have acquired, by consultation with the municipal or other authorities concerned, knowledge of the roads and any existing or likely restrictions upon their use which could affect the transport proposals;
- (e) to have assessed the possibility and extent of any damage to the roads which may be caused by the transport under the Contract;
- (f) to have made due allowance for the effects of such restrictions and for the cost of rectification of such damage in accordance with the requirements of the authorities concerned.

12 CLEARING AND GRUBBING

12.1 Description

This section covers the requirements for the site clearing and grubbing and for the management of the materials generated.

Clearing and grubbing is the removal and proper disposal within specified limits of:

- (a) vegetation such as trees, tree stumps, tree roots, logs, brushes, grass, weeds and decayed vegetable matter; and
- (b) refuse such as pole stumps, rubbish dumps and sawdust piles and other objectionable matter resting on or protruding from the surface of the original ground; and
- (c) obstructions such as concrete paving and foundations form all kerbs and channels, concrete edgings, drainage pits, foundations, fences and old or disused structures within the specified area which will conflict or interfere with construction.

The manner and extent of such work shall be controlled and in accordance with the Drawings, permits and site management plan issued to or prepared by the Contractor.

12.2 Limits of Works

12.2.1 General

Unless otherwise specified, the limits of clearing and grubbing shall be:

- (i) the whole width between the outside edges of any batters, including any roundings, together with a further horizontal distance of 1 meter beyond the outside edges of batter but not beyond the road reserve boundary or, where catch drains are required, to the outside edges of catch drains.
- (ii) Not more than the width required for completion of the work under the Contract.

HP

Prior to the commencement of any clearing and grubbing, the Contractor shall peg the extent of the area to be cleared and conduct a joint inspection with the Superintendent to identify vegetation to be retained and protected. No clearing work or any type of disturbance outside this area shall be carried out without the prior approval of the Superintendent.

12.2.2 Protection of Existing Vegetation

Existing trees, shrubs, native grasses and groundcovers and other areas of existing vegetation marked "to be protected and/or retained" on the Drawings or as directed by the Superintendent shall be protected by temporary fencing and incorporated into the works by the Contractor.

No earthworks, travel of equipment or storage compounds shall be established within 5 metres of the drip line of mature trees of trunks diameter greater than 200 mm.

Construction of table drains within the drip line of roadside trees shall be undertaken with no disturbance beyond the line of the table drain and no damage to the canopy of the trees.

12.2.3 Protective Fencing

Protective fencing shall consist of, as a minimum, star pickets with three strands of wire and parawebbing.

12.2.4 Salvage of Vegetation

Notwithstanding the requirements of Clause 12.6 below, the Contractor shall cooperate with the Council by co-ordinating works under the Contract with activities involving the salvage of timber from felled trees, removal of plants for transplanting and the collection of cuttings and available seed from areas of native vegetation on the site.

12.3 Clearing

Unless otherwise specified, the area within the specified limits shall be cleared of all vegetation, refuse and obstructions down to natural surface.

Trees shall be brought down in such a manner as to avoid danger to personnel and traffic or damage to other trees, shrubs, structures or property outside the area being cleared or designated to be retained within the area being cleared.

Tree branches extending over the carriageway shall be trimmed to provide a clearance of at least 6 m above the carriageway surface. All cuts on trees shall be made flush with the trunk so as to leave no stubs. Where whole branches or long stubs 50 mm or more in diameter are to be removed, the Contractor shall use the three cut method which requires:

- (a) the under cut;
- (b) the upper cut (further way from the trunk than (a) above) to remove the branch; and;
- (c) the final trim cut which is to be cut close to the main trunk but outside the branch collar.

All timber, scrub and debris shall become the property of the Contractor, and shall be disposed of as specified below. If so desired, the Contractor may stack surplus timber in such manner as to be convenient for removal as firewood by others.

12.4 Grubbing

In areas where excavation will be made, all vegetation, refuse and obstructions shall be totally grubbed or grubbed to a depth of not less than 0.3 m below the subgrade and batters, whichever is the lesser treatment.

In areas to be covered by embankments, all vegetation, refuse and obstructions shall be grubbed to a depth of not less than 0.3 m below the stripped surface or not less than 0.6 m below the finished surface of the subgrade, whichever is the lesser treatment. In areas to be covered by embankments exceeding 1 m in height, foundations may remain if located or cut off not more than 0.4 m above the natural surface but not less than 1 m below subgrade.

Pits which are no longer required shall be removed or broken back to a depth not less than 0.3 m below the finished surface of the subgrade. Remaining pipe openings shall be sealed with concrete. Any remnants of pits shall be backfilled with material and compacted to a dry density ratio of not less than 95%. The calculation of density ratio shall be based on Standard compactive effort.

Holes resulting from grubbing shall be backfilled with material similar to the surrounding material and compacted to the same degree as the surrounding material.

12.5 Clearing and Grubbing at Bridge and Culvert Sites

Unless otherwise shown on the drawings, trees and stumps within 10 m of any portion of a proposed bridge, or proposed culvert having a waterway area greater than 6 m² shall be cleared and grubbed together with any trees beyond these limits which could fall on or block

these structures. The Superintendent may direct that certain trees within the above limits shall be retained for conservation purposes.

Clearing and grubbing at bridge and culvert sites shall conform to the other relevant requirements of this section.

12.6 Removal and Disposal of Materials

12.6.1 General

Unless otherwise specified any salvageable materials shall become the property of the Contractor. Works under the Contract shall be carried out to, wherever possible, re-use materials generated from clearing and grubbing operations within the works area. Any materials that cannot be re-used on site shall be removed from the site.

Disposal of materials by burning on site or burying materials on site shall only be carried out when permitted by the relevant authorities and/or approved by the Superintendent.

The roadway and adjacent areas shall be left with a neat and tidy appearance free from unsightly debris.

12.6.2 Trees

Tree trunks and large branches shall be removed from the site.

Small tree branches, shrubs and leaves, excluding noxious weeds, shall be disposed of by chipping and mulching to form mulch.

12.6.2 Concrete, Bituminous and Other recyclable Materials

The Contractor shall dispose of salvaged concrete, bituminous materials of size greater than 50 mm and other recyclable materials at approved recycling establishments.

12.7 Damage to Property

Any damage to fences, buildings, grass, cultivation or other property caused by or arising from the execution of work under this section shall be repaired immediately by the Contractor to a condition at least equal to that existing before damage and no additional payment will be made for this work.

13.1 Description

This section covers the requirements for stripping topsoil, forming and grading of earthworks including excavation, placement and compaction of filling, disposal of surplus and unsuitable materials, and the trimming and shaping to alignments, grades, levels and cross sections shown on the drawings or as directed by the Superintendent.

This section also covers the cutting, filling, shaping and compaction of allotments and reserves as indicated on the drawings.

13.2 Definition

- Formation:** The finished surface after completion of the earthworks, excluding any cut or fill batters.
- Subgrade:** The trimmed or prepared portion of the formation on which pavement and shoulders are constructed
- Boxing:** The space above the subgrade between shoulders or verges, within which the pavement will be constructed.
- Batter:** The uniform side slope of a cut or fill.
- Batter Point:** The intersection of the batter with the natural surface disregarding any batter rounding.
- Table Drain:** A surface drain adjacent to the shoulder, or verge and generally with invert lower than the subgrade.
- Catch Drain:** A surface drain above a cut batter or below a fill batter.
- Verge:** The portion of the formation between the shoulder and the batter.
- Unsuitable Material:** Those materials specified as such or which are soft, excessively wet, or unstable or otherwise not suitable for the specified use.
- Pavement:** Unless otherwise specified or detailed on the drawings, pavement shall consist of subbase, base and bituminous surfacing course.
- Rock** solid material unable to be removed by back-hoe or in the case where hand excavation is required, when the rock cannot be loosened by hand pick
- Floater** classified as rock only when their least dimension exceeds 600mm or when their volume exceeds 0.20m²

13.3 Conformity with Drawings

Earthworks shall be finished to conform within the following limits to the level, lines, grades and cross sections specified or shown on the drawings:

(a) **Formation Width and Alignment**

The widths measured on each side from the specified centreline or design line to the toes of cut batters and/or the tops of fill batters shall not be less than the widths

specified or shown on the drawings, and no portion of cut batters shall encroach within these widths.

(b) Boxing Width and Alignment

The boxing width shall not be less than specified or shown on the drawings and the edge of boxing shall not deviate by more than 100 mm from the designed offset from the centreline or design line.

(c) Formation Level and Shape (Outside Subgrade Width)

Prior to topsoiling, the level at any point on the finished surface outside those areas to be paved shall not differ by more than 50 mm from the specified level and the surface shall be free from depressions capable of retaining water. No point on the surface shall be more than 25 mm below a 3 m straight edge laid on the surface.

(d) Subgrade Level and Shape

The level at any point on the subgrade shall not differ by more than 10 mm above or 30 mm below the specified level and no point shall lie more than 20 mm below a 3 m straight edge laid in any direction, except across a crown.

(e) Batter Slope and Shape

Any any cross section the batter slope shall not be steeper than the slope specified. The batter face shall be finished to uniform shape.

(f) Batter Line

Cut batters shall be so constructed that the batter point is not more than 10% of the batter height outside the calculated batter line.

Fill batters shall be so constructed that the toe of the batter is not more than 10% of the batter height outside the calculated batter line.

Notwithstanding the above, in built up areas and on sections beneath bridges, and on other sections where it becomes necessary to confine the lateral spread of the earthworks to closer limits due to site constraints, the tops of cu batters and the toes of fill batters shall be not more than 300 mm outside the calculated batter lines.

(g) Drain Level

Surface drain invert and side slopes shall be finished to within 50 mm of the specified level at any point and shall be free from depressions capable of retaining water.

(h) Kerb and Channel

Where kerbing and channelling is to be constructed, the Contractor shall excavate the road pavement bed to the underside of the road pavement for the full width to provide a clear 300 mm space behind kerbs on each side of the road bed.

13.4 Stripping of Topsoil

In cut and fill areas, the Contractor shall remove a sufficient quantity of the best topsoil available from the site before commencing excavation to be used as topsoil for the nature strips, batters, easements and disturbed areas.

The Contractor shall be responsible for ensuring that there is sufficient topsoil to reinstate and topsoil all areas as required. If sufficient topsoil is not available on-site, the Contractor shall import topsoil at the Contractor's expense.

Topsoil shall be fertile, dark coloured loam, friable soil containing organic matter and shall be free from subsoil, refuse, tree roots, noxious weeds, clay lumps and stones.

Unless otherwise specified, topsoil shall be stripped from cut and fill areas:

- (a) between the limits of the batter as defined by the line through batter points extended to include any rounding;
- (b) by means which do not increase the extent of unstable areas; and
- (c) be placed in stockpile or prepared areas.

The Contractor shall treat and manage site topsoil before stripping, and after spreading, to remove and/or minimise the spread of weeds and other pathogens and pest organisms throughout the site.

Stripped topsoil shall not be mixed with subsoil. Stockpiles shall be maintained in a neat, well shaped state capable of shedding water.

On completion of the works, fill areas, easements and nature strips shall be surfaced with a 75 mm minimum depth of topsoil. Nature strips shall be neatly raked and trimmed on an even grade from building line or front of footpath to back of kerb.

13.5 Site Excavation

13.5.1 General

Excavation of roadways, allotments or reserves shall consist of:

- (i) excavation, removal and satisfactory disposal of all materials from within the limit of the works; and
- (ii) all shaping and sloping for the construction, preparation and completion of the design surface, subgrade, shoulders, batters, catch drains, intersections or reserves, approaches and private entrances;

to the required alignments, grade and cross sections shown on the drawings or established by the Superintendent.

Where specified, pavement materials shall be salvaged from existing pavement and spread or stockpiled as directed.

Surplus excavated materials shall be disposed of in accordance with Clause 13.7 below.

13.5.2 Excavation Operations

The Contractor shall so conduct the operations that the area outside the limits of the excavation is not unduly disturbed. Any falls or slips of material that occur due to the Contractor's negligence or use of inappropriate methods shall be removed and the area reinstated by the Contractor and no additional payment will be made for this work.

Loose and unstable rock on cut batters shall be removed immediately.

13.5.3 Treatment of Subgrade

Unless otherwise specified, where the excavation at subgrade level is rocky material, the subgrade shall be loosened and rocks or boulders removed to a depth at least 150 mm below subgrade level in areas on which pavement is to be placed. Any resulting

depressions shall be backfilled with approved material properly compacted and drained to suitable outfalls, or in the case of isolated boulders, with properly compacted material similar to the surrounding in-situ material.

No additional payment will be made for this work.

Where removal of material below subgrade level is not required the surface shall not be disturbed by ploughing or scarifying below formation levels as indicated on cross section plans.

13.5.4 Rock Excavation

Blasting will not be permitted without the written approval of the Superintendent.

13.5.5 Groundwater

HP Where any groundwater or seepage is encountered the Contractor shall notify the Superintendent and any action to be taken shall, unless otherwise specified, be submitted to the Superintendent for review.

13.5.6 Surface Finish of Cut Batters

Unless otherwise specified, cut batters to be topsoiled shall be lightly scarified or otherwise grooved horizontally.

13.5.7 Table Drains

All table drains in cuttings shall be constructed as shown on the plans. On the outside of curves in cuttings, the depth of the table drain shall be increased sufficiently to maintain a suitable fall. Table drains shall be evenly graded without lodgement or obstruction, and shall be diverted where directed into side drains or culverts, such diversion drains being made with proper fall.

13.5.8 Dewatering

The Contractor shall be responsible for the diversion of surface waters, subsurface waters and drainage away from the excavated, levelled and filled areas, to enable satisfactory completion of the works and to protect the works from damage.

The Contractor shall provide sufficient de-watering pumps and associated equipment to effectively undertake and maintain satisfactorily dry conditions for construction of the works. Should the Superintendent consider the provision of such equipment is insufficient for the work, he may by written order require the Contractor to provide further equipment without any additional costs to the Principal.

Should the Contractor fail to comply within one day of receipt of such a written order, the Superintendent may obtain such equipment on hire and it shall be in order for the hire charges to be deducted from monies owing to the Contractor by the Principal

All pumps used between the hours of 6:00 pm and 8:00 am shall be electrically driven to minimise noise. Power supply shall be obtained by the Contractor at the Contractor's expense. All other pumps used must comply with EPA Regulations and Council's Local Laws on noise control.

13.6 Removal of Soft Spots or Unsuitable Materials

13.6.1 General

Where directed by the Superintendent, the Contractor shall remove or treat any soft, wet or unsuitable material in accordance with this clause by means that do not increase the extent of unstable areas.

