STANDARDISED FOOTPATH PAVEMENT TECHNICAL SPECIFICATION

Technical Specification

City of Adelaide

January 2026

CITY OF ADELAIDE

ACKNOWLEDGEMENT OF COUNTRY

The City of Adelaide acknowledges that we are located on the traditional Country of the Kaurna people of the Adelaide Plains and pays respect to Elders past, present, and emerging.

We recognize and respect their cultural heritage, beliefs, and relationship with the land. We also extend that respect to visitors of other Aboriginal Language Groups and other First Nations.

DOCUMENT PROPERTIES

Contact for enquiries and proposed changes

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CITY OF ADELAIDE

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1. INTRODUCTION

1.1 Terminology

The following terminology shall apply to this specification:

Table 1: Terms & Definitions

Term	Definition
Council Representative	City of Adelaide
The Council's Representative	The Council Representative's project manager, Council Representative's delegate or external consultant engaged by the Council Representative to oversee the works and release Hold Points on behalf of the Council Representative.

1.2 General

This technical specification specifies the technical requirements for the supply and construction of works associated with footpaths and Footpath paving to all Footpath areas within the City of Adelaide (CoA).

This specification is to be read in-conjunction with the endorsed CoA Standards Suite and approved contract set drawings. Design drawings shall take precedence over the Technical Specification as the Design drawing is more site specific.

Any variations or ambiguity between the Technical Specification, the endorsed CoA Standards Suite or other approved contract set drawings shall be referred to the CoA Representative for a decision before proceeding with any Tendering or Works.

In such cases, project-specific design and engineering assessment must be undertaken to ensure structural integrity and long-term performance.

Limitations of Footpath Specification:

- Laneways and Roads: The specification is not suitable for laneways or road pavements where traffic conditions differ significantly from those of typical pedestrian footpaths.
- Site Limitation: The specification does not account challenges commonly encountered in brownfield developments, such as existing underground services, contamination, or legacy structures. Areas with poor or weak subgrade conditions may require alternative construction methods or reinforced designs.
- High Traffic Loads: Segments subject to significant traffic loading, such as maintenance vehicles or shared paths with heavy usage, are outside the design assumptions of this specification.

1.3 Scope of Works

This Technical Specification shall comprise all plant, labour, and materials necessary to execute the works as shown in the contract drawings and the CoA Standards Suite for footpath construction. It includes all items required for the proper completion of the works comprising but not limited to:

1.3.1 Preliminaries and General Construction Works:

- Liaison and coordination with the Council's Representative.
- Providing advance notice of works, access restrictions, or potential disruptions to relevant residents and stakeholders.
- Set out the works in accordance with the contract drawings, using established benchmarks, cadastral boundaries, and site-specific control points.
- Locating and verifying underground and overhead services prior to excavation or construction (Before You Dig Australia – BYDA).
- Implementing appropriate physical barriers, signage, and exclusion zones to prevent damage.
- Protection of any existing services and structures during construction.
- Co-ordination with Service Authorities for all necessary relocation / adjustment of services required for the construction of works.
- All associated traffic controls for works on roads.
- Obtaining and complying with City of Adelaide City Works Permit.

1.3.2 Earthworks:

Earthworks shall include all activities necessary to prepare the site for footpath construction, in accordance with the contract drawings and relevant standards. This includes, but is not limited to:

- Development and implementation of a soil Erosion and Drainage Management Plan for the duration of construction. Clearing and grubbing of the site to remove vegetation, debris, and obstructions.
- Excavation of existing footpath pavement as required to complete the works.
- Disposal of surplus excavated material with preference given to offsite recycling or reuse.
- Placing and compaction of approved fill material to specified density.
- Ground preparation required to bring the site to the correct shape, level and surface condition.
- Preparation, compaction and trimming of the subgrade to meet design levels and tolerances.
- Quality Assurance testing including compaction, moisture content, and level tolerances, in accordance with the specification and Council requirements.

1.3.2.1 Contaminated Sites – Coordination and Material Disposal

Where works are undertaken on a contaminated site, the contractor shall coordinate with the Council's representative to ensure the safe handling, management and disposal of excavated material in accordance with guideline of the CoA Soil Contamination Policy and Operating Guidelines, EPA SA-criteria for the classification of Waste, Prescribed Waste Regulations (SA) and any other applicable environmental standards, codes or statutory requirements.

1.3.3 Concrete Works:

Concrete works shall include all labour, materials, and equipment necessary for the supply, placement, and finishing of concrete elements in accordance with the contract drawings, CoA Standards Suite, and relevant specifications. The scope includes, but is not limited to:

- Supply and installation of formwork, including stripping upon completion.
- Supply and installation of reinforcement.
- Supply and placement of Concrete to specified grades and strengths.
- Finishing of Concrete surfaces to required texture and tolerances.
- Jointing of Concrete, including control, expansion, and construction joints.
- Curing and protection of concrete to ensure durability and compliance with design requirements.
- Stripping of formwork.
- Supply & installation of kerb, guttering, surface drainage and miscellaneous structures. Refer to the CoA Stormwater Drainage Specification for detailed requirements.
- Quality Assurance testing, including slump, compressive strength, and dimensional tolerances, in accordance with relevant standards and Council requirements.

1.3.4 Paving Works:

Paving works shall include the supply, placement, and finishing of all pavement materials in accordance with the approved contract drawings, CoA Standards Suite, and this specification. The scope includes, but is not limited to:

- Supply of various pavement materials and finishes.
- The quality of various pavement materials and finishes.
- Placement and finishing of pavement materials to achieve specified appearance, durability, and function.
- Supply and installation of Natural Stone Pavers.
- Supply and installation of Clay Pavers.
- Supply and installation of Concrete Pavers.
- Supply and installation of Asphalt Paths.
- Supply and installation of Concrete Paths.
- Supply and installation of Rubble Paths.

- Ensuring all alignments, dimensions, cross sections, and levels confirm to the approved drawings and fall within specified tolerances. Quality Assurance including surface levels, compaction, material compliance, and finish tolerances, as required by this specification and Council standards.

1.3.5 Practical Completion:

Practical Completion shall include all activities necessary to finalise the works and satisfy the contract requirements. This includes, but is not limited to:

- Clean-up of the site and removal of all plant, equipment, surplus materials, and temporary works.
- Demobilisation of personnel and restoration of any disturbed areas not forming part of the permanent works.
- Inspection and testing to identify and rectify defects, as required by the specification and Council's Representative.
- Submission of 'As-Constructed' drawings in accordance with Section 2.5.5, accurately reflecting the completed works and any approved variations.

All works shall be completed to the satisfaction of the Council's Representative prior to formal acceptance.

2. GENERAL PROVISIONS

2.1 Public Utilities

Information provided by The Council's Representative to the Contractor is neither necessarily complete nor accurate and is provided for general information only. The Contractor shall investigate the existence and location of buried and overhead public and private services within the working area. The Contractor shall satisfy itself as to their exact location in liaison with the relevant service authority.

The Contractor shall comply with the guidelines issued by the Office of the Technical Regulator and relevant authorities when working in the vicinity of underground and overhead services. The Contractor shall take due care when working in the vicinity of existing services and take all necessary precautions during the contract to protect all services from damage. The Contractor shall be responsible for any cost resulting from damage to services through its operations.

The Contractor shall be responsible for determining the effect of the existing services on construction activities and shall make all arrangements and necessary payments to the respective authorities for any temporary or permanent relocation of services and new service connections which may be required by or because of its operations and the project requirements. Authorities shall be given six (6) weeks' notice prior to any service work being undertaken.

If, while works are in progress, any authority desires to place a service, the Contractor shall allow reasonable access and working space for the authority to carry out such placement, if so, requested by The Council's Representative.

Any existing or abandoned service that is disturbed shall be restored to the satisfaction of the service authority at the Contractor's cost.

Dispensation Approval from SA Water: Where prior approval has not been obtained during the design stage, the Contractor must secure dispensation approval from SA Water before commencing any relevant works. No construction activity affecting SA Water infrastructure or requirements shall proceed without written confirmation of such approval. All coordination, documentation, and compliance obligations shall be fulfilled in accordance with SA Water's current policies, standards, and approval procedures.

2.2 Temporary Alterations to Public Utilities

If, during construction works, the Contractor deems it necessary to have Public Utilities removed or altered to enable easier or quicker construction, such removal or alterations will be arranged by the Contractor and any costs incurred will be paid by the Contractor.

2.3 Relevant Authorities

The Contractor shall be responsible for liaising with all relevant authorities about programming of works. Where work is to be undertaken in accordance with relevant authorities' standards and specifications, the Contractor is to seek and obtain the necessary standard details and approvals.

The Contractor shall follow the guidelines and standards of relevant service authorities when working near and around third-party assets (SAPN, SA Water, Telstra, APA and any other relevant service authorities). The effects of compaction, vibrations, plant movements and general construction activities must consider the presence of these assets.

2.3.1 Utility Covers

The contractor shall check the site and confirm the locations, sizes, and numbers of the existing utility pits.

All covers shall be recessed and in-filled with paving material specifically constructed to lie flush with the cover edge and surrounding pavement. Infills to be concrete unless specified by the Council Representative, except for footpaths with natural stone paving. Infill lids in granite shall be constructed as per the CoA standard drawings.

Refer to CoA standard drawing CoA 970-974 for matching into service pits.

2.3.1.1 Adjustment and Relocation

Where the level of the footpath is altered from its existing level, the contractor shall liaise with the service provider to adjust and relocate all the existing pit frames and covers that are to be retained to finish flush with the adjacent finished footpath surface.

The contractor shall ensure that the existing pit frames and pit covers that are to be re-used are free from rust and from twists and warps, which would result in uneven seating of the pit covers when relocated.

Where stone paving is to be installed, all existing complying Class C & non-slip metal lids are to remain, and any new infill lids are to be stone infill or other applicable surrounding materials.

All grates, covers, or similar fixtures located in general pedestrian or commuter areas must be heel-safe to ensure public safety and accessibility.

2.3.1.2 Loading

For pit covers in the footpath, loading Class C, ultimate limit state design load of 150kN shall be used unless noted otherwise on the contract drawings.

2.4 Quality Management

The Contractor shall plan, establish, and maintain a Quality Management System to ensure the materials and their works comply with the drawings and the specification.

2.4.1 Inspection and Testing

As part of the Quality Plan the Contractor shall prepare Inspection and Test Plans (ITP) for critical items in the project. The ITPs shall detail the Contractor's proposals for inspections and testing as detailed in the Technical Specification.

The Contractor shall be responsible for undertaking all testing and coordinating all inspections required in the Technical Specification.

The Contractor shall nominate the person responsible for the quality control of each item of the ITP. The Contractor shall maintain the ITPs during the works and make the ITP available for inspection by The Council’s Representative on request.

The frequency of testing and all associated requirements shall be in accordance with DIT Master Specification RD-EW-C1 - Earthworks. All testing and sampling must be carried out by an NATA-accredited testing authority in line with DIT guidelines. These requirements are summarised in Table 8. in this specification If no minimum frequency is stated, the Contractor shall nominate appropriate industry or Australian Standard frequencies in the ITP Specification. If no minimum

frequency is stated, the Contractor shall nominate appropriate industry or Australian Standard frequencies in the ITP.

The Contractor shall provide a copy of the draft Inspection and Test Plans to The Council's Representative prior to commencement of the works.

Prior to the date of Practical Completion, the Contractor shall provide a copy of all completed ITPs. This documentation should provide sufficient assurances for Council that all pavers supplied on site comply with the required standard and are in accordance with the specification. The acceptance of the completed ITPs shall be a requirement for the issue of a Certificate of Practical Completion.

2.4.2 Hold Points

Hold Points are critical aspects of the works requiring assessment by The Council's Representative.

The Contractor shall not proceed to the next stage of the works or cover the work until the release of the Hold Point by The Council's Representative. Such release shall not, in whole or in part, release the Contractor from responsibility for the quality of the work subject to the Hold Point.

The Contractor shall advise The Council's Representative with sufficient notice (nominally 24 hours excluding weekends and public holidays) when a Hold Point has been reached (or is anticipated to be reached) to enable inspections as required.

The Contractor shall submit relevant testing, survey and other documentation associated with the Hold Point to The Council's Representative.