13.6.2 Cuts

In cuts, unsuitable materials which exist or develop during construction immediately below subgrade level, or the level of the bottom of any select subgrade or capping layer, shall be treated in situ or be excavated and replaced with suitable material which shall be spread and compacted as specified in layers not exceeding a compacted thickness of 150 mm.

Where material:

- (i) is unsuitable and does not exceed 150 mm in depth, it shall be treated in situ or excavated and replaced and no additional payment will be made for this work;
- (ii) is unsuitable and exceeds 150 mm in depth, it shall be treated in situ and excavated and replaced and the Contractor will be paid extra for such excavation and backfilling at the rate set out on the tender form or, where no such rate exists, the Superintendent will value the work in accordance with the provisions of the General Conditions of Contract.
- (iii) Has become unsuitable to any depth due to the Contractor's negligence or use of inappropriate methods it shall be treated in situ or excavated and replaced and no additional payment will be made for this work.

13.6.3 Areas upon which fill is to be Placed

After completion of clearing, grubbing and stripping of areas upon which fill is to be placed, any unsuitable material immediately below these areas shall be treated in situ or be excavated and replaced with suitable material which shall be spread and compacted as specified.

The Contractor will be paid an extra for such excavation and backfilling at the rate set out on the tender form or, where no such rate exists, the Superintendent will value the work in accordance with the provisions of the general Conditions of Contract except, where material has become unsuitable due to the Contractor's negligence or use of inappropriate methods, no additional payment will be made for this work.

13.6.4 Treatment of Unsuitable Materials

HP Where unsuitable material is encountered the Contractor shall submit to the Superintendent for review the proposed in situ treatment or extent of excavation.

13.6.5 Fills

Unsuitable materials in fills shall be treated in situ or be excavated and replaced. No additional payment will be made for this work.

13.7 Disposal of Surplus or Unsuitable Excavated Material

Surplus or unusable excavated material is material that is surplus to the total quantity of excavated material required under the Contract.

The Contractor shall notify the Superintendent of any requirement to dispose of surplus or unusable excavated material.

The Superintendent may direct the Contractor to dispose of any or all surplus spoil within a lead of 5 km from the site of the works. Where not directed by the Superintendent, the

Contractor shall be required to dispose of any surplus spoil off site of the works. The Contractor shall comply with all regulations and by-laws and pay all fees and charges to all parties relating to the transport and placement of the surplus material.

On no account shall any surplus spoil be deposited on private land, without the permission of the landowner. Should any such spoil be placed on property not owned by the Contractor, then the Superintendent shall require the Contractor to obtain a clearance in writing from the owner of the property on which spoil has been placed before making the final payment. No spoil shall be dumped on reserves or roadsides without the prior written permission of the Superintendent.

13.8 Filling

13.8.1 General

Fill construction includes the preparation of areas upon which fills are to be constructed and the selection, placement and compaction of fill.

Material to be used for fill construction shall consist of approved materials, free from logs, stumps and weeds, or other perishable material.

13.8.2 Areas upon which fills are to be constructed

Areas upon which fills are to be constructed shall be first cleared and grubbed, as specified.

After completion of clearing, grubbing and stripping of areas upon which filling is to be placed, and prior to filling, the surface of the prepared area shall be test rolled in accordance with the Contractor's approved test rolling method and any unstable areas detected by test rolling shall be rectified by the Contractor using methods agreed to by the Superintendent and shall be re-presented for test rolling.

Where the height of fill to be placed over the stripped surface is less than 1.0 m, material immediately below the surface exposed after stripping of topsoil or removal of existing pavements shall be scarified to a depth of not less than 150 mm and compacted to meet the specified requirements.

Existing pavements which are not required to be salvaged shall be scarified to a depth of not less than 150 mm and compacted as specified.

HP Where groundwater of seepage is encountered the Contractor shall notify the Superintendent and any action to be taken shall, unless otherwise specified, be submitted to the Superintendent for review.

HP The Contractor shall not commence placing any fill on the prepared areas until the Superintendent has inspected these areas and has given the consent to proceed.

13.8.3 Imported Fill Material

The Contractor shall be responsible for locating, selecting, removing and transporting any imported fill material to the site.

The Contractor is responsible for arranging soil tests on the proposed imported fill to verify compliance with the given requirements. Such tests shall be done by a NATA registered laboratory, and be made available to the Superintendent before the material is brought to the site. Costs associated with the tests shall be borne by the Contractor.

Imported Fill shall be obtained from an approved source. The material shall be stable and well graded, free from organic or deleterious matter, and shall meet the following requirements:

- Particle Size after compaction - maximum 75mm
- % passing 19mm AS Sieve - maximum 80%
- % passing 0.075mm AS Sieve - maximum 50%

Material retained on a 2.36mm AS Sieve shall consist of hard durable particles of rock and/or gravel.

Materials passing a 0.425mm AS Sieve shall have the following physical properties:

- Liquid Limit - maximum 50
- Plasticity Index - 6 to 30
- LL x % passing 0.425 Sieve - maximum 1600

The Contractor shall keep on site a sample of and test results on fill material he proposes to import which shall comply with the Specification. Approval of the sample and test results shall not constitute approval of all material from the source from which the sample was taken.

Where the Superintendent considers that the imported fill materials differ from that of the approved sample, further compliance testing may be ordered at the Contractor's expense.

Fill material that is not approved, or has become contaminated or saturated, shall be immediately removed from the site to a place of legal disposal.

13.8.4 Placing of Fill

Fill shall be placed and spread in uniform layers and shall be compacted to meet the specified requirements. Unless otherwise specified, the compacted thickness of each layer shall not exceed 150 mm.

The Contractor shall ensure that an adequate bond will develop between each layer of fill.

During the placement of fill the surface of each layer shall be kept generally parallel to the surface of the subgrade. Prior to the cessation of work each day, the top of fill shall be shaped and compacted to minimise damage resulting from wet weather.

The Contractor shall construct all embankments so that after shrinkage and settlement and at the time of acceptance of the project they shall have the required grade, width and cross section at all points.

13.9 Earthworks Plant and Equipment

The Contractor shall provide and operate sufficient earthworks plant and equipment of suitable type and mass to carry out the works in accordance with the specification.

13.10 Compaction of Earthworks

Compaction of earthworks shall include the compaction of the subgrade in cuttings, the compaction of areas upon which fills are to be placed, and the compaction of all materials to the standards indicated hereunder.

- (a) The top 150 mm of the subgrade in cuttings shall be compacted to produce a dry density not less than 95% of the maximum value obtained in the Standard Compaction Test, in accordance with AS 1289-1993.

- (b) Areas upon which fill is to be placed shall be compacted to produce a dry density not less than 95% of the maximum value obtained in the Standard Compaction Test, in accordance with AS 1289-1993.
- (c) All fill material shall be compacted to produce a dry density not less than 95% of the maximum value obtained in the Standard Compaction Test, in accordance with AS 1289-1993.

The Contractor shall carry out testing at a frequency as specified in Clause 13.11.

Unless otherwise specified, filling have during compaction a moisture content within the range 85% - 120% of the optimum moisture content as determined in the Standard Compaction Test, in accordance with AS 1289 – 1993.

After completion of compaction of a layer, the moisture content of the material in the layer shall be maintained within the range specified until the layer has been test rolled.

Construction equipment and traffic shall not be allowed on the subgrade or fill while it is in a wet condition. Material which has become wetted beyond 130% of optimum moisture content shall be dried or removed from the site and replaced by material of suitable moisture content for compaction at the Contractor's expense.

The formation shall receive a final shaping with grading machine, supplemented with handwork where necessary, to ensure a smooth surface and uniform cross-sections. When final shaping is complete, the surface of the subgrade shall conform accurately to the line, grade and cross section shown on the plans, and no roots, sod or deleterious matter or stones which would fail to pass a 75 mm ring shall be in the top 150 mm of the subgrade.

13.11 Minimum Testing Requirements

The work shall be tested in lots, a lot consisting of a single layer of work which represents an area equivalent to a day's production. For work to be tested for compliance with Table 13.11.1 the number of tests per lot shall be a minimum of six (6).

Table 13.11.1

Material	Density Ratio	Assessment
Fill material placed anywhere in earthworks, and the top 150 mm of areas under fill where specified	Not less than 95%	Accept lot
	93.5% to 94.5%	Re-roll as agreed with Superintendent
	Less than 93.5%	Reject lot

13.12 Test Rolling

HP The Contractor shall submit to the Superintendent for review a test rolling procedure to be used where specified or directed. The procedure submitted by the Contractor shall include details of when test rolling will be undertaken, the method of preparing an area for test rolling and the extent of test rolling.

Areas upon which fills are to be constructed, all layers of fill, and materials within 150 mm of subgrade level in cuts, shall be compacted so as to be capable of withstanding test rolling with a smooth steel wheel roller or pneumatic tyre roller ballasted to comply with the following:

- (a) Steel wheeled – not less than 12 tonne mass with a load intensity on the rear wheels of not less than 6 tonne per metre width.
- (b) Pneumatic tyred – not less than 4.5 tonne per tyre with tyres inflated to 700 kPa.

The moisture content of the compacted material being test rolled shall be as specified in Clause 13.10. Each layer should be test rolled immediately following completion of compaction but if test rolled at some later date the surface shall be watered and given not less than eight coverages of the testing roller by the Contractor before test rolling commences.

HP Test rolling shall be undertaken in accordance with the accepted procedure in the presence of the Superintendent.

Compliance with compaction requirements shall be when an area withstands test rolling without visible deformation or springing.

The Superintendent reserves the right to direct the Contractor to undertake further test rolling on any layer prior to it being covered by successive layer. No additional payment will be made for any requirement to carry out further test rolling.

13.13 Preparation of Subgrade

The subgrade surface shall be prepared to the design shape and within the design tolerances to produce a smooth, hard, tightly bound surface, free from depressions capable of holding water.

HP The pavement subgrade shall be inspected and approved by the Superintendent prior to placing of any road pavement material.

13.14 Dewatering

The Contractor shall be responsible for the diversion of surface waters, subsurface waters and drainage away from the excavated, levelled and filled areas, to enable satisfactory completion of the works and to protect the works from damage.

The Contractor shall provide sufficient de-watering pumps and associated equipment to effectively undertake and maintain satisfactorily dry conditions for construction of the works.

Should the Superintendent consider the provision of such equipment is insufficient for the work, he may by written order require the Contractor to provide further equipment without any additional costs to the Principal. Should the Contractor fail to comply within one day of receipt of such a written order, the Superintendent may obtain such equipment on hire and it shall be in order for the hire charges to be deducted from monies owing to the Contractor by the Principal

All pumps used between the hours of 6:00 pm and 8:00 am shall be electrically driven to minimise noise. Power supply shall be obtained by the Contractor at the Contractor's expense. All other pumps used must comply with EPA Regulations and Council's Local Laws on noise control.

Immediately before placing concrete or masonry on ground, remove all free water and foreign matter. Prevent any water flow over freshly laid work.

13.15 Topsoiling

Unless otherwise specified, all unpaved cut and fill areas within the limits of the batters, including roundings, and any other area disturbed by the Contractor's operations, but excluding cut batters in rock and the subgrade, shall be topsoiled to the following thicknesses measured normal to the slope.

- (a) Top soil – 350 mm. Depth may vary. Top soil to extend down to existing subgrade
- (b) Mulched planting bed areas – 75 mm

After placing, the topsoil and mulch shall be firmly compacted. Topsoiled batters shall be left roughened to reduce rilling.

All stockpile sites shall be left in a neat, well graded state on completion of topsoiling.

13.16 Batters for Road Formation Works

Batter slopes in filling shall generally be 1 in 5 and in cutting shall generally be 1 in 3, except where otherwise directed or specified. All batters, in cut and fill, shall be neatly trimmed.

The table drains and upper edges of embankments shall be ranged in lines, strictly in conformity with the centre line of formation.

Cut and fill batters less than 600 mm in height shall be uniformly graded, to meet the natural surface along the property boundary where clearing permits, or at a slope not steeper than 1 in 5.

Protection works as directed and specified by the Superintendent shall be carried out on all batters steeper than 1 in 3.

13.17 Table and Side Drains for Road Formations

Any table drains in cuttings shall be formed and evenly graded parallel to the centre line of the road, without lodgement or obstruction, and shall be diverted where indicated on the plans, into side drains or culverts, such diversion drains being made with proper fall and not less than 300 mm deep and one metre wide on the surface.

Side drains shall be excavated to the widths and depths shown on plans, evenly traded, parallel to the centre line of the formation, not nearer than one metre to the fence lines, with sides neatly battered as indicated or directed, and diverted into outlet drains or waterways.

If so ordered, the excavated material shall be used in the formation, or banked on the low side of the drain, leaving a 500 mm margin.

13.18 Location of Stockpiles

Stockpiles shall be located in nominated areas only. Stockpiles shall not be located in areas of existing vegetation or groundcovers or near drainage lines and shall be protected from erosion by seeding with sterile annual grass or other protective measures.

14 CONCRETE

14.1 Description

This section specifies the materials and workmanship for concrete and cement products used in drainage works, kerbing, kerbs and channels, footpath, paving, pram and vehicular crossings, and elsewhere in the Contract.

All of the Works shall be constructed to the lines, levels and details shown on the Drawings and shall be straight between changes of direction and shall be done evenly between changes of grade.

The kerb height, cross section or slope and direction of the Works shall only be varied to provide proper approaches to pram crossings, vehicular crossings, pit inlets and the like.

All concrete used shall be ready mixed concrete.

14.2 Standards

The current editions of the following Australian Standards shall form part of this Specification for supply of all labour and material.

AS 3600 Concrete Structures
AS 1315 Portland Cement
AS 1316 Masonry Cement (Metric units)
AS 2758 Concrete Aggregates
AS 1141 Methods for Sampling and Testing Aggregates
AS 1379 Ready Mix concrete
AS 1012 Methods of Testing Concrete
AS 1509 Rules for Design and Construction of Formwork
AS 1510 Codes of Practice for Control of Concrete Surfaces
AS 1302 Steel Reinforcing Bars for Concrete
AS 1303 Hard-drawn Steel Reinforcing Wire for Concrete
AS 1304 Welded Wire Reinforcing Fabric for Concrete
AS 2710 Methods for Sampling and Testing Mortar for Masonry Constructions

14.3 Ready Mix Concrete

All concrete used in this Contract shall be ready-mixed concrete ordered, produced and delivered in accordance with AS 1379-Ready Mix Concrete.

Ready mix concrete shall only be supplied from a source approved by the Superintendent.

Mixed-on-site concrete shall not be used without specific approval of the Superintendent.

In accordance with AS 1379 Clause 2.2.1 Method A – “Performance Ordering” the Contractor shall be responsible for the design of the concrete mix, and the following performance specifications shall be achieved.

- (a) The slump of the concrete at the time and place of delivery shall be appropriate to the method of handling and placing but shall not be greater than 80mm nor less than 40mm without the approval of the Superintendent.
- (b) The nominal maximum size of the aggregate shall be 20mm.
- (c) The characteristic compressive strength $F'c$ at 28 days shall be 25 MPa when tested in accordance with AS 1012 Part 7 and Part 9.
- (d) No further water shall be added to the mix after it leaves the mixing plant.

For the purposes of this Specification where referred to in AS 1379 the “Manufacturer” shall be regarded as a “Subcontractor” of the Contractor and the Contractor’s responsibility under the General Conditions shall apply.

14.4 Strength

The concrete used shall be a dense uniformly graded mix, and when tested in a NATA Registered Laboratory, shall develop the following strengths:

At 7 days	-	Not less than 18 MPa
At 28 days	-	Not less than 25 MPa

Concrete used in kerb extrusion machines will not be subject to these compressive strength requirements but shall have minimum cement content of 280 kg per cubic metre of finished concrete. Concrete kerb and channel shall develop the following strength:

At 28 days using in place testing (cores) - Not less than 20 MPa

14.5 Testing of Concrete

In accordance with AS 1379, the Contractor shall carry out the inspection sampling and testing.

The specified manufacturer's certificates shall be furnished for each truckload.

Tests shall be carried out on a standard 200mm high x 100mm dia cylinder samples, cured and tested in accordance with AS 1012 – Methods of Testing Concrete.

Capping and testing shall be cast for each test. If the specified seven day strength is not attained, the second cylinder shall be tested at 28 days and if the specified strength is still not attained, the Contractor shall remove the whole of the concrete of that batch from the job and replace same at the Contractor's own expense.

The result of the compressive strength tests as specified at 28 days shall be supplied to the Superintendent within 7 days of testing. The cost of the testing shall be at the expense of the Contractor.

14.6 Cement Mortar

Cement mortar shall be supplied, stored, measured and mixed in accordance with AS 2701.

Unless specified otherwise for use in this Contract, the mix proportions by volume shall be 1 part cement to 2 parts sand.

14.7 Inspection by the Superintendent

The Contractor shall give reasonable notice to the Superintendent when inspections are specified.

HP No works shall proceed or be covered up under this section until the following items have been inspected and approval to proceed has been granted:

- (a) Jointing and sawcutting patterns determined.**
- (b) Compacted foundation.**
- (c) Formwork fixed in place braced and coated with form oil or other approved release agent.**
- (d) Reinforcement fixed in position.**
- (e) Connections, fixtures, blockouts and other necessary work prior to pouring concrete.**

14.8 Formwork General

The design, fabrication, erection and stripping of formwork shall be carried out in accordance with AS 1509 and AS 1510 Part 1 Formwork, and shall be the responsibility of the Contractor. For the purpose of this Specification the "Superintendent" referred to in AS 1509 and AS 1410 shall be the Superintendent.

The Superintendent must check all forms and levels before concrete is placed. Notwithstanding this the Contractor shall be solely responsible for the sufficiency and accuracy of the forms.

The forms shall be to the shapes, lines and dimensions required to construct the Works to the Drawings. Forms shall be properly supported and braced to maintain position during and after the placing of concrete.

Approved release agents shall be used on the forms to obtain easy stripping and desired finish.

The forms shall not be stripped until the concrete has hardened and obtained sufficient strength to support its own weight and any construction loads without injury to the concrete. Except for slip formed concrete, in no case shall the forms be removed before 12 hours after placing of the concrete. Due consideration shall be given to the decrease in the rate of hardening in cold weather.

14.9 Reinforcement

Reinforcement shall be carefully formed to the dimensions and shapes shown on the drawings. For mild steel reinforcing bars, cold bends shall be made around a pin having a diameter of four or more times the nominal diameter of the bars.

Reinforcement shall not be bent or straightened in a manner that will damage the material. Bars with kinks or bends not shown on the plans shall not be used. Heating of reinforcement bars will not be permitted.

Where practicable, all reinforcement shall be supplied in the full lengths shown on the drawings. Where not practicable, the Contractor shall splice the reinforcement by lapping where directed. The lap shall not be less than 40 times the nominal diameter of the bars.

All reinforcement shall be accurately placed in the positions shown on the plans, and shall be securely held during the placing and compacting of the concrete by wiring together with annealed iron wire not less than 1.2 mm diameter, and by blocking and supporting the forms with plastic or metal chairs, or by other approved methods. Unless otherwise shown on the drawings, the minimum clear cover to reinforcement shall be as specified in AS 3600 – Concrete Structures.

Reinforcement supports shall be made of durable materials strong enough to withstand the imposed loads without movement of the reinforcement. They shall be positively attached to the reinforcement and of such size as to maintain the specified cover. Bars shall be tied at all intersections except where spacing is less than 300 mm in any direction when alternative intersections shall be tied.

Wooden supports shall not be used, nor shall metal supports or tie wires which extend to the surface of the concrete. Placing bars on layers of fresh concrete as the work progresses and adjusting bars during the placing of concrete will not be permitted.

All reinforcement when placed shall present a clean surface free from grease, tar, paint, oil, mud, loose mill scale, loose or thick rust.

14.10 Foundation Bedding Under Concrete

Bedding under concrete work shall consist of Class 2 fine crushed rock of 20mm nominal size or other material as may be approved by the Superintendent. Bedding material is to be spread and compacted to the thickness as shown on the Drawings, by hand ramming, rolling with a vibrating roller or as directed.

Any soft patches shall be removed and made good with bedding material as above. Immediately prior to placing of concrete the bedding shall be thoroughly wetted with a hose having a spray nozzle, until it will not absorb further moisture. There shall be no pools of water on the base.

14.11 Placing of Concrete

HP Concrete shall not be placed until the Contractor has submitted details of the proposed method of placing and compaction to the Superintendent for review and approval.

After mixing, concrete shall be placed without delay. The methods of transport, handling and placing shall be such as will prevent the segregation or loss of the ingredients. Dropping the concrete a greater height than 1.5 metres will not be permitted.

Depositing large quantities of concrete at any point and moving or working it along the forms will not be permitted. Any concrete which has developed its initial set, or which is not placed in the forms and compacted within 20 minutes after discharge from the mixer, shall not be used.

Concrete shall be placed in one continuous operation between ends of members and construction joints, thereby forming one unit of construction. Concrete shall be placed in the forms within such intervals of time that the contact surface of the proceeding concrete is still in plastic condition.

Concrete shall not be placed under water.

14.12 Compaction of Concrete

14.12.1 General

During and immediately after placing, the concrete shall be thoroughly compacted by means of continuous tamping, spading, slicing and vibration.

Care shall be taken to fill every part of the forms, to force the concrete under and around the reinforcement without displacing it, to work coarse aggregate back from the face and to remove air bubbles and voids.

Workers employed in compacting concrete shall be competent and experienced in this work. Any worker who is deemed by the Superintendent to be unsatisfactory, shall be replaced immediately at the request of the Superintendent.

14.12.2 Vibration

Vibration shall be applied at the point of deposit and in the areas of freshly deposited concrete. The vibrators shall be inserted and withdrawn out of the concrete slowly. The vibration shall be of sufficient duration and intensity to thoroughly compact the concrete, but shall not be continued so as to cause segregation or allow localised areas of grout to form at any point. Application of vibrators shall be at points uniformly spaced and not further apart than twice the radius over which the vibration is visibly effective.

Vibration shall not be applied directly or through the reinforcement to sections or layers of concrete which have hardened to the degree that the concrete ceases to be plastic under vibration. It shall not be used to make concrete flow in the forms over distances so great as to cause segregation, and vibrators shall not be used to transport concrete in the forms.

Vibrators shall have a minimum frequency of vibration such that the intensity of vibration will visibly affect a mass of concrete of 25 mm slump over a radius of at least 500 mm.

Vibration shall be supplemented by such hand tamping as is necessary to ensure smooth surface and dense concrete along surfaces and in corners and locations impossible to reach with the vibrators.

14.12.3 Kerb Extrusion Machines

Concrete used in kerb extrusion machines shall have a density not less than 96% of density achieved in a specimen cylinder prepared in accordance with AS 1012.8 – 1986, Clause 1.7.5.

The Contractor shall carry out concrete core tests in accordance with AS 1012.14 – 1999. Intervals of such tests shall be one (1) test per lot. A lot shall be the kerb and channel cast in one day's production. The location for testing shall be the kerb and channel tray or where there is not a channel, the top of the kerb, on the steepest downhill grade on which the kerb machine is travelling.

On incidental, isolated or on works where the total length of kerb cast in one day's production, is less than 150 linear metres, three (3) core tests shall be conducted. The Contractor shall request the Superintendent to nominate the position of each test.

The Contractor shall fill holes due to core sampling with a suitable concrete mix coloured to match the kerb and channel within 48 hours of testing.

14.13 Joints

14.13.1 Construction Joints

Joints shall be provided where shown on the drawings or where specified or as directed by the Superintendent. Concrete placing shall be carried out continuously from joint to joint. Wherever the work of placing concrete is likely to be delayed until the concrete has taken its initial set, a construction joint shall be formed.

The location of construction joints shall be planned in advance and shall be made only where approved by the Superintendent. These joints shall be perpendicular to the principal lines of stress and in general shall be located at points of minimum shear.

In the absence of any details on the Drawings, jointing shall conform to current recommendations published by the Cement and Concrete Association.

14.13.2 Sawn Joints

The location of sawn joints shall be as shown on the plans or as required and approved by the Superintendent. Sawing shall commence as soon as the concrete has hardened sufficiently to permit cutting the concrete without excessive ravelling, regardless of time or weather conditions.

The line of the joint shall be without any discontinuities. Neither edge shall deviate from a 3 m straight edge by more than 10 mm.

The joint shall not exhibit more than 5 mm of vertical or horizontal edge ravelling. The length of edge ravelling shall not be more than 300 mm in any one (1) metre length of joint on each edge. Saw debris shall be washed from the joint and pavement immediately after sawing.

Immediately after cleaning, a continuous UV stabilised PVC spline seal 5 mm \pm 1 mm diameter shall be installed in the sawcut, and where transverse joint cross longitudinal joints the transverse seal shall pass under any seal inserted in the longitudinal sawn joints. The seal shall not stretch in order to fit the groove and any increase in length of the seal after installation shall not exceed 10% of the original length. Joints in the seal shall not be less than 5 mm or more than 7 mm below the surface of the concrete.

14.14 New Mass Concrete against Old

14.14.1 Non-Structural Mass Concrete Construction

Before placing new concrete on or against concrete which has set, the forms shall be re-tightened and the surface of the set concrete shall be roughened as required by the Superintendent.

Set concrete shall be thoroughly cleaned of foreign matter, laitance, and loose or porous material and the jointing surface saturated with water. The surface shall then be covered with a thin coat of stiff neat cement to bond and concreting shall then proceed immediately.

No work shall be stopped or temporarily discontinued within 300 mm of the top of any finished surface, or during pouring the base of pits or cover slabs.

14.14.2 Non Structural Paving Construction

Before placing new concrete against concrete that has set, the proposed jointing method shall be provided to and approved by the Superintendent. All vehicle crossing construction shall be tied to adjacent kerb and channel using dowels as specified.

14.15 Temperature Constraints on Concrete Pour

No concrete shall be poured without special precautions and the Superintendent's approval if the ambient air temperature is below 5 degrees Celsius or above 30 degrees Celsius.

14.16 Curing

Concrete and rendering shall be cured generally in accordance with AS 3600 so as to prevent excessive loss of moisture from the surface for at least 7 days continuously following the time of placing; or in hot weather for longer periods as the Superintendent may direct.

Curing shall be accomplished by one or more of the following methods:

- (a) covering with hessian or similar material maintained in a wet condition;
- (b) covering with an impermeable membrane after spraying the concrete with water; and
- (c) coating with an approved curing compound.

Curing compounds shall be effective during the whole period of curing, and shall not be applied to surfaces that are to be bonded later to another surface.

Full details shall be submitted for the approval of the Superintendent and shall include the time and rate of application and the effectiveness of the curing compound as a curing agent. Such compounds may be colourless or preferably white and shall not have a deleterious effect of the concrete nor stain the surface or cause the concrete to darken or yellow appreciably.

The occurrence of shrinkage cracking deemed unacceptable by the Superintendent shall be regarded as defective work.

No traffic shall be permitted on the new work for at least seven days.

14.17 Removal of Forms

HP Unless adequate supports are provided, forms shall not be removed until the concrete has achieved adequate strength. Forms shall not be removed without the permission of the Superintendent.

14.18 Surface Finish

All concrete surfaces shall be true and even, free from honeycombed surfaces, depressions or projections.

As soon as forms are removed, all mortar pins shall be tooled away to expose a face of dense sound concrete. Rough or porous areas and holes shall be filled with mortar consisting of three parts fine aggregate to one part of cement mixed with water to produce a mix of suitable constituency.

Bolts, wires or other appliances passing through the concrete to hold forms shall be cut off or set back 50 mm below the surface and the ends covered with mortar mixed as specified above.

14.19 Defective Concrete

The Contractor shall be fully responsible for employing effective methods of mixing, placing, protecting and curing concrete, and for the adequacy of forms. Approval of such work or methods by the Superintendent will not relieve the Contractor of his responsibility.

Concrete which is not placed and completed in accordance with this specification or which, in the opinion of the Superintendent, is defective shall be removed and replaced by the Contractor at the Contractor's expense.

15 CONCRETE KERB AND CHANNEL

15.1 Description

This section covers the requirements for the construction of cast in-situ concrete kerb and/or kerb and channel, inclusive of vehicle crossings and pram crossings, in the locations shown on the drawings.

The works shall be finished in conformity to the levels, lines, grades and cross sections shown on the drawings or as directed by the Superintendent.

15.2 Bedding Preparation

The kerb and channel shall be constructed upon the approved sub-base pavement course prepared as specified and as detailed on the Drawings.

Unless otherwise specified, a minimum 75 mm layer of bedding material consisting of 20 mm Class 2 Fine Crushed Rock shall be provided and laid on a compacted subgrade prepared as specified for road pavement.

The bedding shall extend 200 mm outside the limit of the kerb and channel unless otherwise shown on the drawings.

The bedding shall be sprayed with clean water to a damp but not wet state prior to placing the concrete.

15.3 Kerb Extrusion Machine

The Contractor shall carry out the kerb and channel works with an approved kerb making machine, except as under Clause 15.5. This machine shall be capable of producing kerb and channelling true to line and level and complying with this specification.

The Contractor shall establish the datum for grade and alignment of the section to be extruded.