If following the inspection and review of relevant documentation, The Council's Representative does not release a Hold Point, The Council's Representative shall advise the Contractor, as soon as practical in writing (or within 24 hours), the reasons why a Hold Point has not been released and any remedial works required to enable the release of the Hold Point.

The Council's Representative shall NOT be liable for any cost (including standby costs) incurred by the Contractor as a result The Council's Representative not releasing a Hold Point due.

Notify the Council's Representative of the following Hold Points when works are ready for inspection or according to submitted ITPs. The list below does not discount other requests for n inspections but indicates to the Contractor critical inspections required by the City of Adelaide.

Table 2: Critical Hold Points Schedule

Critical Hold Points Schedule		
Components	**Discipline**	**Reference**
Site Setout	Landscape Architecture, Civil Engineering	
Levels set out for detailed earthworks	Landscape Architecture	
Approval of all proprietary products, samples, prototypes and shop drawings	Landscape Architecture	
Setout of all Pits, pit lids, inspection pits, boxes and junction boxes prior to commencement of any excavation.	Landscape Architecture, Civil Engineering, Services Engineering	

Critical Hold Points Schedule		
Components	**Discipline**	**Reference**
Determine location of all existing services prior to the commencement of any work	Civil Engineering, Electrical, Hydraulic	
Setout on site for all excavation, trenching, backfilling and making good	Electrical, Hydraulic, Mechanical, Civil Engineering	
Setout of all equipment, penetrations, fixings, inserts, recesses and access provisions prior to the forming of penetrations	Civil Engineering, Electrical	
Setout of all block outs for major penetrations prior to the pouring of concrete	Civil Engineering, Hydraulic	
All subgrade / earthworks areas	Civil Engineering	
Pavement layers: In the formation level of Asphalt • Subgrade and proof roll • Sub-base and proof roll • Base course and proof roll	Civil Engineering	
Stormwater trenches, inspection following excavation	Civil Engineering	
Stormwater, prior to use of compaction method for bedding	Civil Engineering	
Drainage pipe installation with bedding and haunching support	Civil Engineering	
Sub surface drainage installations (open trenches prior to backfilling) and sub surface drawing system	Civil Engineering	
Large drainage pits within reinforcement prior to pouring concrete	Civil Engineering	
Connection to existing drainage points	Civil Engineering	
Footing excavation	Landscape Architecture, Civil Engineering	
Reinforcement for all concrete elements	Civil Engineering	
Setout of paving	Landscape Architecture	
Preparation of paving subbase including cleaning and preparation of bonding primer / slurry	Landscape Architecture, Civil Engineering	
Preparation of mortar bedding and install to primer/slurry and base	Landscape Architecture, Civil Engineering	
Grouting of paving	Landscape Architecture, Civil Engineering	

Critical Hold Points Schedule		
Components	**Discipline**	**Reference**
Cleaning of pavers and pavements prior to application of sealer	Landscape Architecture	
Pavement construction Subgrade and proof roll Sub-base and proof roll	Civil Engineering	
Ensure concrete has achieved required strength before backfilling	Civil Engineering	
Setout of all furniture elements	Landscape Architecture	
Setout of concrete saw cuts	Landscape Architecture	
Submission of work methodology statements, risk assessment and emergency response procedures Associated with contamination of soil and its removal/reuse Involving underground services and stormwater	Civil Engineering	
Stone testing report – from independent certifier(s)	Civil Engineering	
Stone paver supply – verification of functional criteria from supplier	Landscape Architect, Civil Engineering	
Decorative concrete testing report Skid and Slip resistance – from independent certifier	Landscape Architect, Civil Engineering	
Stone Paver installation quality program including all documentation including delivery and installation dates, photographs, consumption rates of materials, inspection and approvals schedule and all testing results and plans	Landscape Architect, Civil Engineering	
Decorative Concrete finishes and saw cutting works methodology statements	Landscape Architect, Civil Engineering	
Works methodology for the install of stone and decorative concrete sealer	Landscape Architect, Civil Engineering	
All delivery dockets for aggregate incorporated in decorative concrete including verification of quantities and the origin of the material including the quarry of supply	Landscape Architect, Civil Engineering	
All delivery dockets for decorative concrete including verification of the concrete mix and dosage rates for colour pigments	Landscape Architect, Civil Engineering	
As constructed surveyed drawings including existing services including depths	Landscape Architect, Civil Engineering	

2.4.3 Non-Conformances

The Contractor shall notify The Council's Representative if the completed works do not comply with the contract drawings, the CoA Standards Suite, or specified technical requirements. The Contractor shall written notification of such non-conformances by submitting a Non-Conformance Report (NCR) to the Council Representative.

The NCR shall indicate the nature and location (as applicable) of the non-conformance and the proposed rectification method for correcting the Non-Conformance. The NCR shall include all relevant test results, inspection records, or survey reports.

The identification of a Non-Conformance shall constitute a Hold Point on that item. No further works may proceed on the non-conforming item until release of the Hold Point by The Council's Representative.

The Council's Representative shall review and approve the proposed rectification method detailed by the Contractor or alternatively instruct the Contractor to complete other rectification works as required.

If The Council's Representative becomes aware of any section of the works not conforming with the drawings or specification, The Council's Representative may issue a Corrective Action Request (CAR). The Contractor shall review the Corrective Action Request and address the CAR as per the procedure for an NCR.

2.4.4 Testing Laboratories

The Contractor shall ensure suitably qualified NATA accredited Material Testing Laboratories carry out all field and laboratory testing, compliance testing etc as required under the Contract.

2.4.5 Traceability

The Contractor shall as part of the Quality Plan develop a system to enable the traceability of all materials including but not limited to structural concrete (in situ and precast), pavement material, paver wearing surfaces and asphalt from the source to the location where the material is incorporated into the works.

Traceability shall include:

- The date of works.
- A detailed description of the materials used (e.g., material type, production lot etc.).
- A detailed description of the location where the material is incorporated (e.g., structure reference).
- The Contractor shall keep (in good condition) delivery records (dockets) of the materials used and detailed descriptions of where the materials were incorporated in the works until Final Completion.

2.5 Survey

2.5.1 Survey Marks

The attention of the Contractor is drawn to the appropriate sections of the Crown Lands Act and the Surveyors Act regarding the care of survey marks.

2.5.2 Levels

Existing levels at the time of the most recent survey are supplied for the assistance of the Contractor and are not intended to indicate every detail of the surface profile.

Some levels may be required to be determined on site in the presence of The Council's Representative.

2.5.3 Setting Out

The works are to be set out in accordance with the information provided on the drawings, or as otherwise directed by The Council's Representative. From this information the Contractor shall set out the whole of the works and shall accept the full responsibility for the alignment, levels, and dimensions of all parts of the works.

The Contractor shall exercise proper care in the preservation of all boundaries, alignment, reference and level pegs or marks set out for his use and that of The Council's Representative. If such pegs or marks are damaged, lost or removed by the Contractor's operations, they shall be reset at the Contractor's expense.

2.5.4 Verification Surveys

The Contractor shall provide a verification survey detailing the variance between the design level and the actual level at the following frequency:

Table 3: Verification Surveys

Item	Frequency of Survey
Sub-grade	One level per 10 lineal m per 3m width
Finished pavement layers	One level per 10 lineal m per 3m width, per layer

A copy of the survey reports shall be provided to The Council's Representative within seven (7) days of completion of the survey. The survey reports shall clearly indicate whether the works are within tolerance and if not, areas that are outside of the tolerance. Provision of this survey report constitutes a HOLD POINT.

If the survey indicates the work out of tolerance, unless approved by The Council's Representative, the Contractor shall rectify the works and arrange re-survey at the Contractor's cost.

2.5.5 As-Constructed Drawings and Project Handover Documentation

Project hand over documentation shall be accordance with Project Practical Completion Handover Documentation requirements. As-Constructed drawings are to be prepared prior to the works achieving Practical Completion, or as agreed upon with the City of Adelaide. As-Constructed drawings are to be prepared according to the CoA As-Constructed Drawings Standards. These documents are available on the City of Adelaide website: https://www.cityofadelaide.com.au/development-infrastructure/infrastructure/construction-standards-guidelines/

2.6 Environmental Management and Protection

The Contractor shall take all measures necessary to ensure minimum disturbance to the existing environment by its operations.

The Contractor shall observe all environmental management rules, regulations, Council's Contamination Policy, and codes of practice and shall comply with all notices and instructions issued by The Council's Representative in relation to such Rules and Regulations.

When flammable or combustible materials are to be stored or used, the Contractor shall adhere strictly to relevant standards or codes of practice.

2.6.1 Environmental Control During Construction

The Contractor shall carry out the work with reference to the EPA Codes of Practice listed at the end of this specification clause.

The Contractor shall ensure that pollutants such as dust, sediment, litter and wash down water do not leave the site during construction of the works. Prior to construction commencing, the Contractor shall prepare a Soil Erosion and Drainage Management Plan (SEDMP) showing how this is to be achieved. The Plan shall include a site layout together with a written manual. These shall include all aspects of site management including:

- Site access from public or private roads.
- Access around the site.
- Areas of earthworks, stockpiles, loading areas.
- Site drainage including all relevant information including sediment collection devices, drainage lines and discharge points.
- Management of creek or river flows.

Water shall be used in a judicious manner to avoid wastage and in accordance with any applicable water restrictions.

The approval of a Soil Erosion and Drainage Management Plan by The Council's Representative shall constitute a HOLD POINT.

2.6.2 Trucking

Trucks accessing the site with earth materials or loose debris shall be loaded in such a manner as to prevent dropping of materials and prevent a dust nuisance. The wheels, tracks and body surfaces of all plant and vehicles leaving the site shall be free of mud so that mud is not carried on to adjacent roads or paved areas.

2.6.3 Solid, Liquid and Gaseous Contaminants

The Contractor shall be responsible for the proper disposal of all solid, liquid and gaseous contaminants in accordance with all Statutory and Contractual Requirements.

2.6.4 Disposal of Refuse

Refuse arising from construction operations, including food scraps and similar waste, shall be removed from the site by the Contractor and disposed of at a legal place of disposal, at the Contractor's expense.

2.6.5 References

Stormwater Pollution Prevention – Code of Practice for the Building and Construction Industry – EPA.

Stormwater Pollution Prevention – Code of Practice for Local, State and Federal Government – EPA.

2.7 Preservation of Trees and Vegetation

The Contractor shall refrain from destroying, removing, or clearing trees and shrubs beyond the extent necessary for the execution of the work under the contract. Areas proposed for clearing shall be inspected by the Contractor, and The Council's Representative's and approval obtained from The Council's Representative prior to the removal, clearing, or destruction of any trees or shrubs.

The Contractor shall take every reasonable precaution not to damage any tree, including its root system, that is nominated to be retained.

All construction activities, including storage of materials, vehicles, equipment, or refuse, shall be kept clear of existing trees designated for retention. Prior to any excavation over the roots of retained trees, The Council's Representative as to whether the levels in the vicinity of the tree may be adjusted to protect the roots.

The Council's Representative may direct the Contractor to repair any damage or injury to a tree that is to remain. Such work shall be carried out by an approved tree surgeon engaged by the Contractor, at the Contractor's expense.

In accordance with Australian Standard AS 4970:2025 – Protection of Trees on Development Sites, all works in proximity to existing trees shall be carried out in a manner that safeguards both the root system and canopy from damage. The Tree Protection Zone (TPZ) delineates the area required to sustain the tree's health and long-term viability; no excavation, soil compaction, material storage, or vehicular movement is permitted within this zone unless approved by a qualified arborist. The Structural Root Zone (SRZ) represents the area necessary for the tree's structural stability and must remain completely undisturbed. Any proposed activity within the TPZ or SRZ must comply with the management measures specified in AS 4970:2025 to ensure the safe and sustainable retention of trees during and after construction.

2.8 Drainage of Site During Construction

The Contractor shall carry out the work in such a way as to ensure that no heading-up of floodwaters occurs in new or existing drains or gutters. The Contractor shall be responsible for any damage to public or private property caused by, or arising from, their operations. Should this clause not be complied with, The Council's Representative may order work to cease until, in their opinion, satisfactory arrangements for drainage have been made.

The site may be subject to surface water in the form of base flows or flood flows during the construction period. The Contractor shall account for and manage all such flows during the construction period and shall be deemed to have allowed costs in their tender.

2.9 Traffic Management

The Contractor shall prepare, implement and maintain a Traffic Management Plan for all works on or adjacent to existing roadways. The Plan shall ensure the protection of the public and the Works, and shall comply with AS 1743 - "Road signs - Specifications", DIT Requirements and the City of

Adelaide Requirements outlined at https://www.cityofadelaide.com.au/business/permits-licences/city-works/.

Should this clause not be complied with, The Council's Representative may order work to cease until, in their opinion, the placement of lights, signs and barricades is satisfactory for the protection of the public and the works. All lights, signs and barricades shall be placed, maintained by the Contractor in accordance with the relevant requirements of the above codes and standards.

2.9.1 Traffic Management Plan

The Contractor shall develop a Traffic Management Plan that includes full layout plans of the proposed traffic management scheme, estimated times during which any proposed detours will be in operation; and demonstrate the relationship between the traffic management scheme and the construction program.

The traffic management plan shall be prepared by the Contractor to minimise the disruption to traffic flow and shall consider peak traffic concentrations. Where possible the Contractor shall limit traffic restrictions to weekend or non-peak periods.

The Contractor shall submit a detailed traffic control proposal to The Council's Representative within seven (7) days of acceptance of the tender. No work shall commence on site until the traffic control proposal has been reviewed by The Council's Representative. No roads shall be used as detour routes in the compliance with this clause without the prior approval of The Council's Representative.

The Traffic Management Plan shall show in detail:

- The traffic management proposed during each stage of all projects.
- All temporarily trafficked areas associated with the deviation of traffic.
- Proposals for the placement of temporary signs, advance direction signs, barriers and other warning devices including a schedule of the types and numbers of signs proposed to be used.
- Detour path for buses (where required).
- Proposed speed restrictions.

If the Contractor varies the construction program at any time throughout the works, a revised Traffic Management Plan shall be submitted to The Council's Representative not less than twenty-four (24) hours before the relevant section of work commences.

2.9.2 Notice of Traffic Management

Prior to commencing works on or adjacent to existing roadway and prior to implementing traffic management controls, the Contractor shall notify the relevant authorities including:

- Local Council - City Works Department.
- Emergency Services.
- Passenger Transport Board.
- The Council's Representative.

- DIT as required.

Notice shall include, as a minimum the nature of traffic restrictions, the time commencement of traffic restrictions, and the time of removal of traffic of restrictions, as appropriate.

2.9.3 Maintenance of Traffic Management

The Contractor shall be responsible for the maintenance in good working order of all traffic management structures, signs, traffic control devises, temporary access roads and temporary line-marking required for the completion of the Contract.

The Contractor shall provide The Council's Representative with the details of an emergency contact person who is responsible for the maintenance of the traffic management measures.

The Contractor shall implement a regular, documented inspection programme to verify that the traffic management plan is installed and maintained in accordance with the approved Traffic Management Plan. Any damaged or missing traffic control devices shall be promptly reinstated by the Contractor.

2.9.4 Provision for Vehicular Traffic

The Contractor shall provide and maintain access to all property entrances adjoining the works and shall ensure that local traffic is accommodated throughout the duration of the Contract. The Contractor shall provide temporary ramps for local traffic and shall maintain access to side streets at all times, unless otherwise approved by The Council's Representative.

2.9.5 Provision for Pedestrian Traffic

In accordance with AS 2124–1992 Clause 15 "Protection of People and Property", the Contractor shall ensure that safe and convenient pedestrian traffic is maintained at all times during the execution of the Works.

2.9.6 Traffic Controllers

Traffic Controllers shall be employed whenever traffic movement is temporarily restricted to one direction, in accordance with AS 1742, Clause 4.4. Traffic controllers shall provide additional control to ensure the safety of traffic and the Work.

2.9.7 Traffic Management Audit

During the contract period, The Council's Representative may undertake audits of the traffic management measures implemented by the Contractor to verify compliance with the approved Traffic Management Plan and relevant standards.

2.10 Site Facilities

2.10.1 Site Amenities

The Contractor shall provide all statutory and necessary amenities and sanitary facilities for workers and other persons lawfully upon the site, in accordance with applicable legislation, regulations, and codes of practice.

All such amenities and facilities shall be maintained in good working order throughout the duration of the Works and shall be removed by the Contractor upon completion of the Works.

The Contractor shall contain the Works within fenced or barricaded areas to prevents access to the public.

The Contractor may be permitted to store materials within the work site area if space is available, provided such materials are adequately secured from the public and clear access to adjacent pedestrian paths is maintained. The Contractor is responsible for the security of all materials and assets in use or left at the work site during the Works and shall maintain adequate insurances. Materials and equipment must not be stored outside fenced or barricaded areas without the prior written approval of The Council's Representative.

Only vehicles essential to the Works are permitted to be parked on the work site. Refer City of Adelaide City Works Guidelines: https://www.cityofadelaide.com.au/business/permits-licences/city-works/.

2.11 Water for Works

The Contractor shall make all necessary arrangements for the supply of water required for the execution of the Works.

2.12 Electricity for Works

The Contractor shall make all necessary arrangements for the supply of electrical power required for the execution of the Works, whether temporary or permanent, and shall bear all associated costs, fees, charges, and expenses.

2.13 Dilapidation Survey of Adjoining Properties and Structures

The Contractor shall arrange for a dilapidation survey of the general site where works are to be carried out in conjunction with The Council's Representative.

The Contractor shall record the condition of all buildings, infrastructure, surfaces, or services that may be affected by the Works, either directly or indirectly, by means of visual inspection, written inspection logs, photographs and videos, as appropriate. All records shall be dated, titled and provided to The Council's Representative prior to commencement of the Works.

The Contractor shall allow for and bear all costs associated with the dilapidation survey.

2.14 Matching in and Making Good

In addition to the requirements specified in this specification, any damage caused to or temporary relocations required for, existing stormwater drains, signposts, street signs, barrier posts, litter bins, or other similar items shall be reinstated to a standard at least equal to the existing construction. Such reinstatement shall be carried out in a workmanlike manner and to the satisfaction of The Council's Representative.

Unless otherwise specified, where the Works adjoin or abut an existing roadway, footpath, or other construction, the existing pavement shall be removed within the limits shown on the drawings. The existing asphalt shall be saw-cut in a straight line to ensure the new pavement provides a smooth riding surface and satisfactory drainage properties.

New kerbs and water tables shall match the existing kerbs and water tables at the locations shown on the drawings.

The Contractor shall be responsible for making good any damage to adjacent existing works arising from their operations. Such reinstatement shall be completed to the satisfaction of The Council's Representative.

2.15 Cleaning Up

During the progress of the Works, and upon completion, the Contractor shall maintain the site in a clean and tidy condition. On completion, the site shall be left in such condition to the satisfaction of The Council's Representative.

3. SITE PREPARATION AND EARTHWORKS

This section of the specification details the requirements for Earthworks, including selection of materials, clearing, grubbing, stripping topsoil, proof rolling, excavation, and filling. This section shall be read in conjunction with the approved Contract Drawing Set and the CoA Standards Suite.

3.1 General

This specification shall be read in conjunction with the following Standards and references, which are deemed to form a part of this specification.

AS 1141.1	Methods for sampling and testing aggregates
AS 1289.2.2.1	Methods of testing soils for engineering purposes
AS 3798	Guidelines on earthworks for commercial and residential developments
AS 2436	Guide to noise and vibration control on construction, demolition and maintenance sites
AS 1726	Geotechnical site investigations
AS 4970:2025	Protection of Trees on Development Sites,
DIT Master Specification	RD-EW-C1 – Earthworks
DIT Master Specification	RD-EW-C2 – Trench Excavation & Backfill
DIT Master Specification	RD-PV-S1 – Supply of Pavement Materials
DIT Test Procedure TP 134	Particle Size Distribution – Standard Method of Analysis by Sieving
DIT Test Procedure TP 320	Compaction Control Test – Dry Density Ratio, Moisture Variation and Moisture Ratio

3.2 Materials

3.2.1 General

Site preparation and earthworks materials shall be accordance with the requirement as specified in this Section, or as otherwise approved in writing by The Council's Representative.

3.2.2 Unsuitable and Suitable Materials

Unsuitable materials shall include, but not limited to:

- Organic soils and severely root-affected soils.
- Peat.

- Materials contaminated through past site usage which may contain toxic substances, or substances that can dissolve or leach out and harmful to site users, groundwater, or agriculture (where known, these areas will be identified on the drawings).
- Materials containing substances that can dissolve or leached out in the presence of moisture (e.g. gypsum), or which undergo volume change or loss of strength when disturbed and exposed to moisture (e.g. certain shales and sandstones), unless specifically addressed in the design.
- Silts or materials with deleterious engineering properties equivalent to silts.
- Potentially Acid Sulphate Soils (PASS).
- Other materials unsuitable for forming structural fill.
- Fill containing deleterious materials such as wood, plastic, boulders, or other materials in sufficient proportions to negatively affect the performance of the fill.

Suitable materials shall comprise materials other than those defined as unsuitable, capable of being compacted to form a homogeneous mass and suitable for the construction of structural fill. These will generally consist of clean soil or soil-aggregate mixtures.

3.2.3 Classified Fill

Backfilling or filling, as referred to this Section, shall mean all filling required up to the subgrade level.

Classified Fill shall not include unsuitable materials, as defined in this Specification, and shall comply with the following grading limits:

Table 4: Fill Material Classification

Characteristic	Type A as detailed in RD-EW-C1	General Fill
Fill grading - % passing sieve size		
100 mm	–	100
75 mm	100	–
37.5 mm	80–100	–
0.075 mm	0–25	
Max. Plasticity Index	12	–
Max. Linear Shrinkage	6%	–
Instability Index	0.4%	2%
Max. Weighted Plasticity Index	1000	3000

The Contractor shall obtain a copy of the Supplier's grading test results for the fill materials supplied. The Contractor shall furnish such certificates to The Council's Representative upon request.

Special consideration may be required for the following suitable materials, due to higher risks associated with their behaviour after placement:

- Clays of high plasticity, prone to swelling and shrinkage with moisture changes must be selectively placed within the fill under strict moisture content and density control.
- Materials, containing large particles may cause difficulties in subsequent excavation of trenches for footings or services.
- Single-sized or gap-graded materials, or rock fill that may not break down upon compaction, leaving voids into which finer material may migrate.
- Saline, chemically aggressive, or polluted soils, or carbonate soils may cause acid disposal or other adverse chemical reactions.
- Materials that cannot be tested to demonstrate compliance with the Specification (e.g. soils containing gypsum or other deliquescent materials where moisture content cannot be measured accurately).

Where such materials become apparent during filling operations, the Contractor shall immediately inform The Council's Representative. The Council's Representative may direct the placement or treatment of such filing to mitigate associated risks.

3.2.3.1 Oversized Suitable Materials

Oversized suitable materials are defined as otherwise suitable materials that cannot be reduced by construction plant to the required maximum particle size of 100 mm. Such oversized materials shall not be used in the Works unless prior written approval is obtained from the Council's Representative.

3.2.4 Imported Fill Materials

Material imported to the site that is not a quarry product shall be assessed and suitable for use on the site by an approved Environmental Consultant, at the Contractor's cost, in accordance with the National Environmental Protection (Assessment of Site Contamination) Measure. Written confirmation of the material's suitability shall be submitted to The Council's Representative for approval prior to the material being delivered or placed to site.

No fill material may be brought into site without written approval from The Council's Representative and appropriate accompanied documentation. Any material imported on site without the required documentation, or that fails to comply with the requirement of the National Environmental Protection (Assessment of Site Contamination) measure, shall be removed from site and disposed of appropriately at the Contractor's expense.

3.2.5 Backfilling Sand

Backfilling sand shall be Type Sa - D Sand, in accordance with DIT Master Specification RD-PV-S1.

Type Sa - D sand shall only be used for backfilling services trenches located below subgrade level.

3.3 Construction and Workmanship

3.3.1 Site Clearing and Grubbing

The site shall be cleared only in those areas where the specified construction works are to be carried out, or as otherwise shown on the drawings.