15.4 Concrete

Concrete, the materials and methods of mixing, placing and curing shall comply with the requirements set out in Section 14 - Concrete.

15.5 Formwork

Where radial returns of less than three (3) metres are encountered, the Contractor shall use approved formwork.

Formwork will not be permitted on any other phase of kerb and channel work unless written approval is obtained from the Superintendent. Approval will only be given in special cases and then only for the use of steel formwork of approved manufacture.

Where formwork is used, all templates shall be boned true to grade or set to true level before any concrete is poured.

15.6 Placing and Compaction of Concrete

Placing of concrete shall be carried out without separation of the aggregates. The grade and alignment of the section to be extruded shall be established by an offset guideline set by the Contractor. The forming section of the machine shall be readily adjustable vertically during the forward motion of the machine to maintain the specified grade irrespective of surface irregularities in the bedding.

Concrete shall be fed to the machine at a uniform rate and the machine shall be so operated as to produce a compacted mass of concrete to the satisfaction of the Superintendent. Surfaces shall substantially be free from surface pitting larger than 5 mm diameter.

On grades exceeding 3% work is to proceed up the gradient so as to prevent creeping of concrete. Sufficient means shall be employed for controlling the speed of the extrusion machine to allow the specified density of the concrete to be achieved.

Where work using fixed forms is combined with extruded work and similar concrete mixes are used for both, the concrete in fixed form sections shall be thoroughly compacted by manual spading and rodding whilst it is being placed to produce a satisfactory compacted mass of concrete.

Transitions between different profiles being constructed under the Contract or where it is necessary to join to an existing profile different from that being constructed, shall be made over a five (5) metre length.

15.7 Surface Finish

Exposed faces of the work shall be rendered to produce a neat appearance of uniform colour.

Rendering shall be applied immediately after the body of the concrete is laid, but under no circumstance must the time between laying the concrete and rendering exceed 45 minutes. The thickness of the rendering shall not exceed 7 millimetres.

The mortar mix shall be 1 part Portland Cement: 2 parts washed concrete sand.

Moulding and chamfering of angles as shown in Drawings, is to be done with proper trowels made for the purpose.

All concrete kerb and channel shall be trowelled to a smooth glass like impervious finish with a steel float and free from all imperfections. Excessive trowelling of the surface is to be avoided.

HP The colour of the rendering coat (if specified) is to be confirmed with the Superintendent.

15.8 Joints

Distinct and complete transverse joints shall be made at intervals not exceeding 2.5 metres. For extruded kerb and channel this shall be done by a method that does not damage or distort the adjacent surfaces; for kerb constructed using fixed forms, templates shall be removed as soon as practicable after finishing the work.

The guillotine (for extruded work) or template (for fixed form work) shall cut between 40% and 70% of the area of the section. In both cases the resultant slot in the edging shall be tooled to a depth of 20 mm to produce a neat groove not less than 5 mm wide of the exposed surfaces, following which a vertical cut shall be made through the base of the groove a depth of not less than 50 mm from the surface of the section.

Joints shall be truly square and vertical and edges of joints will be neatly finished.

Joints shall correspond as to location on opposite sides of road pavement.

15.9 Layback for Vehicular and Pram Crossings

Where vehicle crossings and pram crossings are shown on the drawings to be provided, layback sections shall be constructed in accordance with the Drawings concurrently with kerb and channel construction.

15.10 Household Drain Connections

Where underground stormwater drains are not provided, openings through the barrier type kerbs will be made opposite existing house drains on and in the low side of all allotments and/or in such positions as the Superintendent may direct. Such openings will be made with galvanised or PVC circular cross section kerb entry adaptors with suitable section for connection to 100mm diameter house drain.

15.11 Protection of Concrete

All concrete shall be adequately protected from damage by pedestrians, animals, vehicles, rain or any other cause.

The Contractor shall give 24 hours notice to the owner concerned in any property vehicle crossing that no motor vehicle will be permitted to cross over the concrete until at least four (4) days after the completion of the laying of the concrete and, if such vehicle is over 1.5 tonnes in weight, until at least seven (7) days after laying.

The Contractor shall be held responsible for any damage to concrete kerb and channel during the Contract period.

15.12 Backfilling

After the concrete has set sufficiently and not sooner than three days after placing, the spaces on both sides of the kerb and channel shall be refilled with sound material, which shall be thoroughly compacted in layers not exceeding 150 mm thickness, the whole being left in a neat and workmanlike manner.

16 FOOTPATH PAVEMENT CONSTRUCTION

16.1 Description

This section covers the requirements for the construction of footpath pavements including all subsurface treatment finishes, to the alignment, dimensions, cross sections and levels shown on the drawings or as directed by the Superintendent.

16.2 Inspection

The Contractor is to give 3 days notice to the Superintendent so that they may inspect the following stages of work:

- Set-out and excavation complete;
- Base course installed

In addition, the Contractor is to give 3 days notice to the Superintendent before the placing of any paving.

16.3 Conformity with Drawings

All surfaces shall be finished in conformity with the lines, grades, thicknesses and cross sections shown on the drawings or specified or directed by the Superintendent within the following limits:

- (a) The deviation of the finished work from line or level shall not exceed 20 mm in 10 metres or 5 mm between adjacent blocks. Except on curves or in shaped areas, the deviation of the finished work from a 3 metre straight edge shall not exceed 15 mm at any point.
- (b) Footpaths and surfacing shall be shaped to match existing features eg pit covers, edgings and driveways, within 5 mm.
- (c) Alignment of the paving shall not differ from the specified line by more than ± 50 mm, provided that the minimum pavement width is achieved at all points throughout the construction.
- (d) The cross slope at any point on the surface shall be not less than 1% and not exceeding 2.5%.
- (e) Unless otherwise specified or directed, finished surfaces shall be shaped to shed surface water from the entire area in the direction of natural slope or towards constructed surface drains.

16.4 Alignment and Levels

The Contractor shall excavate or fill as may be required to bring the pavement bed to the full specified depth below finished pavement level. All formation shall be thoroughly consolidated and shall be neatly trimmed true to line, level and cross slope, so as to provide for the full specified thickness of pavement at all places.

Any soft sections in the formation shall be excavated and filled with fine crushed rock, loam or other granular material to the approval of the Superintendent and the whole shall be thoroughly compacted as specified herein. No additional payment will be allowed for this work.

16.5 Excavation and Bedding Preparation

The Contractor shall excavate and/or fill and compact to the levels as shown on the plans or as directed. All soft, wet or unsuitable material shall be removed to a depth of not less than 75 mm below the design level of the underside of the bedding and the resulting space filled with bedding material, moistened and compacted to form a stable foundation.

Unless otherwise specified, a minimum 75 mm compacted thickness of bedding material consisting of 20 mm Class 2 Fine Crushed Rock shall be provided under the full width of the paving.

The subgrade to paved areas shall be trimmed to the appropriate levels, moistened as necessary, and compacted with a vibrating footpath roller of equivalent weight to four (4) tonnes or other by suitable mechanical equipment to the satisfaction of the Superintendent. The top 100 mm of the subgrade shall be compacted to a dry density of not less than 98% of the maximum value obtained in the standard compaction test in accordance with AS 1289.

HP The Superintendent shall approve the bedding before any concrete is placed.

The cost of all works specified above, including the supply of bedding material, shall be deemed to be included in the schedule price for the construction of paving.

16.6 In-Situ Concrete Paving

16.6.1 General

The Contractor shall construct in-situ concrete paving as shown on the plans and as detailed in this specification.

Concrete, the material and methods of mixing, placing and curing shall comply with the requirements set out in Section 14 - Concrete.

16.6.2 Formwork

The edge forms shall be set true to line and level with the transverse forms set at right angles to the longitudinal forms.

The practices in relation to formwork shall be observed as specified under Clause 14.8 – Formwork General.

HP Formwork shall be placed for a minimum length of 30 metres and shall be inspected and approved by the Superintendent before any concrete is cast.

Forms shall not be removed sooner than 24 hours after placing of the last section of concrete.

16.6.3 Placing and Compaction of Concrete

The concrete shall be placed in the forms immediately it arrives on site and shall be well spaded and rammed with approved tampers or an approved vibrating screed and shall be screeded off on the templates or adjacent finished slabs until a true surface is obtained.

16.6.4 Pavement Thickness

Footpath and pram crossings shall be constructed in accordance with Vic Roads Standards

16.6.5 Footpath Crossfall

Footpaths shall fall from back to front with a gradient of not less than 1 in 40 and a maximum gradient not to exceed 1 in 30.

Tolerances for a 1.5 metre footpath width: Minimum crossfall 38mm
 Maximum crossfall 50mm

16.6.6 Surface Finish

The surface shall be rendered with a coat rendering 7mm thick consisting of one part of clean sand, one part of stone dust and one part of cement. The surface of the render shall be steel trowelled to produce a smooth, matt, non-skid hard surface, free from stone pockets, depressions or projections. Excessive trowelling of the surface is to be avoided. The whole surface shall be lightly broomed with a fine hair broom.

The footpath margins shall be neatly tooled with a suitable edging tool to provide a smooth border completely around each slab. The edge of the 40 mm tooled width shall be flush with the footpath surface and shall not be indented to form a lip or tripping hazard.

The finish of the footpath, including the 40 mm tooled edge, shall be broom finished to the approval of the Superintendent.

HP The colour of the rendering coat (if any) is to be confirmed with the Superintendent.

16.6.7 Weakened Plane Joints

Weakened plane joints 5mm wide and 40mm deep shall be constructed at right angles to the side forms at 1.5 metre intervals and at all service access pits unless otherwise required by the Superintendent.

16.6.8 Expansion Joints

Transverse joints shall be made at intervals not exceeding 1.5 metres and over all house drain outlets, unless otherwise shown on the drawings, and shall be grooved with a suitable marking tool to a depth of not less than 8 mm and a width of not more than 6 mm.

Expansion joints shall be made:

- (a) at intervals not exceeding 15 metres;
- (b) at each intersection;
- (c) at each break in concreting lasting more than half an hour;
- (d) around all manholes, service pits, poles, valve boxes, fire hydrants and the like as directed by the Superintendent;
- (e) on the outside of the thickened sections at vehicular crossings;
- (f) at the interface between the concrete paving and kerb (eg concrete infill to traffic island).

The expansion joint shall be 10 mm wide Bitumastic, Comprebond, Abelflex or other approved jointing material which shall be pre-cut to size and so placed that the top of the jointing material shall be 3 mm below the level of the adjacent concrete or brick, extending for the full width and full depth of the concrete paving.

The filler shall be placed in position before concrete is placed, and shall be held firmly in position during the placing of the concrete. Joints shall be truly square and vertical and edges of joints will be neatly finished.

16.7 Pre-Cast Concrete Paving Units

16.7.1 General

The Contractor shall construct pre-cast concrete paving as shown as shown on the plans and as detailed in this specification. All pavers are to be as detailed on drawings. The placing shall comply with the requirements set out in this specification and drawings.

16.7.2 Expansion Joints

The Contractor shall provide a 10 mm wide expansion joints at all junctions with surrounding surfaces.

The expansion joint shall be 10 mm Bitumastic, Comprebond, Abelflex or other approved jointing material which shall be pre-cut to size and so placed that the top of the jointing material shall be 7 mm below the level of the adjacent concrete or brick.

16.7.3 Workmanship and Construction

The Contractor shall install a compacted fine crushed rock base as specified.

A 6:1 sand cement wet mortar bedding shall be spread in a uniform layer on the prepared base and screeded to the nominated design profile and levels to achieve a uniformly thick layer in the range of 20 to 25 mm. Any sand used shall be white well graded washed sand passing a 4.75 mm sieve.

A masonry saw cutter shall be used to cut pavers where necessary. Pavers are to be laid with a nominal 3 mm gap. Any pavers which are structurally damaged during laying shall be immediately removed and replaced.

After bedding has set, "Sandstick" for joint filling shall be applied to the paved surface.

16.7.4 Tolerances

The finished surface shall not deviate more than 5 mm over a 3 metre long straight edge and not more than ± 2 mm in any 500 mm.

16.8 Brick Paving

16.8.1 General

The Contractor shall construct brick paving as shown as shown on the plans and as detailed in this specification. All brick pavers are to be as detailed on drawings. The placing shall comply with the requirements set out in this specification and drawings.

16.8.2 Expansion Joints

The Contractor shall provide a 10 mm wide expansion joints at all junctions with surrounding surfaces unless otherwise specified on plans.

The expansion joint shall be 10 mm Bitumastic, Comprebond, Abelflex or other approved jointing material which shall be pre-cut to size and so placed that the top of the jointing material shall be 7 mm below the level of the adjacent concrete or brick.

16.8.3 Testing of Bricks

Tests to determine compliance with this specification shall be carried out by the manufacturer of the bricks in accordance with BDRI Specification and Methods of Test for Clay Bricks.

A manufacturer's certificate stating that each lot or consignment of bricks has been tested for compliance with this specification shall be made available to the Superintendent upon request.

16.8.4 Sampling

Sampling shall be carried out in accordance with Methods of Tests Part B of BDRI Specification.

(a) Dimensions and Tolerances

Tests for dimensions and tolerances shall be carried out generally in accordance with Part C of BDRI Specification to meet the following requirements.

- (i) The determined mean length, width and height of 20 brick sample shall be between the following limits:
 - Length 218 to 222 mm
 - Width 106 to 110 mm
 - Height 63 60 67 mm
- (ii) The average length of each brick in any 20 brick sample shall not depart from the following:
 - Not more than 2 bricks outside the range 218 to 222 mm and brick outside the range 217 to 224 mm

(b) Water Absorption

When tested in accordance with Part J of BDRI Specification, the average water absorption from the results of the 24-hour immersion test on a ten specimen sample shall not be greater than 10 percent.

(c) Brick Quality

A sample pallet shall be selected from the first consignment of brick delivered to the site. The Superintendent reserves the right to inspect each brick with regard to quality of finish, including cracking, voids, crazing edges, chipping, colour and shape.

Any bricks deemed unsuitable as regards to quality of finish shall be set aside and maintained on site as examples of rejected bricks.

The Contractor shall thereafter maintain the quality of the approved bricks for all exposed fair face bricks to be incorporated in the works, using the examples of any rejected bricks in the above sample pallet as a guide.

(d) Strength Guide

When tested in accordance with Part F of BDRI Specification, the characteristic transverse strength shall be not less than 3 MPa. When tested in accordance with Part G of the BDRI Specification, the characteristic strength shall not be less than 40 MPa.

(e) Rejection of Bricks

The Contractor, when preparing his tender, shall allow for a maximum of 5% of bricks per pallet to be rejected on the basis of the brick quality standards.

All bricks rejected on the basis of the quality standards which do not exceed 5% per pallet and are not used (subject to approval) elsewhere in the works and any bricks damaged as a result of the Contractor's operations shall be promptly removed from the site by the Contractor.

In the event of the number of reject bricks based on the quality standards exceeding 5% per pallet, the Contractor shall immediately notify the Superintendent. The whole of any lot to which the test samples and test results apply shall be rejected if tests indicate failure to meet any of the requirements of this specification.

All bricks rejected on the basis of failure to meet the requirements of this Specification and the whole of any pallet in which the number of reject bricks exceeds 5% shall be promptly removed from the site and replaced. The cost of any replacement bricks shall be borne by the Contractor.

(f) Workmanship and Construction

The Contractor shall prepare and install a compacted fine crushed rock base in accordance with the drawings. Bricks supplied shall be clay paving bricks as specified or an approved equivalent.

(i) Cutting of Bricks

Where bricks are required to be cut, they shall be cut using an approved masonry saw. Bricks shall be cut where necessary to accommodate as accurately as possible, all service covers, fixtures and where paving abuts header margins at vertical surfaces. No cut brick shall be less than a quarter brick.

(ii) Cement Mortar Bed

A 4:1 sand/cement wet mortar bedding shall be spread in a uniform layer and screeded to the nominated design profile and levels to achieve a uniform thick layer in the range of 20 to 25 mm. Any sand used shall be white well graded washed sand passing a 4.75 mm sieve.

(iii) Brick Laying

Bricks shall be placed on the prepared mortar bed by hand with the face uppermost. Bricks shall be placed in the required pattern such that joint widths are not greater than 3 mm nor less than 2 mm. Joints shall be maintained in straight lines.

Bricks shall be laid in a uniform manner to create an evenly graded surface.

(iv) Joint Filling

Apply "Sandstick" joint filling as specified over the pavement to fill all joints, sweep pavement clean and remove excess "Sandstick".

(v) Accuracy

The completed pavement shall be laid to the following tolerances:

- surface finishes shall be free of depressions exceeding 6 mm as measured with a 3 metre straight edge;
- the difference in level between adjacent bricks shall not exceed 1 mm;
- the maximum deviation from the specified design levels for brick on mortar shall be ± 2 mm;

- the pavement levels shall be flush with the surfaces of adjacent materials, edges, kerbs etc.

(vi) Cleaning of Paving

At completion, clean all paving, removing all stains, surplus mortar or concrete, topsoil, sand, mulch or other similar material.

16.9 Granitic Gravel Paving to Pedestrian Areas

16.9.1 General

The Contractor shall construct granitic gravel paving to pedestrian areas as shown on the drawings and as detailed in this Specification.

Granitic gravel used shall be approved by the Superintendent and shall be free of scoria dust, weeds and foreign matter.

16.9.2 Construction

The Contractor shall prepare and install a 50 mm compacted depth of 20 mm Class 2 Fine Crushed Rock base in accordance with the drawings.

The approved granitic gravel shall be placed directly in a uniform continuous layer of loose thickness which after compaction, will not be less than the required 75 mm thickness. The method of placement shall not cause segregation of the material.

Timber edging (if specified) shall be 75 mm x 25 mm treated pine, straight, free of warps, splits, splinters or other defects, fixed to 450 mm x 75 mm x 50 mm hardwood stakes at 1200 centres using 50 mm hot dipped galvanised nails.

16.9.3 Finish

The surface of the granitic gravel pavement shall be graded and if necessary, scarified, re-graded and re-rolled until the regular finish of the required surface density at the required levels, grades and profiles has been achieved. Finished surface levels are to match surrounding surface levels.

16.10 Asphalt Paving to Pedestrian Areas

16.10.1 General

The Contractor shall construct asphalt paving to pedestrian areas as shown on the drawings and as detailed in this Specification.

16.10.2 Construction

The Contractor shall prepare and install a 75 mm compacted depth of 20 mm Class 2 Fine Crushed Rock base in accordance with the drawings.

Asphalt used shall be 7 mm Type L asphalt supplied and laid in accordance with Section 19 – Hot Mix Asphalt.

The asphalt shall be placed directly in a uniform continuous layer of loose thickness which after compaction, will not be less than the required 30mm thickness.

Timber edging (if specified) shall be 75 mm x 25 mm treated pine, straight, free of warps, splits, splinters or other defects, fixed to 450 mm x 75 mm x 50 mm hardwood stakes at 1200 centres using 50 mm hot dipped galvanised nails.

16.10.3 Finish

The Contractor shall adjust and trim surrounding surface levels if required to finish surface levels of the asphalt paving. Finished surface levels are to match surrounding surface levels.

17 STORMWATER DRAINS AND PITS

(NOT USED)

18 ROAD PAVEMENT CONSTRUCTION

Description

This section covers the requirements for the supply, delivery, spreading and compaction of crushed rock, plant mixed wet-mix crushed rock and cement treated crushed rock, for the construction of pavement courses including shoulders.

Conformity with drawings

Pavement courses, each consisting of one or more layers, shall after compaction be finished to smooth and uniform surfaces conforming to the limits for level, line, grade, thickness and cross section shown on the drawings or as specified.

16.10.4 Level

The top of each pavement course shall not differ from the specified level by more than 15 mm.

Where pavement is to be constructed to the lip of kerb and channel, it shall be constructed flush with the lip of the channel or not more than 5 mm above,

16.10.5 Thickness

The subbase course at any point shall be not less than the specified thickness by more than 15 mm and where the subbase consists of two or more layers the thickness of the top layer at any point shall be not less than that specified by more than 10 mm.

The base course at any point shall be not less than the specified thickness by more than 10 mm and where the base consists of two or more layers the thickness of the top layer at any point shall be not less than that specified by more than 5 mm. The average thickness of base over every 100 m section, for the full carriageway width shall be not less than the specified thickness.

The combined thickness of subbase and base courses at any point shall be not less than the specified thickness by more than 15 mm.

16.10.6 Widths and Alignment

The widths measured on each side from the specified centreline or design line shall not deviate by more than 50 mm from the designed offset when measured from the nearest point.

16.10.7 Shape

No joint on the surface of each layer of base or subbase shall lie more than 10 mm below a 3 m straight edge laid parallel to the centreline of the pavement or below a template placed at right angles to the centreline.

Materials

Unless otherwise specified, the Contractor shall be responsible for the procurement of sufficient specified material to complete the works.

HP Prior to the commencement of work, the Contractor shall confirm the quarry from which the crushed rock material will be sourced.

18.3.1 Description

This section covers the requirements of crushed rock and plant mix wet-mix crushed rock for Class 1 and 2 base of 20 mm and 40 mm nominal sized produced from igneous or metamorphic source rock, Class 3 sub-base of 20 mm and 40 mm nominal size, Class 4 crushed rock sub-base and cement treated Class 2 crushed rock of 20 mm and 40 mm nominal size.

The classes and nominal sizes shall be as specified in the special clauses, drawings and/or the schedule.

18.3.2 Definitions

Rock type

Rock is classified as igneous, metamorphic or sedimentary on the basis of the classification scheme detailed in Code of Practice RC/MTD 500.00, Code of Practice for Quarry Investigations.

Material Type

Material from a particular quarry and which is distinguishable on the basis of colour, texture, hardness, the degree of weathering and test properties.

Rock Durability Classification

The classification of a material in terms of the durability requirements of Clause 18.3.3.

Source Rock

The insitu rock mass located in a quarry that is used or proposed to be used in the production of crushed rock or aggregate.

Sedimentary rock shall not be used for the production of crushed rock base.

Crushed Rock

Crushed rock is composed of crushed rock fragments with or without sands and with or without filler, produced in a controlled manner to close tolerances of grading.

Plant Mix Wet-Mix Crushed Rock (PMWMCR)

Plant mix wet-mix crushed rock is a mixture of crushed rock and water, produced at a controlled mixing plant to close tolerances of grading and moisture content based on the modified optimum moisture content of the material.

Cement Treated Crushed Rock

Plant mix wet-mix crushed rock is a mixture of crushed rock fragments, cement and water or crushed rock fragment, sand, cement and water produced at a controlled mixing plant to tolerances of grading, moisture content and cement content.

Unsound Rock

Unsound rock is that material, whether in the source or as spall or as crushed particles, which:

- (a) is soft, friable or composed of clay or weathered rock, or which contains matter which breaks up when alternately wetted and dried;
- (b) in the case of igneous and metamorphic source rock, has a Degradation Factor – Source Rock less than the minimum value for marginal rock specified in Table 18.3.3.2;
- (c) in addition, in the case of basic igneous rock, has a Secondary Mineral Content greater than the maximum value for marginal rock specified in Table 18.3.3.2;
- (d) in the case of sedimentary rock, has a Texas Ball Mill value greater than the maximum value for marginal rock specified in Table 18.3.3.2.

Assigned Los Angeles Abrasion Loss

The assigned Los Angeles Abrasion Loss in a hardness rating derived from Los Angeles Abrasion test results and is assigned to each source by VicRoads on the basis of past test data obtained from testing products.

18.3.3 Source Rock

Source rock shall be considered sound or marginal in accordance with the provision of Tables 18.3.3.1 and 18.3.3.2.

The hardness of the source rock shall be measured by a Los Angeles Value test on the product and the assigned Los Angeles Value shall comply with the test values shown in Table 18.3.3.3.

Table 18.3.3.1 – Sound Rock

Rock Type	Test Value			
	Degradation Factor Source Rock (mm)	Secondary Mineral Content (%) (max)	Accelerated Soundness Index (min)	Texas Ball Mill Value (max)
Acid Igneous				
Granitic Rocks	50	-	-	-
Other Acid Igneous	45	-	-	-
Intermediate Igneous				
Trachyte	50	-	-	-
Other Intermediate Igneous	45	-	-	-
Basic Igneous				
Basaltic Rocks	50	25	94	-
Metamorphic				
Hornfel	40	-	-	-
Other metamorphic	45	-	-	-

Sedimentary				
Argillaceous Sediments	-	-	-	30
Arenaceous Sediments	-	-	-	45

Table 18.3.3.2 – Marginal Rock

Rock Type	Test Value			
	Degradation Factor Source Rock (range)	Secondary Mineral Content (%) (range)	Accelerated Soundness Index (range)	Texas Ball Mill Value (range)
Acid Igneous				
Granitic Rocks	35 - 49	-	-	-
Other Acid Igneous	35 - 44	-	-	-
Intermediate Igneous				
Trachyte	30 - 49	-	-	-
Other Intermediate Igneous	35 - 44	-	-	-
Basic Igneous				
Basaltic Rocks	30 - 49	26 - 30	90 - 93	-
Metamorphic				
Hornfel	20 - 39	-	-	-
Other metamorphic	30 - 44	-	-	-
Sedimentary				
Argillaceous Sediments	-	-	-	31 - 35
Arenaceous Sediments	-	-	-	46 - 55

Table 18.3.3.3 – Loss Angeles Abrasion Loss

Rock Type	Loss Angeles Value (max)	
	Class 2	Class 3
Acid Igneous		
Granitic Rocks	40	45
Other Acid Igneous	25	30
Intermediate Igneous		
Trachyte	30	35
Other Intermediate Igneous	25	30
Basic Igneous		
Basaltic Rocks	30	90 - 93
Metamorphic		
Hornfel	25	25
Other metamorphic	30	35
Sedimentary		
Argillaceous Sediments	-	25
Arenaceous Sediments	-	45

If the Contractor proposes to use a source rock other than those listed in Tables 18.3.3.1 and 18.3.3.2 the Superintendent will determine whether the rock type is acceptable and will set appropriate test values.

The Superintendent's approval shall be obtained prior to changing the source of material. If at any time the Contractor proposes to obtain material from a source other than the confirmed source, the Superintendent shall be notified in sufficient time so that investigations, as may be required, can be carried out before approval is given.

Source rock which does not comply with the specified durability and hardness requirements but from which crushed rock and aggregates of proven satisfactory performance have been produced may be accepted for use subject to the written approval of the Superintendent.

18.3.4 Product

- (a) The crushed rock fragments shall be free from vegetable matter and lumps or balls of clay and shall comply with the relevant requirements of Table 18.3.4.1.

Table 18.3.4.1

TEST	Test Value			
	Base		Sub-Base	
	Class 1	Class 2	Class 3	Class 4
Liquid limit % (max)	25	30	35	40
Plasticity Index (max)	3	6	10	20
California Bearing Ratio % (min)*	-	-	-	15
PI x % passing 0.425 AS Sieve (max)	-	-	-	600

* Value applicable to material 19.0 mm sieve. Initially at modified optimum moisture content and dry density equal to 95% of max dry density obtained in using modified compactive effort, but then soaked for 4 days prior to the CBR test

- (b) Unsound and marginal rock in that fraction of the product retained on a 4.75 mm AS sieve shall not exceed the percentages in Table 18.3.4.2. Where two or more aggregates are combined to produce the crushed rock and no facilities exist in the mixing plant to sample the mixture, unsound and marginal rock in that fraction of each aggregate retained on 1 4.75 mm AS sieve shall not exceed the percentages specified in Table 18.3.4.2.

Table 18.3.4.2

Class	Total of Marginal And Unsound Rock (% by mass) max	Unsound Rock (% by mass) max
1	10	5
2	10	5
3	20	10
-	-	-

- (c) For plant mixed wet-mix crushed rock, the aggregates and water shall be mixed at a mixing plant by continuous or batch plant.
- (d) For cement treated crushed rock, the aggregates shall conform to the material gradings and physical properties as specified for crushed rock of 20 mm and 40 mm nominal size.

Cement shall be added and mixed into the crushed rock at a mixing plant to produce uniform cement content. After mixing, the cement content, expressed as a percentage by mass of the dry crushed rock, shall be within ± 0.3 of the value as specified on the drawings or the schedule.

Addition of Water

Where it is specified that water shall be added to the crushed rock prior to delivery, such water shall be clear, clean and substantially free from detrimental impurities such as oils, salts and alkalis and vegetable substances.

Grading of Uncompacted Rock and PMWMCR Base

After completion of production, but before compaction, crushed rock and PMWMCR base shall comply with the relevant grading requirements of Table 18.5.1 to 18.5.3 corresponding to the assigned Los Angeles Abrasion Loss and the nominal size of the material.

The Contractor shall aim to produce the crushed rock and PMWMCR in such a way that the grading coincides with the relevant target grading specified in Table 18.5.1 to 18.5.3. The permitted ranges of grading in these tables provide for random fluctuations in the production processes.