All vegetation shall be removed in accordance with DIT Part CH50 'Environmental Protection Issues'. Loose material, rubbish, and existing structures within the earthwork zone shall be removed to a depth of not less than:

- 300 mm below the subgrade level and batters in areas of cut; and
- 300 mm below the stripped surface in areas of fill.

Unless otherwise specified, grubbed holes shall be backfilled with Type A material.

All materials resulting from the site clearing shall be removed from the site and disposed of by the Contractor at their expense.

3.3.2 Clearance of Surface Vegetation

Prior to the stripping of topsoil, the Contractor shall remove existing surface vegetation and dispose of such material off-site at a legal place of disposal, at the Contractor's expense.

3.3.3 Removal of Trees

Trees shall be removed only where necessary for construction of the Works, where nominated on the drawings, or as otherwise directed by The Council's Representative. Where trees are to be removed in areas of proposed structures, stumps and root systems shall be removed to a depth of at least 1.0 m below formation level.

Excavation resulting from stump and root removal shall be backfilled with suitable material. Backfill shall be placed and compacted in layers not exceeding 200 mm compacted depth, to achieve a density at least that of the adjacent undisturbed natural material.

3.3.4 Removal of Rubbish

The Contractor shall remove and dispose of all rubbish materials from the site, as indicated on the drawings, at the Contractor's expense. Disposal shall be carried out at a legal place of disposal.

3.3.5 Stripping and Re-spreading of Topsoil

Topsoil shall be stripped from all areas of construction to a nominal depth of 75 mm and stockpiled on site for later re-use in filling to road reserves, nature strips, batter slopes and other designated areas, where applicable.

Stockpiles shall be provided with adequate drainage and erosion protection and shall be protected from contamination by other excavated material, weeds and building debris.

The Contractor shall provide details of proposed temporary topsoil stockpile locations for approval by The Council's Representative prior to stripping.

Following completion of earthworks topsoil shall be spread on all batters and other designated areas in a layer of the specified thickness. The surface of the topsoil shall be free of lumps greater than 75 mm.

Any topsoil not required for re-use, or surplus to requirements, shall remain the property of the Council Representative. Such material shall be left in a neat stockpile at the position or positions on the site as directed by The Council's Representative.

3.3.6 Excavation

3.3.6.1 General

The contractor shall undertake a Before You Dig Australia (BYDA) enquiry prior to any excavation and shall take any precautions necessary to identify and avoid existing services where applicable.

The Contractor shall assess and allow for the nature of the material to be excavated, and shall be deemed to have made due allowance for excavating material of any type encountered, provided that, in the opinion of The Council's Representative, such material is capable of being excavated using a mechanical excavator of appropriate capacity for the situation, without the use of rock breakers, jack hammers and/or blasting.

Any overcut shall be rectified to the satisfaction of The Council's Representative at the Contractor's expense.

If soft spots are revealed in the formation following the proof rolling exercise, the Contractor shall immediately notify The Council's Representative. Where deemed necessary by The Council's Representative, the Contractor shall undertake further excavation as directed and backfill the excavation with material specified by The Council's Representative.

The cost of additional excavation and backfilling shall be treated as a variation to the contract, unless the works are required due to the Contractor's actions or negligence. The Contractor shall obtain prior approval from The Council's Representative before undertaking any excavation of soft spots: otherwise, no claim for associated costs will be considered. The Contractor shall record all survey measurements necessary to accurately calculation the volume of additional excavation and backfilling and submit these to The Council's Representative for approval.

3.3.6.2 Bulk excavation

All excavated areas shall be finished to a uniform surface. Floors and sides of excavations shall be trimmed to the lines, levels, grades, and batters shown on the drawings within the specified tolerances.

All areas disturbed by excavation activities, including loose surface material, shall be compacted by moisture conditioning (where required) and rolling with approved compaction equipment to achieve the specified density for the relevant fill type. The top 200mm of fill under the pavement (subbase) shall consist of Type A fill, with fill below this to consist of General Fill.

3.3.6.3 Trench excavation

Unless otherwise approved by The Council's Representative, trench work for pipes laid to grade shall proceed from the lowest point (downstream) to the highest point (upstream) in each system. Trenches shall be excavated to the lines, levels and grades shown on the contract drawing set and the CoA Standards Suite of Details. Minimum trench widths shall be as specified in the contract drawing set and CoA Standards Suite of Details or, where no width is specified, as narrow as practicable, consistent with good construction practices.

The floors of all excavations shall be evenly trimmed, and all protrusions, loose soil and debris removed.

Excavated material shall not be used for backfilling of trenches below subgrade level.

The maximum length of open trench excavation in any one section shall be 100 metres, unless otherwise approved by The Council's Representative.

Saw cutting into existing paving for trench excavations shall be carried out in accordance with CoA Standard Detail 416.

3.3.6.4 Excavation around services

The Contractor shall refer to the Service Utilities Clearance & Protection requirements prior to commencing excavation work.

The Contractor shall immediately inform The Council's Representative upon encountering any services, obstructions, or conditions not shown on the contract drawings or existing survey that may impact construction and/or project program and seek further direction from The Council's Representative.

3.3.6.5 Excavation of latent conditions

Where latent conditions are encountered below ground level, the Contractor shall cease excavation in the affected area and notify The Council's Representative immediately. Further excavation shall only proceed in accordance with The Council's Representative's instructions.

3.3.6.6 Excavation of Hazardous Materials

Where hazardous materials are identified on the drawings, the Contractor shall include in their testing and quality management procedures a documented process for the safe excavation, handling, and disposal of such materials, subject to approval by The Council's Representative and in accordance with relevant regulatory requirements.

3.3.6.7 Excavation of Rock

Where material encountered during excavation is considered by the Contractor to require rock breaker, jackhammer, and/or blasting as the only practical means of removal, the Contractor shall immediately notify the Council's Representative.

If The Council's Representative agrees that the material should be classified as rock, approval shall be granted for the use of a rock breaker, jack hammer and/or blasting and payment will be made as a variation to the contract, based on the volume of rock excavated at the appropriate rate in the Schedule of Unit Rates. The Contractor must obtain prior approval from The Council's Representative confirming that the material is classified as rock for payment purposes, otherwise, no claim will be considered.

The Contractor shall record and submit survey measurements necessary to calculate the volume of rock excavated, for approval by The Council's Representative.

For the purposes of interpretation, measurement and/or payment under the specification, rock shall be defined as material occurring in ledges, masses, bedded deposits and/or conglomerate formations that, in the opinion of The Council's Representative, exhibits the characteristics of rock and cannot be removed for bulk excavation by a ripper dozer (Caterpillar D8 or equivalent) or for trench excavation, by using a bucket excavator (nominally 30 tonne excavator) with rock bucket and would normally require removal by blasting, pneumatic tools or mechanical impactor.

Where, due to limited access, the use of standard excavation equipment (as defined above) is impracticable, the use of a side-shift bucket backhoe may be approved by The Council's Representative.

If the restricted access is a result of the Contractor's previous works, and the presence of rock could reasonably have been anticipated, any rock encountered shall be assessed based on the excavation capacity of the previously available equipment.

Trenches in areas with a high likelihood of rock shall be pre-excavated prior to access becoming restricted.

Floaters encountered in trenches, foundations, or similar excavations shall only be classified as rock for payment purposes where the least dimension of the floater exceeds 0.6 m, or the volume of the floater exceeds 0.25 m^3.

Materials that can be excavated by the specified plant such as broken shale, weak conglomerates, and similar at the rate outlined above or faster, shall not be classified as rock for payment purposes.

3.3.6.8 Measurement of rock excavation for payment purposes

Rock shall be measured in its solid form, within the design limits of the excavation, prior to placement of any backfill or commencement of new works.

- Bulk Excavation: The volume of rock shall be determined by an independent engineering surveyor engaged by the Contractor. Measurement shall be based on the difference between the approved rock surface (following removal of overburden) and the approved 'extent of rock' or 'design' surface, whichever is lesser, as confirmed by The Council's Representative.
- Trench Excavation: The volume shall be calculated using depth and length measurements taken in liaison with The Council's Representative, and the minimum trench width applicable to the installation as shown on the drawings.
- No payment shall be made for overbreak beyond the limits of the required excavation.

3.3.6.9 Protection of excavation

All work necessary to ensure the stability of the construction excavations and to prevent damage to adjoining structures, services and property is the responsibility of the Contractor. This responsibility includes installation and maintenance of timbering, shoring, strutting, bracing, sheeting, piling, and any other temporary support measures required.

CoA assumes no responsibility for the stability of the ground to be excavated. The Contractor shall be deemed to have satisfied themselves, through their own investigations, regarding the ground conditions likely to be encountered.

The provisions of Chapter 6, Part 3, Division 3 of the *Work Health and Safety Regulations 2012* (SA) under the *Work Health and Safety Act 2012* (SA) apply to excavation works in South Australia.

Should the Contractor fail to provide equipment and/or adopt methods to the satisfaction of The Council's Representative, The Council's Representative may direct that work cease until suitable equipment is provided and acceptable methods are adopted which are to the satisfaction of The Council's Representative.

3.3.6.10 Dewatering of excavation

Excavations shall be maintained in a thoroughly drained condition at all times. Where groundwater is encountered, the Contractor shall be responsible for de-watering the excavation in a safe, controlled, and efficient manner.

The Contractor shall assess the likelihood of groundwater and its potential impact on the execution of the contract and shall ensure due allowance for all costs associated with groundwater management is included in the Tender.

Groundwater pumped from excavations shall be disposed of in accordance with the requirements of the Environmental Protection Authority and other relevant regulatory bodies.

3.3.6.11 Disposal of Surplus Excavated Material

All surplus excavated material arising from the specified works shall be disposed of by the Contractor off site, preferably at a recycling facility where practicable.

The Contractor shall be responsible for undertaking, and bearing cost of, all environmental testing and reporting required for the lawful disposal of excavated material. This includes any additional testing necessary where prior testing has been undertaken but is insufficient for disposal purposes.

3.3.7 Fill Construction

Filling construction includes all activities associated with the preparation of areas where fill is to be placed, and the subsequent placement and compaction of suitable material.

Where filling is required to achieve the design formation levels, such as footpaths on sloping ground or areas requiring fill to meet longitudinal grades requirements, the works shall be carried out in accordance with the methods specified herein.

For the purposes of this Specification, *fill* refers to the subgrade layer located beneath the subbase pavement layer.

3.3.7.1 Fill Foundation and proof rolling

Prior to placement of fill material, the natural surface shall be inspected by The Council's Representative and where applicable, by the Geotechnical Inspection and Testing Authority to verify compliance with AS 3798.

The subgrade on which fill is to be placed shall be proof rolled to assess the uniformity of its response under load and to evaluate its capacity to support the fill and withstand the construction process.

Proof rolling shall be conducted using one of the following methods:

- A pneumatic-tyred roller, not less than 4.5 tonnes per tyre and 600 kPa tyre pressure or
- A water tanker carrying not less than 10,000L of water during the proof roll, with internal baffles to minimise sloshing and with a minimum 600 kPa tyre pressure.
- Or where site constraints do not allow for the above, a proof roll may be undertaken with at least 6 passes of the heaviest practicable plant. A leg rammer may be used, but a plate compactor or similar is not acceptable for proof rolling purposes.

Test equipment shall be operated at a speed between 3 km/h and 10 km/h, as directed by The Council's Representative. The rolling pattern shall cover the entire test area with successive passes offset laterally by 40% to 50%.

Prior to inspection by The Council's Representative and/or Geotechnical Inspection and Testing Authority (GITA), the contractor shall undertake their own inspection and proof roll to confirm the surface is ready for formal inspection. All associated costs shall be borne by the Contractor.

The Council's Representative and /or GITA shall assess surface deformation under proof rolling as either acceptable or not acceptable at specific locations, and as either uniform or non-uniform across the test area.

If The Council's Representative or GITA as applicable considers the surface is suitable, the Contractor shall commence filling as described below. If The Council's Representative or GITA as applicable considers that the surface is unsuitable, the Contractor shall carry out additional excavation or other remedial measures as directed by The Council's Representative.

Filling shall commence after the surface has been inspected and approved by The Council's Representative. This constitutes a HOLD POINT.

3.3.7.2 Placing Fill

The Contractor shall adopt methods of excavating, transporting, placing, and spreading the fill material to ensure that the fill is mixed to form a homogeneous mixture prior to compaction.