Grading requirements for 20 mm Base (by Mass)

Table 18.5.1

Assigned Los Angeles Abrasion Loss: **25 or less.**
Igneous (other than granite) and metamorphic source rock

Sieve Size AS (mm)	Target Passing (% Passing)	Test Value Before Compaction	
		Limits of Grading (% Passing)	% Retained between Sieves
26.5	100	100	
19.0	100	95-100	0-5
13.2	85	78-92	7-18
9.5	73	63-83	10-16
4.75	54	44-64	14-24
2.36	39	30-48	10-20
0.425	18	14-22	14-28
0.075	8	6-10	6-13

Table 18.5.2

Assigned Los Angeles Abrasion Loss: **26 or more.**
Igneous (other than granite) and metamorphic source rock

Sieve Size AS (mm)	Target Passing (% Passing)	Test Value Before Compaction	
		Limits of Grading (% Passing)	% Retained between Sieves
26.5	100	100	

19.0	100	95-100	0-5
13.2	85	78-92	7-18
9.5	73	63-83	10-16
4.75	54	44-64	14-24
2.36	38	29-47	10-21
0.425	16	12-20	15-29
0.075	4	2-6	9-15

Table 18.5.3
Granitic Source Rock

Sieve Size AS (mm)	Target Passing (% Passing)	Test Value Before Compaction	
		Limits of Grading (% Passing)	% Retained between Sieves
26.5	100	100	
19.0	100	95-100	0-5
13.2	85	78-92	7-18
9.5	73	63-83	10-16
4.75	54	44-64	14-24
2.36	39	30-48	10-20
0.425	17	13-21	15-29
0.075	7	5-9	7-14

The Superintendent may change the target grading requirements pertaining to the 2.36 mm, 0.425 mm and 0.7075 mm sieves specified in Table 18.5.1 to 18.5.3. Notwithstanding any change made to the target grading, the magnitude of the range of limits of grading will remain unchanged and the range will remain centred on the target grading. No additional payment will be made unless the change from the specified requirements exceeds two (2) percentage units above the 2.36 mm and 0.425 mm sieves or one percentage unit for the 0.075 mm sieve.

Grading of Uncompacted Crushed Rock and PMWMCR Sub-Base

After completion of production, but before compaction, Class 3 crushed rock and PMWMCR sub-base shall comply with the relevant grading requirements of Tables 18.6.1 to 18.6.4 corresponding to the assigned Los Angeles Abrasion Loss and the nominal size of the material.

The Contractor shall aim to produce the crushed rock and PMWMCR in such a way that the grading coincides with the relevant target grading specified in Tables 18.6.1 to 18.6.2. The permitted ranges of grading in these tables provide for random fluctuation in the production process.

The crushed rock shall not be graded from near the coarse limit on one sieve to near the fine limit on the following sieve or vice versa.

Grading requirements for 40 mm Sub-Base (by Mass)

Table 18.6.1

Assigned Los Angeles Abrasion Loss: **25 or less.**
Igneous (other than granite) and metamorphic source rock

Sieve Size AS (mm)	Target Passing (% Passing)	Test Value Before Compaction
		Limits of Grading (% Passing)
53.0	100	100
37.5	100	95-100
26.5	85	75-95
19.0	77	64-90
9.5	60	42-78
4.75	46	27-64
2.36	35	20-50
0.425	17	10-23
0.075	9	6-12

Table 18.6.2

Assigned Los Angeles Abrasion Loss: **26 or more.**
Igneous and metamorphic source rock and all sedimentary and granitic source rock

Sieve Size AS (mm)	Target Passing (% Passing)	Test Value Before Compaction
		Limits of Grading (% Passing)
53.0	100	100
37.5	100	95-100
26.5	85	75-95
19.0	77	64-90
9.5	60	42-78
4.75	46	28-64
2.36	35	20-50
0.425	15	7-23
0.075	6	2-9

The Superintendent may change the target grading requirements pertaining to the 2.36 mm, 0.425 mm and 0.7075 mm sieves specified in Table 18.6.1 to 18.6.2. Notwithstanding any change made to the target grading, the magnitude of the range of limits of grading will remain unchanged and the range will remain centred on the target grading. No additional payment will be made unless the change from the specified requirements exceeds two (2) percentage units above the 2.36 mm and 0.425 mm sieves or one percentage unit for the 0.075 mm sieve.

Moisture Content

18.3.5 Crushed Rock

Where payment is to be made on a mass basis, the average moisture content of crushed rock at the plant shall not exceed 3.5% by mass unless otherwise specified or unless the Superintendent has, at the time of tendering, nominated an upper limit of average moisture content greater than 3.5%.

The average moisture content of crushed rock supplied on any one day will be determined from three (3) samples taken at random from that day's supply. If the average is greater than that specified or nominated, the material may be rejected.

If at the discretion of the Superintendent the material is accepted, payment will be made for the mass determined by deducting the calculated mass of excess moisture from the nett mass shown on the delivery dockets.

18.3.6 PMWMCR

Where the work of the Contract includes supply and delivery only, the moisture content of the mixture at the point of delivery, expressed as a percentage by mass, shall be within $\pm 10\%$ of the target nominated from time to time by the Superintendent.

18.3.7 Cement Treated Crushed Rock

The moisture content of the materials at the time of spreading, expressed as a percentage by mass, shall not differ from the modified optimum moisture content, as appropriate by $\pm 10\%$.

Stockpiling Prior to Delivery

Material may be stockpiled prior to delivery provided the following requirements are fulfilled:

- (a) the product, after recovery from the stockpile, complies with this specification;
- (b) the stockpile site is clean, adequately paved and well drained;
- (c) if a stockpile is constructed in more than one layer, each layer is fully contained within the area occupied by the upper surface of the preceding layer; and
- (d) no cementitious filler is used.

Handling of Materials

Handling of materials, including loading of trucks and stockpiling, shall be effected in such a manner as to minimise segregation.

Minimum Testing Requirements

The Contractor shall test the crushed rock, PMWMCR and cement treated crushed rock at a frequency that is sufficient to ensure that each class and nominal size of material supplied under the Contract complies with the specified requirements.

The frequency shall not be less than that shown in Table 18.10.1, except that the Superintendent may agree to a lower frequency where the Contractor has implemented a system of statistical process control and can demonstrate that such lower frequency is adequate to assure the quality of the product.

Table 18.10.1 – Minimum Frequency of Testing

Test	Minimum Frequency of Testing
Grading	On each day – one per 300 tonnes or part thereof
Unsound Rock	On each day – one per 300 tonnes or part thereof
Moisture Content ++	
- Crushed rock	On each day – 3 No.
- PMWMCR	On each day – one per 300 tonnes or part thereof
- Cement Treated Crushed Rock	On each day – one per 300 tonnes or part thereof

Plasticity Index	In each month – one per 20,000 tonnes or part thereof
California Bearing Ratio	Prior to the commencement of work and when in the opinion of the Superintendent the nature of the material has changed significantly

Delivery Dockets

Where material is scheduled for measurement by loose volume in delivery vehicles or by mass, a delivery docket for each load shall be issued to the Superintendent at the point of delivery.

Where material is measured by other means and for Lump Sum Contracts, the Contractor shall make delivery dockets available for inspection on request by the Superintendent.

Delivery dockets shall show:

- (a) name of the supplier, and location of plant;
- (b) docket number;
- (c) name of user;
- (d) project name and location (or contract number);
- (e) registered number or fleet number of the vehicle;
- (f) date and time of loading;
- (g) nature and source of material;
- (h) empty and loaded masses of the vehicle (where material is scheduled for measurement by mass); and
- (i) loose volume in delivery vehicle.

Spreading of Fine Crushed Rock

The road pavement material shall be spread in even and equal layers, each layer to be of maximum loose thickness of 150 mm and no less than three (3) times the nominal size of the material as a minimum.

Where the excavation is below the design level of the underside of any proposed kerb and channel, the base course shall be spread and thoroughly compacted to a level to provide bedding for the kerb and channel.

The bottom course shall be spread and compacted before the top course is spread, and the Contractor shall keep the bottom course graded and maintained during the spreading of the top course. No layer of pavement material shall be spread until the previous layer has been approved by the Superintendent.

Spreading shall commence at a point on the road nearest the sources of supply, and shall continue from the point, so that the spread pavement material will receive traffic and compaction by the vehicles used for cartage.

The pavement material shall be spread from tipping trucks in an even continuous layer. The Contractor shall be responsible for spreading the material uniformly, but will be permitted to move the material by graders to obtain this uniformity provided there is no segregation of fine and coarse material and complete compaction is subsequently obtained.

All material shall be spread accurately to level pegs and control of longitudinal shape and cross sections and shall be maintained by means of boning rods and/or string lines used continuously during the spreading of material.

If segregation occurs in crushed rock, the segregated material shall be mixed and re-spread using methods agreed to by the Superintendent.

Plant mixed wet-mixed crushed rock shall be spread with a self-propelled paver unless otherwise approved by the Superintendent. Care shall be taken to minimise segregation of material. If segregation occurs in plant mixed wet-mix crushed rock, the segregated material shall be replaced at the Contractor's expense.

Compaction

Compaction shall commence promptly after spreading and all material spread each day shall be compacted sufficiently to provide a dense surface to minimise the entry of water in the event of rain.

Compaction of the pavement shall be effected with an approved machine loaded to twelve (12) tonnes or a vibrating roller of this effective weight and by continuous grading to maintain the correct shape. Construction and ordinary traffic shall be directed to assist uniform compaction of the pavement.

The crushed rock shall be compacted at a moisture content of not less than 85% or more than 115% of optimum moisture content to a dry density of not less than 95% of the maximum value obtained in the Modified Compaction test carried out in accordance with AS 1289 – 5.2.1:1993 except that material within 100 mm of the finished surface levels shall be compacted to a dry density of not less than 98%.

After completion of compaction of a layer the moisture content of the material in the layer shall be maintained within the range specified until test rolling has been completed.

Rolling shall begin at the side of the pavement and work towards the centre in longitudinal traverses, and all deficiencies shall be remedied in the presence of the Superintendent and to his entire satisfaction. The Contractor shall water the pavement material to assist in compaction. The amount of water shall be determined by the Superintendent, and the Contractor shall have sufficient plant on the job to adequately water the crushed rock being spread.

Any unstable areas detected by test rolling shall be rectified at the Contractor's own expense.

Unless otherwise directed by the Superintendent, in place density and moisture content shall be measured by means of a nuclear gauge calibrated in accordance with AS 1289 – E8.4.

The Superintendent may require deflection testing to be carried out on the compacted pavement. The deflection at each test site shall be measured beneath a single axle loaded to 8165 kg and fitted with dual wheels having 10.0 X 20-12 ply tyres; each wheel shall be placed to give a centre distance between the tyres of 330mm. The procedure and results shall be in accordance with the methods and standards as set out in Technical Bulletin No. 29 of the Country Roads Board (Testing for deflection with the Benkleman Beam).

Requirements for Testing and Acceptance of Compaction

The Contractor shall submit to the Superintendent for review a programme for compaction testing. The programme shall indicate the number, spacing and location of tests.

The Contractor shall carry out testing at a frequency which is sufficient to ensure that work performed under the Contract complies with the specified requirements but which is not less than six (6) tests per lot size as shown in Table 18.14.1.

Table 18.14.1 – Minimum Frequency of Testing for Compaction

Material	Acceptable Lot Size in a Single Layer of Work *
Base	2400 sq m or one day's production
Sub-base	5000 sq m or one day's production
* Where alternative acceptable lot sizes have been specified, the smaller lot size shall apply	

The calculation of density ratio shall be based on tests performed using Modified compactive effort. The work shall be assessed for compliance with requirements for testing and acceptance of compaction as provided in Table 18.14.2.

A lot shall consist of one layer or work and its size shall not exceed that given in Table 18.14.1.

All pavement layers shall be compacted to withstand rolling and shall be test rolled in accordance with Clause 13.12, prior to acceptance of the layer.

Table 18.14.2 – Requirements for Lot Acceptance of Compaction

Characteristic Value of Density Ratio %		Assessment
Base	Sub-Base	
Not less than 98.0	Not less than 95.0	Accept lot
97.0 to 97.9	94.0 to 94.9	Re-roll as agreed with the Superintendent
Less than 97.0	Less than 94.0	Reject lot

The extent of re-rolling proposed by the Contractor to be undertaken as referred to in Table 18.14.1 shall be reviewed by the Superintendent.

Where agreement cannot be reached, the re-rolling shall be carried out as proposed by the Contractor. However the Superintendent may direct the Contractor to carry out compaction testing to confirm acceptance of the lot.

No additional payment will be made for any requirement to carry out confirmation compaction testing as directed.

Protection of Compacted Layers

The surface of any compacted layer shall be kept moist, in good order and condition and be free from contamination until any subsequent pavement work under the Contract is commenced or the Superintendent accepts and takes responsibility for that part of the Works.

Preparation for Sprayed Bituminous Surfacing

Where the work for the Contract includes preparation of the pavement surface for sprayed bituminous surfacing, the provisions of this clause shall apply.

The pavement shall be scarified to a depth of 100 mm and the whole of the loose material thoroughly mixed by blading with a power grader. Water shall be added by approved watering plant to obtain optimum moisture content prior to setting down the surface.

The surface shall be graded and rolled using a 12 tonne self propelled pneumatic multi-tyred roller, tyre pressure of 600 kPa and 12 tonnes steel drum roller to obtain a true cross section

and a thoroughly compacted pavement with a tightly bonded surface. Water shall be added as required to obtain the required compaction and surface condition.

On completion of compaction, any segregated areas shall be rectified. The method of rectification shall be reviewed by the Superintendent.

In place density tests on the final prepared pavement shall be carried out by the Contractor at the frequency as set out in Clause 18.14 and at locations agreed to in the "programme for compaction testing" as referred to under Clause 18.14.

HP An inspection of the shape and surface conditions shall take place prior to approval of the prepared pavement for sealing.

NO PAVEMENT WILL BE CONSIDERED SUITABLE FOR SEALING UNLESS ALL OTHER WORKS WITHIN THE ADJACENT ROAD RESERVE HAVE BEEN COMPLETED.

The Contractor shall maintain the pavement in the accepted condition until surfacing works are commenced. Should the pavement condition deteriorate before surfacing works are commenced, the Contractor shall re-prepare the pavement and re-present the pavement for approval.

Preparation for Hot Asphalt Surfacing

Where the work of the Contract includes preparation of the pavement surface for hot asphalt surfacing, the provisions of this Clause shall apply.

The pavement shall be scarified to a depth of 100 mm and the whole of the loose material thoroughly mixed by blading with a power grader. Water shall be added by approved watering plant to obtain optimum moisture content prior to setting down the surface.