Fill materials shall be placed in horizontal layers of uniform thickness and deposited systematically across the fill area to maintain a self-draining surface profile.

Large particles shall be broken down and evenly distributed through the fill material. Where particles cannot if not capable of being broken down removed from the filling. The maximum size of rock particles throughout the fill material shall not exceed the grading requirement as per Table 4. Each layer shall be compacted uniformly from a maximum loose thickness of 200 mm, unless otherwise approved by The Council's Representative.

Prior to placing subsequent fill layers, the Contractor shall verify that previously placed layers remain compliant with the specified requirements, including moisture content.

Care shall be taken by the Contractor to use equipment and construction techniques that minimise surface heaving and prevent damage to underlying layers, including damage caused by overworking or construction traffic.

Unless otherwise specified on the Drawings or in this Specification, fill materials shall be as detailed in Table 5.

Table 5: Fill Material Schedule

Location	Material
The upper 200 mm of fill areas supporting pavements (sub-grade)	Type A
Below pavement other	General fill
Road reserves, roadways, park lands and public reserves	General fill
Allotment filling	General fill
Trench backfills (around services/drainage)	Sand Type D

3.3.7.3 Compacting fill

All fill layers shall be systematically compacted using appropriate equipment to achieve uniform compaction across the full depth and width of each layer.

Embankment slope faces shall either be compacted separately or overfilled and trimmed back to meet the specified tolerances.

Unless otherwise specified on the Drawings or elsewhere in this Specification, compaction shall comply with the requirements set out in Table 6.

Table 6: Earthworks Compaction Requirements

Location	Requirement
Upper 200 mm below pavements (sub-grade)	98% of Maximum Dry Density (Standard)
More than 200 mm depth below pavements	95% of Maximum Dry Density (Standard)
Road reserves (other) and public reserves	95% of Maximum Dry Density (Standard)
Trenches in road reserves	98% of Maximum Dry Density (Standard)
Trenches not in road reserves	95% of Maximum Dry Density (Standard)

These compaction requirements are specified in the DIT Master Specification, in RD-EW-C1 Earthworks.

Acceptance of the compaction results forms a HOLD POINT.

3.3.7.4 Moisture Control

Unless otherwise specified on the Drawings or in this Specification, the moisture content of fill material at the time of compaction shall be within ±2% of the optimum moisture content determined by Standard compaction.

The Contractor shall adjust the moisture content of the fill material as necessary to achieve the specified density and moisture content prior to compaction.

Completed fill layers shall be sealed and graded to prevent concentration or ponding of water on the surface.

Any soils found to exceed the specified moisture content range shall be removed and replaced with material that complies with the moisture and compaction requirements.

3.3.7.5 Benching

Where new embankment slopes are to be constructed against an existing slope which is steeper than 8 horizontal to 1 vertical, the existing slope shall be benched by forming successive terraces with a minimum horizontal length of 1.0 m to form a key for new fill. The minimum depth of each bench shall be equal to the specified compacted layer thickness.

3.3.7.6 Oversize Suitable Material

The Contractor shall notify The Council's Representative of any oversize materials won from site that cannot be broken down to meet the specified particle size limits. Upon notification, the Council's Representative shall assess the material's suitability for inclusion in the fill.

If approved, the Contractor shall prepare a method specification detailing the proposed placement and compaction procedures for the material and submit it to The Council's Representative for approval prior to placing or compacting any such material.

3.3.7.7 Filling Adjacent to Structures

The Contractor shall use appropriate equipment and construction techniques to prevent damage to adjacent structures, services, and property during filling operations.

Filling shall not be carried out against newly constructed concrete structures until a minimum of fourteen (14) days has elapsed since placement, in accordance with the contract drawings or until such other time as may be approved by The Council's Representative.

3.3.8 Backfilling of Trenches

3.3.8.1 General

Trenches shall be backfilled with Type D backfilling sand after the pipes, culverts, cables, or conduits have been installed, surrounded, and overlaid in accordance with the Specification, Council standards, and all required testing has been completed.

No backfilling material shall be placed until The Council's Representative has approved both the works to be covered and the materials to be used for backfilling.

3.3.8.1 Road Reserves

Where a trench is located beneath an existing or proposed road pavement, or where the nearest edge of the trench lies within 2.0 m of such pavement, the portion of the trench above the specified surround and overlay material shall be backfilled using Type D backfilling sand.

Sand backfill shall be placed in layers not exceeding 200 mm uncompacted thickness with each layer being compacted and tested in accordance with this specification. The sand backfill material shall be placed and compacted to the formation level specified for the pavement construction.

3.3.9 Filling Behind Kerbs and Gutters

Upon completion of the construction of the concrete kerbs and gutters, the area behind the kerb shall be filled with General Fill in accordance with the CoA Construction Standard 900 – 901 and compacted to the density specified in this Specification.

After construction of the footpath (where applicable) the area shall be surfaced with a 150 mm thickness of lightly compacted topsoil, garden loam, or other material matching the existing surface or shown on the drawings.

Any residual area between the back of kerb and the new footpath edge shall also be surfaced with a 150 mm thickness of lightly compacted topsoil, garden loam, matching footpath material, or other surfacing as specified in the contract drawings.

3.4 Quality Requirements

3.4.1 General

The Contractor shall arrange for field and laboratory compaction testing of bulk earthworks filling and trench backfilling. The testing shall be carried out by a NATA-accredited laboratory. All costs associated with the testing shall be borne by the Contractor.

Copies of the test results shall be made available to The Council's Representative for its approval as soon as reasonably practicable following testing and in any case within a week of the test being performed. The risk of proceeding with subsequent construction before the Contractor has received NATA-endorsed test certificates shall rest with the Contractor and no claims for extension of time or associated costs will be considered due to unavailability of such test results.

The frequency of field density testing shall be as set out in AS 3798 unless specified otherwise.

3.4.2 Materials

Prior to the construction of the works the Contractor is to provide The Council's Representative details of the fill materials to be used. Filling materials shall be placed in identifiable lots and shall be tested for compliance at the rates set out in this specification.

3.4.3 Inspections

The following Hold Points are required during the construction of Earthworks:

H-E1	Installation of Soil Erosion Management Plan, prior to the commencement of works
H-E2	Inspection of final excavated levels prior to placement of fill (if applicable)
H-E3	Completion of earthworks formation

3.4.4 Quality Testing

The following test procedures shall be used for Quality testing:

Table 7: Test Procedures for Earthworks

Test Type	Test Procedure
Atterberg Limits	AS 1289.3.2.1
Particle Distribution	DIT TP134
Compaction Control Test - Dry density ratio, Moisture Variation, Moisture Ratio	DIT TP 320

Note:

- Dry Density Ratio shall be calculated to the nearest 0.1%.
- Density measurements shall be made to the nearest 0.01 tonne/m^3.
- Test location co-ordinates shall be measured to the nearest 100 mm.
- DIT TP 134 & TP 320 refer to DIT Master Specification - Roads / Supply of Pavement Materials (RD-PV-S1)
- The Contractor shall undertake testing of the earthworks at the following minimum frequency:

Table 8: Quality Testing Requirements for Earthworks

Item	Test Type	Minimum Testing Frequency
Types A Fill Material	Grading	One test per 1,000 tonnes
	Plasticity Index	One test per 1,000 tonnes
	Linear Shrinkage	One test per 1,000 tonnes
	Weighted Plasticity Index	One test per 1,000 tonnes
General Fill Material	Partial Grading	One test per 1,000 tonnes
	Plasticity Index	One test per 1,000 tonnes
	Weighted Plasticity Index	One test per 1,000 tonnes
Bulk Fill under Pavements (subbase)	Field Density	1 per 500 m^2 per layer (a minimum of 3)
	Laboratory Compaction	1 per field test
Trench Fill under pavements (subbase)	Field Density	1 per 50 lineal metres per layer
	Laboratory Compaction	1 per field test

Trenches for water reticulation and sewer construction shall be backfilled and tested in accordance with SA Water requirements and override the requirements nominated in this specification.

If no rate of testing is specified, testing rates shall be in accordance with AS 3798.

3.4.5 Materials Being Used in the Works

Where in the opinion of The Council's Representative the material being used in the Works differs from the specified material, The Council's Representative may order a sample to be taken and tested. If the tested material does not comply with the specification, the cost of sampling and testing shall be borne by the Contractor. In addition, the work which incorporates the non-compliant material shall be liable to be rejected at The Council's Representative 's discretion.

3.4.6 Vertical Tolerances

Construction Tolerances on earthworks are as follows:

Table 9: Tolerances on Earthworks

Item	Tolerance
Field Density	0% + 4% of specified compaction
Thickness of each fill layer	Within ± 25 mm of maximum layer thickness with an absolute minimum compaction thickness of 80mm.
Finished level of pavement subgrade	As detailed in the pavement design on the contract drawing set.
Finished level of private allotments	Within ± 50 mm of design level
Finished level of public reserves	Within ± 75 mm of design level
Finished surface of batters	Within ± 75 mm of design level, but without reverse falls
Shape of pavement subgrade	Longitudinal ± 20 mm below a 3.0 m straightedge Transverse ± 40mm below a 3.0 m straightedge

The shape of the finished surface shall deviate below a 3.0 m straightedge, measured between any two points, by not more than the tolerances specified above.

3.4.7 Acceptance Criteria

Where test results show that the compaction of filling material that has been achieved is below that specified, the areas or volumes represented by the tests (as determined by The Council's Representative) may be rejected. The Contractor is to replace any defective material and re-work or further compact the area and re-submit it for further testing until the specified requirements are achieved and The Council's Representative's approval received. All costs associated with remedial works and re-testing shall be borne by the Contractor.

4. PAVEMENT SUBGRADE

This section of the specification details the requirements for preparation of the pavement subgrade. It shall be read in conjunction with the Site Preparation and Earthworks section of this specification, the pavement design schedule detailed on the contract drawing set and the CoA Standards Suite.

The subgrade shall comprise the uppermost 200 mm of the formation directly beneath the pavement subbase.

4.1 General

This specification shall be read in conjunction with the following Standards and references, which are deemed to form a part of this specification.

AS 3798	Guidelines on earthworks for commercial and residential developments
DIT Master Specification RD-EW-C1	Earthworks
DIT Test Procedure TP 320	Compaction Control Test – Dry Density Ratio, Moisture Variation and Moisture Ratio

4.2 Construction and Workmanship

4.2.1 General

Preparation of the subgrade shall follow completion of the underlying earthworks as detailed in the Site Preparation and Earthworks section of this specification.

4.2.2 Subgrade Preparation

Following the completion of formation earthworks, the subgrade shall be trimmed to produce a tight, dense surface within the specified tolerances.

The subgrade shall be systematically compacted over its full width using appropriate compaction equipment to achieve the compaction requirements specified in the Site Preparation and Earthworks section of this specification.

Where required the subgrade shall be moisture conditioned and compacted in accordance with the Site Preparation and Earthworks section. Moisture conditioning may include tyning of the subgrade, aeration to reduce its moisture content prior to spreading and re-compaction. Care shall be taken to ensure the subgrade is not affected by inclement weather during moisture conditioning.

Trafficking of the subgrade by construction activities shall be kept to a practical minimum to reduce “pumping” of moisture from lower layers into the subgrade.

Subgrades shall be finished and always maintained with adequate drainage to ensure water runs off without ponding.

4.2.3 Maintenance of Subgrade

The Contractor shall maintain the subgrade to ensure that the shape conforms to the specified tolerance, and degree of compaction meets the requirements of the specification. Compliance shall be verified immediately prior to placement of the first pavement course.

Any deterioration of the subgrade occurring between completion of compaction and placement of the pavement course shall be rectified by the Contractor at no additional cost.

Trafficking of the subgrade by construction activities shall be kept to a practical minimum to prevent deterioration of the surface and underlying layers.

Areas of subgrade that become affected by moisture after achieving the specified requirements shall be re-worked and re-compacted as necessary to restore full conformance with the specification.

- Re-working shall include trimming, moisture conditioning, and compaction as appropriate.
- All rectification works shall be carried out at the Contractor's cost.