The surface shall be graded and rolled using a 12 tonne self propelled pneumatic multi-tyred roller, tyre pressure of 600 kPa and 12 tonnes steel drum roller to obtain a true cross section and a thoroughly compacted pavement with a tightly bonded surface. Water shall be added as required to obtain the required compaction and surface condition.

On completion of compaction, any segregated areas shall be rectified. The method of rectification shall be reviewed by the Superintendent.

In place density tests on the final prepared pavement shall be carried out by the Contractor at the frequency as set out in Clause 18.14 and at locations agreed to in the "programme for compaction testing" as referred to under Clause 18.14.

HP An inspection of the shape and surface conditions shall take place prior to approval of the prepared pavement for sealing.

The Contractor shall maintain the pavement in the accepted condition until surfacing works are commenced. Should the pavement condition deteriorate before surfacing works are commenced, the Contractor shall re-prepare the pavement and re-present the pavement for approval.

19 HOT MIX ASPHALT

19.1 General

This section covers the requirements for the manufacture and placing of asphalt Types T, V, H, N, L and R and of Sizes 7, 10, 14 and 20. The requirements relate to quality of materials, mix design, supply and placing of the asphalt. This specification accords with the VicRoads Specification Section 407.

19.2 Standards

Requirements for the manufacture and placing of hot mix asphalt shall be in accordance with VicRoads Standard Specification for Roadworks – Hot Mix Asphalt – Section 407 (current issue).

19.3 Asphalt Requirements

Asphalt requirements shall be as specified in VicRoads Standard Specification for Roadworks – Hot Mix Asphalt, Section 407 (current issue).

All asphalt requirements as per the drawings.

19.4 Schedules

(NOT USED)

20 PAVEMENT MARKINGS – NEW INSTALLATIONS

20.1 General

This section covers the requirements for materials and application of pavement markings including:

- (a) fixing of both reflective and non-reflective raised pavement markers to asphalt or sealed pavements using epoxy adhesive or hot melt bitumen adhesive;
- (b) supply and application of pavement marking paint and glass beads for new installation of longitudinal lines, intersection markings and other markings on the road surface;
- (c) supply and application of thermoplastic or cold-applied plastic material and glass beads, and pliant polymer tape for new installations of pavement markings..

18.3.8 Standards

The requirements for the supply and application of road marking paint and glass beads for new installations of longitudinal lines, intersection markings and other markings on the road surface shall be in accordance with VicRoads Standard Specification for Roadworks – Section 722 – Pavement Markings – New Surfacing (current issue).

20.2 Painted Pavement Markings

This clause refers to the application of painted pavement markings for new installations to road surfaces, including asphalt, concrete or spray sealed, which have not previously had pavement markings on them.

18.3.9 Pavement Marking Paint Standard

The standard for painted pavement markings shall be a thermoplastic paint.

In the following circumstances the Superintendent may approve alternative paint marking applications:

- (a) where cold or wet weather makes the drying time for the above standard impractical, or
- (b) where water based paint marking will not adhere well to new reseals, or
- (c) where pre-coated aggregate has been used.

Subject to the approval of the Superintendent a solvent based paint with normal glass beads may be used. Solvent based paint will only be approved in the following circumstances:

- the standard paint system cannot be applied successfully.
- the solvent based treatment is temporary, to be followed by standard treatment at a later date.

18.3.10 Line Marking Application

Line marking shall be undertaken at a slow speed (no more than 10 km/hr) to ensure the minimum dry film thickness is attained and that large glass beads do not roll in the paint or bounce off the marking.

21 BLUESTONE PAVING

(NOT USED)

22 LANDSCAPING AND TREE PLANTING

22.1 Description

This section covers the requirements for supply, planting, grass seeding, turfing, erosion protection, tree protection, timber structures, paving, drainage, irrigation and other associated landscape work and maintenance as specified and shown on relevant Drawings, Planting Details and Schedules.

22.2 Definitions

(a) Weed

A weed is any plant which is not specified in the plant schedule and/or is specified to be removed and/or is classified a weed under the Catchment and Land Protection Act 1994 and/or is not indigenous to the site.

(b) Propagule

A propagule is any structure capable of producing a new plant (eg seeds, cuttings etc.).

22.3 Inspections, Samples & Certificates Supplied By the Contractor

The specified inspections, samples and certificates shall be made available or submitted to the Superintendent for acceptance prior to the commencement of associated work. Accepted samples shall become the agreed minimum standard and approved source of supply for the contract work. The Contractor shall not substitute any specified or accepted material without the Superintendent's prior written approval. The Contractor shall be responsible for programming the provision of samples, certificates and all inspections and allowing 48 hours notice to the Superintendent.

The Contractor shall provide the following before commencement of the relevant landscape work:

Inspections:

- plant stock for all plant species

Samples

- mulch
- erosion control mat
- weed mat
- tree guard
- any imported topsoil

Certificates

- evidence of origin of indigenous provenance plant material
- testing of any imported topsoil

22.4 Supply of Materials

All materials shall be supplied by the Contractor unless otherwise specified.

If any materials are supplied by Council, a joint inspection of the materials shall be made by the Contractor and the Superintendent following delivery of the materials to site. The materials, if satisfactory, shall thereafter become the responsibility of the Contractor with respect to their storage, care, theft, loss or damage.

22.4.1 General Supply of Plant Stock

Plant stock for the works shall be of the size and type as specified in the plant schedule(s). No substitution of species shall occur without the Superintendent's approval. All stock shall be hardened off in nursery conditions, local to the planting area, for 2-4 weeks prior to planting.

Plants shall show a healthy growth, be undamaged, free of disease, have a size in proportion to their pot size and species, not be pot bound and shall generally have roots penetrating to the edge of the pot.

Advanced trees shall be straight-trunked and, when planted, be of minimum height and calliper as specified in the plant schedule(s). Head growth shall be strong and well-formed.

Plant tubes shall be a minimum depth of 150 mm.

Plant cells specified shall be of a minimum depth of 70 mm. Plant cells shall only be used for grasses and herbaceous plants.

22.4.2 Supply of Indigenous Plant Stock

Indigenous plant species shown on the plant schedules shall be propagated from sources of local provenance found within the site or the closest possible natural plant source of similar genetic make-up.

The Contractor is responsible for obtaining all necessary permits before collecting any propagules. Plant material harvested must be pest free.

The Contractor shall make available for review by the Superintendent an indigenous propagule collection program to supply the quantities of indigenous plant stock as shown in the plant schedule(s).

22.4.3 Supply of Imported Topsoil

In the event that the site topsoil is not available or is not appropriate, imported topsoil shall be supplied by the Contractor at the Contractor's expense. Imported topsoil shall be free from pathogens, toxic levels of any element and any weeds and their roots.

If imported topsoil is used, the Contractor shall supply topsoil with the following characteristics:

Texture	Light to medium, ie capable of handling when moist but lacking cohesion so that it will spread easily
pH	Slightly acid to neutral pH 6.0 – 7.0
Stone Content	Less than 4% by dry weight with stone size not exceeding 10 mm
Organic Matter	Decomposed matters shall not exceed 40% by volume, undecomposed matter shall be less than 4% by volume
Salinity	Less than 600 ppm

Extraneous Material	The topsoil shall be free of sods of subsoil, rubbish, petrol and oil contaminants, lime etc
General description	Topsoil for mulch planting beds shall be light to medium friable clay loam Topsoil for grass areas shall be a light to medium friable sandy loam

22.4.4 Supply of Herbicides and Insecticides

Only herbicides and insecticides registered for use in Victoria may be used.

22.4.5 Supply of Fertilisers and Trace Elements

Fertilisers shall be blended in accordance with the results of a site topsoil analysis test and shall take into account soil type, plant species and/or grass mix, pH and nutrient level, trace element requirements, average annual rainfall and the planting season.

Fertilisers for plant stock shall be proprietary slow release with a 9-10 month release period and suitable for the establishment of plant types, sizes and species specified in the plant schedule.

22.4.6 Supply of Shredded Wood Mulch

Mulch must be produced to comply with AS 4454 – 1997 Soil Conditioners and Mulches, and as specified below. Samples of the proposed mulch shall be submitted to the Superintendent for approval and all material used shall conform to the approved samples.

Fine shredded wood mulch or approved equivalent shall be free of soil, rocks, weeds, seed, vermin, deleterious material, toxins or contaminants.

Mulch available from indigenous on-site vegetation shall be used as agreed by the Superintendent.

Mulch derived from plywood products, particle board or painted timber is not acceptable.

Particle sizes shall be no wider than 20 mm and no longer than 100 mm. Fines content shall be no more than 5% by volume.

22.4.7 Supply of Playground Mulch

(NOT USED)

22.4.8 Supply of Weed Mat

(NOT USED)

22.4.9 Supply of Erosion Control Mat

(NOT USED)

22.4.10 Supply of Tree Guards and Stakes (200 and 300 mm Pots)

(NOT USED)

22.4.11 Supply of Tree Guards (Advanced Tree Planting in Pavement)

(NOT USED)

22.4.12 Supply of Grass Seed (excluding playing field – refer Clause 22.16.13)

(NOT USED)

22.4.13 Supply of Turf

(NOT USED)

22.4.14 Supply of Sterile Grass Seed

(NOT USED)

22.5 Erosion Protection

The Contractor shall ensure that all disturbed areas are adequately protected from erosion.

Disturbed areas shall be protected immediately following topsoiling by one or more of the following or other approved methods:

(a) Programming Planting

For areas to be planted, hydro-mulching/mulching and planting shall be implemented as soon as practicable.

(b) Sterile Cover Crop

For areas to be planted, seeding with a temporary cover crop of sterile annual grass at a rate which shall provide quick stable cover to the soil.

(c) Formation Protection

For areas to be grassed, the batter slope or drain shall be sown with grass seed, fertilised as specified and immediately covered with an erosion control mat as required.

For planting bed areas steeper than 2:1, weed mat only shall be installed.

Erosion control and weed mat shall be laid and anchored in accordance with the manufacturer's instructions. In drainage channels the erosion control matting shall cover the full width of the floor and extend 600 mm up each side.

Any erosion control mat area which is damaged or in which a full and even grass growth has not been established within the first growing season shall be repaired or replaced as necessary, to ensure that erosion control and establishment of a full and even grass coverage is achieved.

22.6 Tree Surgery

(NOT USED)

22.7 Trees To Be Removed

(NOT USED)

22.8 Setting Out and Site Preparation

22.8.1 Setting Out

(i) Planting Areas and Individual Plants

The Contractor shall set out the location and shape of planting beds and the location of individual plants in accordance with the Drawings by scaling dimensions from the Drawings or by complying with plant number and density requirements as shown in the plant schedule (s) and locating by reference to existing features.

Trees shall be placed a minimum of 1 metre from any fence and shared pathway unless specified otherwise.

(ii) Grassed Areas

The seedbed for grassed areas is to be firm following the general slope of the surface with no localised depressions.

(iii) Nature Strips

Nature strips shall mean all the areas within the road reserve and within the limits of the Contract shown on the plans which are not to be paved with concrete and other paving materials.

22.8.2 Site Preparation

(i) Site Clearing

The Contractor shall clear only the site areas to be occupied or affected by the works. The Contractor shall be responsible for the removal of all deleterious and excess material from the site.

General clearing: Remove everything on or above the site surface, including rubbish, vegetable matter and organic debris, scrub, timber, stumps, boulders and rubble.

Grubbing: Grub out stumps and roots over 50 mm diameter to a minimum depth of 500 mm below subgrade under buildings, embankments, or paving, or 300 mm below finished surface in unpaved areas.

Old works: Remove old slabs, foundations, pavings, drains, manholes and the like found on the surface.

Existing grass: Remove existing grass to a depth just sufficient to include the root zone.

(ii) Stripping of Existing Topsoil

Topsoil from the areas of excavation, filling, trimming and grading shall, unless otherwise specified, be stripped to a depth of 150 mm and neatly stockpiled where directed on site.

Stripped topsoil nominated as "Approved Topsoil" by the Superintendent shall be used in Landscape works in this contract and shortfall being made up by importing topsoil.

(iii) Excavation and Filling

Any excavation required shall be finished off with an even surface, thoroughly consolidated until a firm and uniform sub-grade has been obtained throughout the entire area. Depressions which have developed during compaction shall be filled with approved, sound material and consolidated.

Where filling is necessary, approved topsoil shall be imported at no extra cost. Excess excavated material shall be the property of the Contractor and removed from site at no extra cost.

The cartage of soil shall not be carried out along the nature strip of the footpath (if any) but along the road, the soil being placed directly on to the nature strips.

(iv) Grading and Trimming

The Contractor shall provide for the minor trimming and grading to the subsoil as required for the works and in conformity with the requirements shown on the drawings.

During the course of the Contract, if any major filling and/or excavation become necessary, it shall be considered as separate to this Contract. Such works shall be by negotiation as directed and agreed with the Superintendent.

The shaping and trimming of nature strips shall be completed prior to the sealing of the road pavement.

HP

The Contractor shall obtain the Superintendent's review and approval of the final shape of the nature strips prior to the preparation for sealing of the road pavement.

(v) Weed Control

The Contractor shall eradicate weeds by environmentally acceptable methods using a non-residual glyphosate herbicide (or other approved non-residual herbicide) in any of its registered formulae, at the recommended maximum rate following the manufacturer's recommendations.

Regularly remove by hand, rubbish and weed growth that may occur throughout grassed, planted and mulched areas. Remove weed growth only (identify and leave native grasses and plants) from an area 750 mm diameter around the base of trees in grassed areas. Continue eradication throughout the course of the works and during the planting establishment period.

All herbicides and pesticides are to be used strictly in accordance with the manufacturer's instructions.

Weed control shall be in accordance with the Contractor's OH&S Procedure for the safe handling of herbicides.

Herbicides shall not be used around wetlands and waterways without the prior consultation with the relevant water authority and ecological assessment.

The Contractor shall be responsible to reinstate areas to their pre-contract condition, excluding weed growth, if damaged during this process.

The Contractor shall submit for review by the Superintendent nominated herbicides, licensed holders and any other pesticide types, mixes, rates and application techniques.

(vi) Mounding

In the areas of mounding, cultivate existing soil to a depth of 200 mm prior to mound formation.

Construct mounds where indicated on plans from approved fill. Form in the positions and to the height, gradient and dimensions, shown on the Drawings.

Apply fill in layers 300 mm thick, compacted to 85% of the dry density ration with internal packing down. Round gradually corners and intersections of planes.

Construction of mounding shall allow for the top layer of 75 mm of approved topsoil in lawn areas.

Approved fill shall be soil or subsoil material without debris or rubbish, free of chemicals and without stone or rock fragments larger than 20 mm diameter. The material shall be slightly clayey in nature to aid in moisture retention.