4.2.4 Proof Rolling

The Contractor shall make available a suitable vehicle for proof rolling of the subgrade. No payment will be made for transportation of the proof rolling vehicle to the site or around the site. The Contractor shall undertake proof rolling in the presence of The Council's Representative. Proof rolling shall be carried out within 24 hours of completing subgrade preparation and prior to any trafficking by construction traffic of the subgrade. The Council's Representative will determine whether a particular section of subgrade should not be proof rolled (e.g., over utility services with limited cover) and the method of proof rolling for small areas.

Proof rolling shall be conducted using either:

- A pneumatic-tyred roller, not less than 4.5 tonnes per tyre and 600 kPa tyre pressure or
- A water tanker carrying not less than 10,000L of water during the proof roll, with internal baffles to minimise sloshing and with a minimum 600 kPa tyre pressure.
- Or where site constraints do not allow for the above, a proof roll may be undertaken with at least 6 passes of the heaviest plant practicable. A leg rammer may be used, but a plate compactor or similar is not acceptable.

Test equipment shall be operated at a speed in the range 3 km/h to 10 km/h, as directed by The Council's Representative. The rolling pattern shall cover the area to be tested with successive passes of the equipment offset laterally by 40% to 50%.

The Council's Representative will assess the surface deformation under the proof roll as perceptible or not perceptible at specific locations and as uniform or non-uniform over the entire test area.

If The Council's Representative considers that the surface is unsuitable, the Contractor shall carry out additional compaction or other measures as may be directed by The Council's Representative. Such remedial work will not be considered as a variation to the contract.

4.2.5 Protection of the Subgrade

Once an area or lot has been proof rolled and accepted by The Council's Representative, any damage to the subgrade due to weather or the Contractor's activities shall be the responsibility of the Contractor. No further payment will be made for the repair of any such damage.

If construction of the pavement does not commence immediately following approval of the subgrade, the Contractor shall put appropriate measures in place to protect the subgrade from inclement weather and/or construction traffic.

4.2.6 Subgrade Remediation

Where directed by The Council's Representative, the Contractor shall carry out remedial works to areas that have failed the proof roll or to areas of subgrade damaged after meeting the specified requirements due to weather, vehicular traffic or the Contractor's activities. Areas where the subgrade is damaged after meeting the specified requirements due to weather, vehicular traffic or the Contractor's activities shall be re-worked to meet the specified requirements at the Contractor's cost.

The Contractor shall first prepare a remediation method plan for review and acceptance by The Council's Representative, including the:

- Depth of excavation required to meet sound material; and,
- Proposed replacement material (e.g., appropriately moisture conditioned excavated material, PM 3/40QG or PM2/20QG).

Once the remediation plan has been agreed, the Contractor shall execute the plan. Appropriate records of the remediation process shall be kept, and all requirements of this Specification in relation to compaction, shape, tolerances, and soundness shall be achieved before the placement of pavement material above remediated subgrade.

4.3 Quality Requirements

4.3.1 Inspections

The following HOLD POINTS are required during the subgrade preparation:

H-SG1	Approval and proof roll of the subgrade, prior to commencing pavement construction.

4.3.2 Quality Testing

The Contractor shall undertake testing of the subgrade at the following minimum frequency:

Table 10: Quality Testing Requirements for Subgrade Preparation

Item	Test type	Minimum Testing Frequency
Subgrade	Field Density	1 per 300 m^2 or min of 3
	Laboratory Compaction	1 per field density
Pavement Moisture Content	Field Moisture content	1 per field density
Level of finished Subgrade	Verification Survey	10 m spacing longitudinally; 3 points per cross section

The following test procedures shall be used for Quality testing:

Table 11: Test Procedures for Sub-Grade Preparation

Test Type	Test Procedure
Laboratory Compaction	
Moisture Content	
Field Density	Nuclear Method
Compaction Control Test – Dry Density Ratio, Moisture Variation, Moisture Ratio	DIT Test Procedure – TP 320

Note:

- Dry Density Ratio shall be calculated to ± 0.1%.
- Density measurements shall be made to ± 0.01 tonne /m^3.
- Test location co-ordinates shall be measured to ± 100 mm.

When homogeneous material is present, field compaction control may be optimised by the Council's representative, based on the recommendations of the accredited testing authority. This may include correlating multiple field density tests with a single laboratory compaction test.

4.3.3 Tolerances

Construction tolerances on each finished granular pavement layer below the subbase are as follows:

Table 12: Tolerances

Item	Tolerance
Finished level of subgrade	As detailed in the pavement design on the drawings.
Field Moisture content	-5% + 2% of Optimum Moisture Content

4.3.4 Acceptance Criteria

Areas where the subgrade fails to meet the specified requirements including:

- Compaction and moisture content.
- Level tolerances and shape.
- Surface finish; or
- soft / over wet areas, surface cracking, shoving and ruts.

May be rejected by The Council's Representative and shall then be reworked, moisture conditioned and respread and compacted to meet the specified requirements at the Contractor's cost.

Areas where the subgrade is damaged after meeting the specified requirements due to weather, vehicular traffic or the Contractor's activities shall be re-worked to meet the specified requirements at the Contractor's cost.

5. GRANULAR PAVEMENT

This section of the specification details the requirements for supply, spreading, compaction and maintenance of unbound and cementitious-bound granular pavements. This section shall be read in conjunction with the pavement design details of the contract drawing set, CoA Standards Suite and the Site Preparation & Earthworks and Pavement Subgrade sections of this specification.

5.1 General

This specification shall be read in conjunction with the following Standards and references, which are deemed to form a part of this specification.

AS 1289.5.3.5	Methods of testing soils for engineering purposes
	Methods for sampling and testing aggregates.
DIT Master Specification RD-PV-S1	Supply of pavement materials
DIT Master Specification RD-PV-C1	Construction of Unsterilised Pavements
DIT Master Specification RD-PV-S2	Plant Mixed Stabilised Pavement
DIT Environmental Instruction 21.6	Recycled Fill Materials in Construction
DIT Test Procedure TP226	Sampling of Soil, Aggregates and Rocks
DIT Test Procedure TP320	Compaction Control Test – Dry Density Ratio, Moisture Variation and Moisture Ratio
DIT Test Procedure TP349	Determination of Pavement Hardness (Ball Penetration Test)
AS 3972	General purpose and Blended Cements

Plant mixed stabilised pavement has been nominated for the pavement stabilisation procedure. However, should the Contractor nominate in-situ pavement stabilisation, the material, construction, and quality testing shall be in accordance with DIT Master Specification RD-PV-C3 In-situ Pavement Stabilisation.

5.2 Materials

Granular pavement materials are to be as specified herein or as otherwise approved by The Council's Representative.

The properties of the granular pavement material shall comply with the grading-based requirements of DIT Master Specification RD-PV-S1 Appendix 1.

5.2.1 Quarried Pavement Materials

Quarried granular pavement materials shall be obtained from the crushing of approved hard, sound, clean and durable natural rock in accordance with the DIT Master Specification RD-PV-S1.

The type, class and size of the quarried pavement materials shall be as detailed in the pavement design on the design contract drawing set.

5.2.2 Cement-Stabilised Material

The Contractor shall supply and construct cement-stabilised pavement materials in accordance with *DIT Master Specification RD-PV-S2 – Plant Mixed Stabilised Pavement* and *Part R15 – Supply of Pavement Materials*. Stabilising binders may include cement, lime, fly ash, polymers, or approved combinations thereof. Cement used for stabilisation shall comply with *AS 3972 – General Purpose and Blended Cements* and shall be Type GB unless otherwise specified. All stabilised materials shall be mixed under controlled plant conditions and compacted to achieve the required density, moisture content, and unconfined compressive strength specified in the contract documents. The Contractor shall ensure that the final pavement layer meets all performance and durability requirements in accordance with the DIT specifications.

Cement-treated materials shall achieve a 7-day unconfined compression strength of not less than 2.0 MPa and not more than 5.0 MPa based on DIT Master Specification.

5.3 Construction and Workmanship

5.3.1 General

Placement of each granular pavement layer shall not commence until the subgrade or underlying layers have been approved by The Council's Representative and all preceding Hold Points have been released, unless prior written approval has been granted.

5.3.2 Placement of Un-bound Granular Pavement

Each pavement layer shall be spread as a uniform homogeneous layer, which after compaction and trimming will provide the compacted layer thickness as specified in the pavement design.

Care shall be taken through the spreading process and at junctions with existing pavements to ensure material is uniform in moisture and particle distribution. Placement of the material shall be planned to reduce the number of joints between placement runs.

During and/or following the compaction process each layer shall be trimmed to produce a tight dense surface to the tolerances specified. Any areas identified as low shall be tyned, respread and recompacted.

5.3.3 Placement of Stabilised material

The spreading and shaping of the stabilised materials shall be undertaken by hand or small plant (e.g., bobcat) or grader in accordance with DIT Master Specification RD-PV-S2.

The rate of delivery shall be sufficient to enable all spreading, shaping and compaction to be carried out within 2.75 hours of the material being stabilised. The rate of delivery and placing shall also be sufficient to enable the first (or initial) compaction testing to be undertaken within 1.5 hours of the material being stabilised. This is to enable additional rolling of the material if the compaction standard has not been achieved.

Stabilised material shall not be delivered when the shade air temperature exceeds 35ºC and material shall not be placed if the mix temperature at the site exceeds 27ºC.

5.3.3.1 Stabilised material Pavement Joints

The works shall be planned to minimise the number of joints. All joints, whether single or double layer, shall be near vertical and shall be continuous through the full depth of the stabilised material.

At the end of each days' work and where spreading operations have been halted for any reason for a period exceeding 3 hours, the Contractor shall provide construction joints at each discontinuity in the operation. Joints shall be cut within one hour of completion of compaction.

Joints shall be made either transverse or parallel to the direction of the stabilising run. The joints shall be formed by cutting back into the compacted stabilised material to the extent necessary to form a near vertical face. The loose trimmed material shall not be incorporated into the pavement. Joints shall be kept moist prior to commencement of the next stabilising run.

5.3.3.2 Curing Stabilised Pavement material

The surface of compacted stabilised layers shall be kept continuously moist by watering with suitable spraying equipment for a minimum period of seven (7) days. This period shall commence on completion of compaction of the section being stabilised.

No vehicular traffic or construction equipment shall be permitted on stabilised areas for a period of seven (7) days following completion of compaction, except for vehicles and plant required for curing purposes. Vehicles used for curing shall be limited to single-axle units not exceeding 8 tonnes per axle.

After the seven (7) day period, the only traffic permitted on stabilised areas shall be construction equipment used for construction of subsequent pavement layers and backfilling of kerb and gutter.

The Contractor shall not use any section of stabilised pavement as a construction or haul track.

Where access by heavy commercial vehicle over the stabilised pavement area is required, the Contractor shall place a sacrificial 200 mm thick layer of PM2/20Q Class 2 Pavement Material over the trafficked area.

Equipment and vehicles required for kerb laying operation shall be permitted on stabilised areas after a period of three (3) days from completion of compaction of the stabilised section.

5.3.3.3 Finish of Stabilised material

The surface of the pavement layers shall be uniformly tight and free of loose uncompacted material, segregated or 'bony' material or soft, over wet areas and free of roller indentations. The surface of the subbase layer shall have a well graded aggregate texture.

5.3.4 Compaction of Pavement

All pavement layers shall be systematically compacted in layers as detailed in the standard pavement details with appropriate compaction equipment to ensure the full depth and full width of each layer.

Care shall be taken to ensure that vibration from compaction equipment does not affect adversely adjacent structures. In established residential area, the maximum size of compaction equipment shall be a nominal 6 tonne roller, unless noted otherwise. In confined locations, or where larger equipment is not appropriate, a leg rammer may be used for compaction.

Following compaction, the surface finish of each granular pavement layer shall be a tight dense, and free of loose material, excessive slurry fines, or segregated 'bony' material.

5.3.5 Moisture Control

Moisture shall be uniformly distributed through the material by use of wet mix materials and or fine mist spraying prior to spreading and compaction. Care shall be taken to ensure that fines are not washed out of the base during spraying operations.

Upon completion of each pavement layers, the moisture content shall be reduced to achieve adequate dry-back prior to placement of the subsequent layer. The Contractor shall make allowance for this process in the Tender and construction program.