(vii) Ripping

Planting bed areas shall be cross-ripped to a minimum depth of 450 mm at rip line spacings of 500 mm in order to shatter the ground.

Where trees are to be planted in grass areas, the ground shall be cross-ripped to a distance of 500 mm radius from each new tree location and to a minimum depth of 450 mm.

Ripping shall not occur within the extent of existing vegetation or the dripline of existing trees.

HP

A representative sample of ground ripping not less than 100 m² in area shall be made available for review by the Superintendent at not less than 48 hours notice prior to the commencement of the balance of the relevant work. The accepted ground ripping shall be used as a reference standard for the standard for the remaining work to be completed under the Contract. In areas where ripping is not practical, the Contractor submit alternative methods to the Superintendent for review.

(viii) Batter Treatment

The surface of batters in planting bed areas shall be left rough such that the specified depth of topsoil is "keyed" into the ground in order to prevent slippage and erosion.

(ix) Topsoil Application

Weedy site topsoil shall not be spread to other locations on the site.

Topsoil shall be applied to mulched planting beds following ripping and cultivation.

A total depth of topsoil of 300 mm shall be placed on all mulched planting bed areas and 75 mm (compacted) on areas to be grassed, including nature strips.

Topsoil shall be spread and firmly compacted to 90% of the maximum value obtained in the Standard Compaction test in accordance with AS 1289 – 1981, but not over compacted to the specified depth.

(x) Addition of Nutrients and Trace Elements

In order to maximise plant and grass performance, nutrients and trace elements shall be added to the site topsoil during topsoil spreading and/or planting bed areas as specified or agreed by the Superintendent, in accordance with results from site topsoil analysis tests.

The Contractor shall submit for review by the Superintendent nominated fertiliser types, blends, rates and techniques for application, prevention of plant burning and nutrient run-off into waterways.

(xi) Cultivation

All plantation areas shall be cultivated where practicable to a minimum depth of 300 mm by mechanical means. Cultivate manually within 300 mm of paths or structures. Do not disturb services or tree roots, if necessary cultivate by hand.

During cultivation, thoroughly mix any materials required to be incorporated into the subsoil. After cultivation, the surface shall be left rough to allow topsoil to be keyed in.

Cultivation may cause hard panning in some soil types, such cases shall be brought to the attention of the Superintendent. The Contractor shall advise of alternative cultivation techniques.

In the event of saturated ground conditions, cultivation shall be delayed until the ground has satisfactorily dried out.

Procedures for the cultivation of cut or fill batters steeper than 3:1 and undisturbed areas shall be submitted for the Superintendent's review prior to work proceeding.

Seeded grass areas and hydroseeded areas shall be cultivated to a depth of 100 mm.

(xii) Removal of Debris

Remove stones exceeding 25 mm in size, clods of earth greater than 50 mm in size which cannot be broken down, and any weeds, rubbish or other deleterious material brought to the surface during cultivation. Appropriate topsoil shall be used to fill any depressions and holes caused by the removal of rock and debris from areas which have been prepared for planting or grassing.

(xiii) Subsoil Additives

Additives: Apply additives after ripping or cultivation and incorporate into the upper 100 mm layer of the subsoil.

Locations: Incorporate additives during cultivation where specified.

Subsoil additives: In all areas to be grassed and planted, gypsum shall be supplied and installed on prepared subsoil/topsoil at a rate of 2 kg/m² to garden bed areas, and 1.5 kg/m² to lawn areas.

(xiv) Planter Bed Edging

(a) *Timber Edging*

The Contractor shall supply and install timber edging as detailed and located on the drawings. The edge is to be set flush with finished adjoining lawn levels unless specified otherwise. Where curved edges of radius less than 3 metres are required, timber shall be notched and staked to ensure even and accurate curves can be set and maintained.

Unless otherwise specified, timber shall be new 75 mm x 25 mm treated pine edging. Timber shall be straight, free of warps, splits, splinters or other defects.

Provide and install 450 mm x 75 x 50 mm hardwood stakes at 1200 centres and nailed to plant bed edging using 50 mm hot dipped galvanised nails.

(b) *Sleeper Edging*

The Contractor shall supply and install sleeper edging as detailed and located on the drawings. The edge is to be set flush with finished adjoining lawn levels unless otherwise specified.

Unless otherwise specified, sleepers shall be 75 mm x 200 mm x 2000 mm treated pine sleepers. The sleepers shall be bolted to 75 mm x 200 mm x 600 mm treated pine posts at maximum 2000 mm centres using galvanised coach bolts.

All timber shall be new, straight and selected to avoid split or damaged faces being exposed. All exposed edges of timber shall be chamfered.

(xv) Playground Edging

The Contractor shall supply and install timber edging to playground softfall areas as detailed and located on the drawings. The edge is to be set flush with adjoining lawn levels unless otherwise specified.

Unless otherwise specified, timber shall be 75 mm x 200 mm x 2000 mm treated pine sleepers. The sleepers shall be bolted to 75 mm x 200 mm x 600 mm treated pine posts at maximum 2000 mm centres using galvanised coach bolts.

All timber shall be new, straight and selected to avoid split or damaged faces being exposed. All exposed edges of timber shall be chamfered.

“Softfall” playground mulch as specified shall be placed and spread to provide a minimum compacted depth of 300 mm.

(xvi) Trimming and Finished Levels

The Contractor shall adjust and trim subsoil levels so that subsoil is placed to the level of back of kerb or timber edge. The specified depth of topsoil and/or mulch shall then be added and tapered so that the finished mulch and/or topsoil levels meets flush with the adjacent surfaces.

HP A representative sample of topsoiling and any associated ground trimming, not less than 100 m² in area shall be made available for review by the Superintendent at not less than 24 hours notice prior to the commencement of the balance of the relevant work. The accepted topsoiling and any associated ground trimming shall be used as a reference standard for the remaining work to be completed under the Contract.

22.9 Planting

22.9.1 Mulching

Mulch shall be placed to a minimum depth of 100 mm on planting bed areas. Mulch shall extend at least 500 mm beyond plant centres at the outer edges of planting beds.

All trees in lawn areas are to be mulched with minimum 75 mm deep x 500 mm radius of mulch.

Mulch must be kept clear of plant stems to avoid collar rot.

HP A representative sample of mulching, not less than 100 m² in area shall be made available for review by the Superintendent at not less than 24 hours notice prior to the commencement of the balance of the relevant work. The accepted mulching shall be used as a reference standard for the remaining work to be completed under the Contract.

22.9.2 Weed Control Mat

(NOT USED)

22.9.3 Planting

(NOT USED)

22.9.4 Transplanting

The Contractor shall obtain approval before commencing any transplanting required under the Contract.

Timing of the works shall be selected with regard to the appropriate season, time of operation, rootball diameter etc. Approval may be deferred if weather conditions are unfavourable.

Two days prior to transplanting of each specimen the rootball shall be thoroughly irrigated. Cutting of roots shall be minimised. A ball of soil around the root system shall be maintained in a firm condition by wrapping in hessian or other appropriate open weave material.

Prior approval of the Superintendent shall be obtained for the selective pruning of branches prior to transplanting.

22.9.5 Fertilising

(NOT USED)

22.9.6 Watering

(NOT USED)

22.10 Turf

(NOT USED)

22.11 Hydroseeding

(NOT USED)

22.12 Drainage for Landscape Works

(NOT USED)

22.13 Concrete for Landscape Works

(NOT USED)

22.14 Footpath Paving for Landscape Works

The Contractor shall construct paving as shown on the plans in accordance with Section 16 – Footpath Pavement Construction of the specification. The placing shall comply with the requirements set out in the specification and drawings.

22.15 Irrigation – Playing Field Construction

(NOT USED)

22.16 Grassing – Playing Field Construction

(NOT USED)

22.17 Establishment and Maintenance After Practical Completion

22.17.1 Scope of Establishment and Maintenance

The Contractor shall establish and maintain the whole of the landscape work performed under this Contract for a period of fifty-two (52) weeks following the date of issue of the Certificate of Practical Completion by the Superintendent, unless specified otherwise in Appendix A to the General Conditions of Contract. Any defects shall be rectified immediately.

Establishment and Maintenance shall mean the care and maintenance of the works by accepted horticultural and arboricultural practices, as well as rectifying any defects that become apparent in the works under normal use.

Establishment and Maintenance of the landscape work shall include, but shall not be limited to, the following items where and when required:

- (i) watering
- (ii) fertilising
- (iii) cultivation
- (iv) top dressing
- (v) renovating
- (vi) weeding
- (vii) pest and disease control
- (viii) staking
- (ix) replacement of plant materials
- (x) replanting
- (xi) pruning
- (xii) re-mulching
- (xiii) maintaining the site neat and tidy

The Contractor shall give the Superintendent seven (7) days notice that the works have reached Practical Completion for commencement of the establishment/maintenance period. The Superintendent shall inspect the works and if any defects or deficiencies are found they shall be rectified within 14 days.

Any soil subsidence or erosion that may occur after soil filling and preparation operations shall be made good.

All newly planted areas shall be kept protected from casual pedestrian traffic as specified herein. Protective fences shall be removed following successful establishment of the works.

All mulched surfaces shall be kept in a clean and tidy condition and be reinstated or topped up where necessary.

22.17.2 Joint Inspections

Joint inspections shall be undertaken by the Contractor and Superintendent at three monthly intervals after commencement of the maintenance period.

Any remedial work shall be performed within two weeks of the date of inspection or during the planting season following written documentation of the defect.

22.17.3 Replacement Materials

All replacement materials used shall be in accordance with the requirements of this specification, the drawings and plant schedule.

22.17.4 Maintenance

The works shall be maintained as follows in accordance with the requirements of this specification, the drawings and plant schedule.

(i) Planting

The planting establishment period shall commence at the Date of Practical Completion and the maintenance period of fifty-two (52) weeks must include one full summer.

Practical completion of the planting works includes, but is not limited to, the germination of grassed areas, establishment of turfed areas and replacement of plants which have failed, been damaged or been stolen during the works.

The Contractor shall produce and comply with a planting maintenance program and keep a log book recording when and what maintenance work has been done and what materials, including toxic materials, have been used. The program and log book shall be made available for inspection on request of the Superintendent.

Where existing planting or grass is within the Contract landscape area, the Contractor shall maintain it as for the corresponding classifications of new grass areas or planting.

(ii) Replanting

Plants which die or do not show satisfactory growth within the maintenance period shall be replaced and replanted by the Contractor at the Contractor's cost.

The Contractor shall programme and allow for the supply and propagation of plants whether by weed or cutting as required for any replanting during the current or next available planting season.

All plants (including any replacement plants) are required to clearly indicate healthy growth at the completion of the maintenance period by demonstrating growth through consecutive growing seasons.

(iii) Weed Control

Garden beds shall be weeded a minimum of once every two weeks unless otherwise instructed and be maintained in a minimum 90% weed free state.

Grass areas shall be sprayed with approved selective herbicide against broadleaf weeds as required by the Superintendent and in accordance with the manufacturer's directions.

(iv) Watering

Trees, garden beds and grassed areas are to be watered regularly to ensure continuous healthy growth. The minimum requirement shall be consistent with the natural rainfall of the site location. New planting shall receive regular and frequent deep soakings to ensure establishment and healthy growth. During periods of hot and dry weather, lawn areas shall be watered on a daily basis, preferably in the early morning or late afternoon.

(v) Mowing

Initially, mow with a sharp rotary type mower taking care to cut no more than one third of the leaf area in any one mowing. Modification to the closeness of cut should be made gradually. Later mowing can be done with a reel type mower.

The first cut and any subsequent mowing during the maintenance period, shall be carried out at intervals sufficient to maintain the grass height at 50 to 75 mm \pm 10 mm.

With any mowing, no more than one-third of the leaf length is to be removed. The grass shall be cut in even swathes. The formation of windrows is not permitted. Grass cuttings may be spread evenly over mown area without the formation of clumps.

(vi) Reseeding of Seeded Grass Areas

Areas with less than 90% grass cover after three months of growth shall be resown by the Contractor at the Contractor's expense.

(vii) Fertilising of Grassed Areas

Apply a complete liquid fertiliser ("Defender Lawn Food" or similar approved) lightly at regular intervals. During winter fertiliser application should be minimised to avoid weed infestation. Generally, apply fertiliser at a rate of 3 kg per 100 square metres every four (4) weeks during spring, summer and autumn.

Do not apply a dry fertiliser to wet grass. Apply fertiliser to manufacturer's recommendation, ensuring an even spread. Delivery half the application in one direction, then apply the remaining half at right angles to the first application. Do not spread fertiliser by hand. Fertiliser shall be watered in immediately after application.

(viii) Pest and Disease Control

All plants are to be maintained free of insect infestation and plant disease.

Spray against insect and fungus infestation as required, and if considered necessary by the Superintendent. All spraying shall be carried out in accordance with the manufacturer's directions.

Report any occurrence of insect attack or evidence of disease amongst the plant material. The Superintendent shall be notified prior to spraying work being carried out.

(ix) Re-mulching

Areas mulched with shredded wood mulch shall be maintained at a minimum consolidated depth of 75 mm and maximum depth of 100 mm.

(x) Pruning

Trees and shrubs shall be pruned as directed by the Superintendent. Pruning shall be as directed for the establishment of dense foliage or miscellaneous pruning as beneficial to the condition of the plants. Any damaged growth shall be pruned. Tree branches likely to form a dominant "U" or "V" shaped crotch shall be removed.

(xi) Maintaining the Site in a Neat and Tidy Condition

The Contractor shall keep the site in a neat and tidy condition.

(xii) Removal of Tree Guards and Stakes (200 mm and 300 mm post)

Tree guards shall be removed when the plant reaches 1000 mm in height.

(xiii) Repairs to Erosion Treated and Affected Areas

The Contractor shall maintain all areas subjected to erosion protection treatments and shall repair all damage or erosion which arise during the maintenance period. Any soil subsidence or erosion which may occur after filling and preparation operations, shall be made good.

Such areas shall be re-prepared and re-protected as specified. Additional materials required by the Contractor to maintain, repair or complete erosion control work shall be supplied by the Contractor at the Contractor's expense.

(xiv) Expiry of Establishment and Maintenance Period

The Contractor shall ensure that all works of the Contract are complete immediately prior to the expiry of the fifty-two (52) week Establishment and Maintenance Period. The Contractor shall remove all debris from the site and any material that may have been stored on or adjacent to the site and leave the site tidy.

Grass areas shall have a healthy and vigorous grass sward appropriate to the area, and trees and shrubs shall show signs of vigorous growth.

The Contractor shall arrange an inspection with the Superintendent. On approval of the works and rectification of any defects, the Establishment and Maintenance Period shall be deemed to be completed.