5.3.6 Maintenance of Pavement Layers

Completed pavement layers shall be maintained with adequate drainage to ensure that water drains from the surface without ponding.

Pavement layers affected by moisture and therefore outside the specified requirements, even if they previously met those requirements, shall be dried out, reworked and recompacted as required to achieve compliance. where this occur within the defect liability period, the rework shall be at the Contractor's cost.

5.3.7 Granitic Sand Footpath

Where footpaths are nominated on the drawings as unsealed, construction shall be in accordance with CoA 469 & CoA 470 Granitic Sand: Pavement Requirements.

Rubble shall be placed and compacted in accordance with CoA 470: Pavement Requirements. The granitic sand surface shall be finished to match adjacent existing paths in level and appearance and provide satisfactory drainage.

The Contractor shall ensure that completed works do not present a hazard or otherwise compromise public safety.

5.4 Quality Requirements

5.4.1 Materials

Granular pavement materials shall be produced in identifiable lots and tested in accordance with this specification.

Records shall be maintained in the form of delivery dockets or equivalent to ensure traceability of materials incorporated into the pavement.

5.4.2 Inspections

The following HOLD POINTS apply to the construction of granular pavements:

H-GP1	Approval of subgrade or underlying layer.
H-GP2	Placement of first granular pavement layer. Notification that materials are ready for placement, with test results confirming compliance with specification.
H-GP3	Completion of compaction and trimming of each layer. Completion of compaction and trimming of each layer.

H-GP4	Correction of low areas. Areas identified as low have been tyned, respread, and recompacted.
H-GP5	Final surface prior to subsequent layer placement or surfacing. Confirm uniformity, moisture control, particle distribution, and minimisation of joints.

For remediation works or small projects, The Council's Representative may release specified Hold Points prior to the commencement of works. In all cases, release shall be subject to the Council's Representative approval.

5.4.3 Quality Testing

Where directed by The Council's Representative, the Contractor shall excavate test holes in the pavement at specified locations to verify minimum pavement thicknesses.

The Contractor shall undertake testing of the granular pavement at the following minimum frequency:

Table 13: Quality Testing Requirements for Granular Pavements

Item	Test Type	Minimum Testing frequency
Granular	Particle Size Distribution	One test per 1,000 tonnes
Pavement material	Atterberg Limits	One test per 1,000 tonnes
	Los Angeles Value	One test per 1,000 tonnes
Recycled material	Foreign Materials Content	One test per 1,000 tonnes
Each granular material type	Maximum Dry Density	1 per material type
	Optimum Moisture Content	1 per material type
Pavement compaction	Field Dry Density. Achieve specified % of maximum dry density	2 per 300 sq.m or min of 3 per lot (refer Table RD-PV-S2 12.1)
Moisture content	Field Moisture content. Within specified moisture range prior to compaction	1 per field dry density
Binder content	Refer Quality Plan	One test per 150 tonnes or part thereof
Surface tolerances (levels and shape)	Each layer, full coverage by survey or straightedge	Within tolerances specified in Drawings/specification

For remediation works or small projects, The Council's Representative may reduce the amount of testing prior to the commencement of works. Such reduction shall only occur with the Council's Representative approval.

Where approved by The Council's Representative, the frequency of field dry density testing for granular pavement layers may be reduced for areas greater than 2,000 m^2.

The following test procedures shall be used for Quality testing of granular pavements:

Table 14: Test Procedures for Granular Pavements

Test Type	Test Procedure
Particle Size Distribution	DIT Test Procedure - TP134
Atterberg Limits	AS 1289.3.1.2 ,3.2.1, 3.3.1 and 3.4.1
Los Angeles Value	AS 1141.23
Foreign Materials Content	RTA Test Procedure - T276
Sampling of materials	DIT Test Procedure - TP 226
Preparation of samples	AS 1289.1.1
Maximum Dry Density	AS 1289.5.2.1
Optimum Moisture Content	AS 1289.2.1.1 and AS 1289.2.1.4
Field Density	AS 1289.5.8.1 (Nuclear Method)
Dry Density Ratio	DIT Test Procedure - TP 320
Pavement hardness testing	DIT Test Procedure - TP 349

Note:

- Dry Density Ratio shall be calculated to the nearest 0.1%.
- Density measurements shall be made to the nearest 0.01 tonne /m^3.
- Test location co-ordinates shall be measured to the nearest 100 mm.

The following tolerances shall apply to finished unsealed footpaths:

Table 15: Tolerances on Unsealed Footpaths

Item	Tolerance	
Unsealed Footpaths	Absolute	± 10 mm
	Relative	± 6 mm from a 1.0 m straight edge
	Alignment	± 10 mm from design location

5.4.4 Quality Plan

The Contractor shall prepare and implement a Quality Plan that includes:

- Details of the proposed mixing plant, including type, location, output capacity and method of controlling binder content and moisture content (including measures to ensure uniformity).
- Details of the retarder to be used with cement binder.
- Procedures for calibration of plant, including frequency.
- Procedure for verifying binder content, including evidence of reliability of the procedure.

- Procedures for material handling, including loading of mixer and control of segregation during loading and mixing; and
- Detailed procedures for pavement construction.

If not provided beforehand, the documentation shall be submitted at least seven (7) days prior to the commencement of site work. Provision of the documentation listed in this Clause shall constitute a HOLD POINT.

5.4.5 Tolerances

Construction Tolerances on each finished granular pavement layer shall be as follows:

Table 16: Tolerances on Granular Pavements

Item	Tolerance
Filed Dry Density	0% + 5% of specified compaction
Depth of each pavement layer	As detailed in the pavement design
Binder Content	Within ± 0.5 % of that specified
Shape of finished base/ subbase course surface	Longitudinal ± 10 mm below a 3.0 m straightedge Transverse 5 mm (above) to 15 mm (below) a 3.0 m straightedge

The finished surface shall not deviate by more than the specified tolerances a 3.0 m straightedge, measured between any two points in any direction.

5.4.6 Acceptance Criteria

Areas where the pavement fails to meet the specified requirements, including:

- Minimum thicknesses
- Relative compaction and moisture content
- Level tolerances and shape
- Surface finish; or
- Soft or over wet areas, surface cracking, shoving and ruts.

May be rejected at the discretion of The Council's Representative. Such area shall be reworked, moisture conditioned, respread and recompacted to meet the specified requirements at the Contractor's cost.

Areas where the pavement is damaged after meeting the specified requirements, whether due to weather, vehicular traffic, or the Contractor's activities, shall also be reworked to meet the specified requirements at the Contractor's cost.

6. CONCRETE – BASECOURSE

This section shall be read in conjunction with the contract drawings, subgrade and granular pavement section of this specification and CoA Standard Suite.

6.1 General

This specification shall be read in conjunction with the following Standards and references, which are deemed to form a part of this specification.

AS 1012	Methods of testing concrete
AS 1379	Specification and supply of concrete
AS 1478.1 & AS 1478.2	Chemical admixtures for concrete
AS/NZS 1554.3	Structural steel welding
AS/NZS 1748.1	Timber – Solid – Stress-graded for structural purposes
AS 2758.1	Aggregates and rock for engineering purposes - Concrete aggregates
AS 3600	Concrete structures
AS 3610.1	Formwork for concrete – Specifications
AS 3799	Liquid membrane-forming curing compounds for concrete
AS 3972	General purpose and blended cements
AS 4671	Steel reinforcing materials

6.1.1 Extent of the Work

The extent of the concrete work shall include but not be limited to the following:

- Design, supply, erection and removal of all formwork and falsework.
- Supply and fixing of all reinforcement.
- Supply and fixing of all inserts, anchor bolts, embedded fixings, water stops and membranes.
- Supply and placing of all concrete.
- Sampling and testing of concrete and its components and reporting to The Council's Representative.
- Finishing of all concrete surfaces.
- Curing and protecting of all concrete.

6.1.2 Responsibility

The Contractor shall be fully responsible for carrying out all concrete works in accordance with the drawings and this specification.

6.2 Materials – Concrete

The Contractor shall be responsible for supplying concrete in accordance with this specification and the drawings. If requested by The Council's Representative, the Contractor shall supply copies of NATA-endorsed test certificates covering all relevant tests described in the referenced Standards prior to supplying concrete to the site.

6.2.1 Aggregates

Aggregates shall comply with AS 2758-1. The maximum nominal size of aggregate shall be 20 mm or as shown on the drawings. Non-ferrous – metallurgical slag aggregate shall not be used.

6.2.2 Cement

All cement shall comply with AS 3972. Cement used for precast work shall be from a single manufacturing batch.

6.2.3 Water

Water used in concrete shall be free from substances that are harmful to concrete, reinforcement, or other embedded materials.

6.2.4 Chemical Admixtures

No admixture shall be used without prior written approval from The Council's Representative. If approved, admixtures shall not contain chlorides, fluorides or nitrates and shall comply with AS 1478.1.

Where retarder or accelerator admixtures are proposed for use, the Contractor shall submit a concrete mix design incorporating the admixture, demonstrating the performance characteristics of the concrete with the admixture.

6.2.5 Storage

Cement shall be stored in watertight buildings, bins or silos which provide protection against damp and contamination.

Aggregate stockpiles shall be arranged and used to prevent segregation or contamination with other types or sizes of aggregate. Stockpiles shall be arranged to be free draining. Where colour uniformity of aggregates is important for concrete finishing, all aggregate required for the project shall be stored so that colour changes in the finished concrete are prevented.

Admixtures shall be stored to prevent any detrimental effect on their properties. The Contractor shall comply with any special requirements of the manufacturer of the product regarding storage or handling of the admixture.

6.2.6 Performance Requirements

The concrete for the work shall be designed and produced to meet the performance requirements of this specification and the contract drawings.

The selection, proportioning and mixing of the concrete materials shall produce a mix which works readily into corners and angles of the forms and around reinforcement using the method of placement employed on the work, while ensuring that the concrete does not segregate and excess free water does not collect on the surface. The resultant concrete shall be sound and have the other qualities specified.

The minimum performance requirement of the concrete for the various concrete elements shall be as follows, or as shown otherwise on the contract drawings:

Table 17: Concrete Performance Requirements

Element	Compressive Strength f'c (MPa)	Flexural Strength f'cf	Slump (mm)	Drying Shrinkage (µm)
Concrete basecourse	32	4.5 MPa @ 28days	80	650

6.2.7 Ready Mixed Concrete

Except where otherwise specified, all concrete shall be ready mixed using a batch production process and supplied in accordance with AS 1379. Ready mixed concrete shall be delivered in agitating trucks.

6.2.8 Transportation

Concrete may be rejected if the elapsed time between charging the mixer and discharging of the concrete into the formwork exceeds the following time periods for the specified ambient temperatures.

Table 18: Concrete Transportation Requirements

Concrete Temperature at Time of Discharge	Maximum Elapsed Time (hours)
less than 24°	2.0
24°–27°	1.5
27°–30°	1.0
30°–32°	0.75
greater than 32°	not permitted

6.3 Materials – Reinforcement

6.3.1 Reinforcement

All reinforcing fabric, reinforcing bars and hand drawn steel wire shall comply with the requirements of AS 4671.

The Contractor shall provide copies of the Manufacturer's test certificates for the steel reinforcing materials, as required by AS 4671.

6.4 Construction and Workmanship – Formwork

Formworks shall be constructed of steel or timber, faced with a smooth, hard surface and shall confirm to the lines, shapes and dimensions of the concrete as shown on the Drawings and specified herein.

Forms shall be mortar tight to prevent leakage and shall be sufficiently rigid to resist distortion under the pressure of the concrete, vibration, or incidental construction loads.

Forms shall be set, strutted, and tied to ensure that the finished concrete accurately confirms to the lines and dimensions shown on the Drawings.

6.4.1 Formwork Design

Formwork shall be designed in accordance with AS 3610.1. Formwork shall be designed and constructed so that elastic shortening, deflection and cambers resulting from prestressing forces are not restricted.

Falsework shall be designed to provide lateral stability for the forms against the loads resulting from wind, lateral pressure of plastic concrete and vibration of equipment.

The Contractor shall submit formwork documentation to The Council's Representative in accordance with AS 3610.

Submission of this documentation shall constitute a Hold Point. Release of the Hold Point is subject to approval by the Council's Representative.

6.4.2 Dimensional Tolerances

Dimensional tolerances applicable to formed and other surfaces shall comply with the requirements of AS 3610.1 – Formwork for Concrete.

6.4.3 Types of Formwork

The Contractor shall design formwork to achieve the required surface finishes, shapes, lines, levels, and dimensions of the concrete work as shown on the Drawings and specified herein. Unless otherwise shown on the Drawings, for work above ground, forms shall be chamfered for re-entrant angles and filleted for corners. The face of the bevel in each case shall be 25 mm, unless noted otherwise. Materials used in the formwork shall comply with the requirements of AS3610. 1 – Formwork for Concrete.

6.4.4 Treatment of Formwork

6.4.4.1 Release Agents

Internal faces of the forms shall be coated, prior to placing reinforcement, with an approved release agent compatible with the contact surfaces. The Contractor shall ensure that the release agent is applied uniformly and does not puddle due to excessive application, to avoid staining or retardation of the concrete surface. No part of the reinforcement or construction joints shall be coated with the release agent.

6.4.4.2 Cleaning of Formwork

All forms shall be thoroughly cleaned prior to placing concrete. All dust, debris, rust, and other stains shall be completely removed to prevent contamination of the concrete surface.

Cleaning shall be carried out in a manner that does not damage the formwork surface or compromise the specified finish.

6.4.5 Finished Formwork

6.4.5.1 Classes of Finishes

The classes of finishes are to be in accordance with AS 3610.1 and shall comply with the requirements of the Drawings for class and location, with reference to critical face, form liners, surface pattern, form face deflection, and surface treatment.

Unless noted otherwise, colour control shall be in accordance with AS 3610.1.

Concrete basecourse: Class of finish C. See Table 20f or Tolerances on Finished Concrete.

6.4.5.2 Repair to Concrete Finishes

Where the concrete finish fails to comply with the specification or AS 3610.1, the Contractor may propose a repair method in accordance with AS3600 for approval by The Council's Representative.

The Council's Representative may impose additional requirements in accordance with AS 3600.

If the proposed method is not approved, or if, the opinion of The Council's Representative, the approved method does not produce a satisfactory concrete finish, the concrete shall be removed to the extent determined by The Council's Representative and recast against properly formed construction joints.

6.4.5.3 Stripping of Formwork

Formworks shall not be stripped, nor shall any formwork supports be removed, until the concrete has acquired sufficient strength to support its own weight and any superimposed loads without detriment to its intended use.

Stripping of formworks and removal of formwork supports shall comply with the requirements of AS 3600 – Concrete Structures.

6.5 Construction and Workmanship – Reinforcement

The Contractor shall be responsible for the supply and fixing of the reinforcement, including all tie wire, support chairs and associated accessories, in accordance with the drawings and the Specification.

6.5.1 Supports for Reinforcement

Bar chairs, spacers and ties made of concrete, steel or plastic shall be used to support all reinforcement in position within the tolerance specified in AS 3600 until the concrete has hardened. Timber, aggregate, brick, or other materials shall not be used.

Supports shall be capable to withstanding construction traffic and shall be providing in sufficient number and spacing to maintain the correct position of the reinforcement before and during concrete placement. Where chairs are located over a membrane or moisture barrier, appropriate plates shall be used under each chair to prevent damage to the membrane or moisture barrier.

6.5.2 Bending

Bending of reinforcement shall comply with AS 3600.

6.5.3 Welding

Welding of reinforcement shall comply with AS 3600 and AS/NZS 1554.3. Written approval from The Council's Representative shall be obtained before reinforcement is welded.

6.5.4 Laps

Unless otherwise directed by The Council's Representative, the minimum end lap for mesh shall be 300 mm and the minimum side lap 150 mm. The minimum lap for deformed bars shall be 38 times the bar diameter. The location of any laps is subject to the approval of The Council's Representative.

6.5.5 Cover

The minimum clear cover to any reinforcement shall be as follows unless otherwise noted on the drawings:

Concrete basecourse: minimum clear cover to reinforcement shall be 50 mm

Damp proof membranes are to be installed between the concrete basecourse and surrounding soil.

6.5.6 Fabrication

Reinforcement shall be fabricated to the shape and dimensions shown in the drawings and to the dimension tolerances specified in AS 3600.

6.5.7 Surface Condition of Reinforcement

Reinforcement shall be free from loose mill scale, loose rust, oil, grease and other non-metallic coatings which would reduce the bond to the concrete. Where reinforcement is to be left exposed, it shall be protected with coating with a cement wash to the approval of The Council's Representative.

6.5.8 Fixing of Reinforcement

Reinforcement shall be held in its correct position within the tolerances specified in AS 3600 until the concrete has hardened.

6.5.9 Protection in Hot Weather

Where the ambient air temperature is likely to exceed 32ºC during concrete placement, reinforcement shall be adequately shaded or sprayed with water to prevent the temperature of the concrete in contact with the bars from exceeding 32ºC.

6.6 Construction and Workmanship – Placing of Concrete

The Contractor shall be responsible for placing concrete so that the requirements of the drawings and specification are met.

Care shall be exercised to avoid segregation of the concrete during placing. All the form shall be filled. Concrete shall be placed and moved to surround the reinforcement without displacing it.

Coarse aggregate shall be worked back from the face of formwork, and all air bubbles and voids shall be removed from the concrete. Concrete shall be placed in horizontal layers not exceeding 225 mm in height and each layer shall be thoroughly compacted before placing additional concrete.

Under no circumstances shall concrete be dumped in a heap and spread with vibrating tools.

During placing of concrete, the specified slump shall be maintained within the Specification tolerance. No water shall be added to the concrete after discharge from the agitator has started.

The concrete shall not be placed when the conditions which will not permit the requirements of this Specification to be met, either at the time or subsequently.

6.6.1 Compaction

The concrete shall be compacted using immersion and screed vibrators to remove air bubbles and to fill all voids. At least one reserve vibrator in working order is to be provided on site during concrete placing. Concrete shall not be over vibrated so that segregation results.

6.6.2 Laitance

Care shall be exercised during compaction to avoid laitance forming to a reasonably practicable extent.

6.6.3 Disturbance after placing

Under no circumstances shall formwork or projecting reinforcement be shaken, displaced, or disturbed within 20 minutes after concrete placing finishes. Concrete shall not be walked on or otherwise trafficked or disturbed for at least 48 hours after concrete placing finishes.

6.6.4 Weather Requirements

In addition to the requirements for cold weather and hot weather concreting set out in AS 3600, concrete shall not be poured if the shade air temperature at the site is less than 10ºC or greater than 35ºC.

6.6.5 Joints

All joints including construction, isolation, expansion, and sawcut joints, shall be located as shown on the Drawings.

Where concrete placement is interrupted prior to initial set, the point of interruption shall be formed into a construction joint. The location of construction joints shall be planned in advance and submitted to the Council's Representative for approval no later than four (4) weeks prior to the proposed joint placement.

The placing of the concrete shall be carried out continuously between joints in a single operation.

Construction joints on exposed faces shall be truly horizontal or vertical. Where required to ensure a regular joint appearance, a beading shall be fixed to the internal face of the formwork.

Prior to placing new concrete against a construction joint, the joint surface of the hardened concrete shall be thoroughly roughened and cleaned to remove all loose or soft material, foreign matter and laitance. The prepared surface shall be dampened with clean water and coated with neat cement slurry immediately before placing the new concrete.

6.6.6 Saw Cut Joints

Saw cut transverse joints shall be made within 24 hours of the concrete placement to mitigate the risk of shrinkage induced cracking. Refer the CoA Standard Drawings CoA 435 / CoA 436.

Saw cuts shall be clean, straight, and continuous, and shall not result in spalling or surface damage. Where adverse weather or site conditions prevent timely saw cutting, alternative crack control measures shall be proposed and approved by the Council's Representative prior to placement.

6.6.7 Type of Finishes

Concrete basecourse shall be steel trowelled finish unless otherwise specified on the contract drawings.

The concrete shall be placed, struck off, consolidated, and levelled to a Class C tolerance.

6.6.8 Curing of Concrete

Curing procedures shall be determined with due consideration of the prevailing average ambient temperature at the site during the curing period, to ensure optimal hydration and strength

development of the concrete. Implement curing measures that comply with the following requirements:

- Curing commencement: Initiate continuous curing immediately upon completion of surface finishing, once the concrete has attained sufficient set to prevent surface damage from the curing process.
- Minimum curing duration: The total cumulative number of days, or fractions thereof, during which the concrete temperature exceeds 10°C, shall comply with the requirements of AS 3600:2018 Clause 17.1.5, unless accelerated curing methods are approved. Minimum curing durations are as follows:
- Fully enclosed internal surfaces or early-age strength concrete: Three (3) days.
- All other exposed concrete surfaces: Seven (7) days.
- Termination of curing: At the conclusion of the curing period, adopt measures to prevent rapid moisture loss or thermal shock that could induce shrinkage cracking or surface deterioration.
- Maintain the concrete under controlled environmental conditions to minimise temperature fluctuations and prevent moisture loss throughout the curing period.

6.6.8.1 Curing Methods

Apply one of the approved curing methods for all unformed concrete surfaces. Where formwork is removed during the prescribed curing period, immediately implement an equivalent curing method to all newly exposed surfaces for the balance of the required curing duration.

Acceptable methods of curing shall include the following:

- Ponding or continuous sprinkling with clean water to maintain surface moisture.
- Absorption covers (e.g. hessian or fabric mats) kept continuously wet throughout the curing period.
- Impermeable membrane curing compounds applied uniformly to the concrete surface in accordance with manufacturer's instructions.
- Low pressure steam curing, where approved, in controlled environments to accelerate strength gain.
- Impermeable sheet membranes over a pre-moistened surface and fixed with sufficient overlap to prevent air circulation at the concrete interface.
- All curing methods shall be applied immediately after finishing operations and maintained for the duration specified in the relevant standards or project requirements.

6.6.9 Cold and Hot Weather Curing

Precaution shall be made to prevent concrete from freezing at any time. When the ambient air temperature during curing is less than 10ºC, the concrete temperature shall be maintained between 10ºC and 20ºC for the full curing duration. The use of salts, chemicals, or admixtures to prevent freezing is prohibited.

When the ambient air temperature during curing exceeds 32ºC, curing shall be carried out using one of the following methods only:

- Ponding or continuous sprinkling with clean water.
- Absorptive covers (e.g. hessian) kept continuously wet.

Impermeable membranes or sheet curing methods shall not be used under high-temperature conditions unless specifically approved by the Council's Representative.

6.6.10 Curing Compound

Where curing compounds are proposed, the Contractor shall submit documentary evidence from the manufacturer demonstrating:

- A satisfactory efficiency index, in accordance with AS 3799-1998 (reconfirmed 2018).
- That the compound will not adversely affect adhesion of any subsequent applied finishes.
- That the compound will not react detrimentally with the concrete substrate.

No curing compound shall be applied until written approval has been obtained from the Council's Representative. In areas subject to frequent pedestrian movement, the use of a liquid membrane-forming curing compound is recommended to ensure effective curing of concrete without reliance on continuous water application. The curing compound shall comply with AS 3799 – Liquid Membrane-Forming Curing Compounds for Concrete, providing a uniform, unbroken film that minimises moisture loss and promotes proper hydration. To maintain curing efficiency, the surface should be protected from pedestrian traffic, windblown debris, and mechanical disturbance until the membrane has fully dried and formed a continuous seal.

Where pedestrian access is unavoidable, the contractor shall install temporary barriers, signage, or protective coverings such as geotextile mats or light-duty boards to prevent disruption of the curing film. This method shall be implemented to ensure the concrete achieves its intended strength and durability while accommodating the operational constraints in high-traffic environments.

6.7 Quality Requirements

6.7.1 Quality Control

A quality control testing system shall be implemented throughout the supply of the concrete to ensure compliance with the requirements of this specification. Copies of all the test results shall be submitted to The Council's Representative within five (5) days from the test being carried out.

Daily reports shall be prepared for all concrete placed. Each report shall contain following information:

- Identifying the batch of concrete supplied.
- Quantity of water, if any, added prior to discharge.
- Results of any testing carried out on the day of placement.
- Location of each batch placed on the project.
- Method of placement; and
- Climatic conditions during the pour.

The reports shall be provided to The Council's Representative within three (3) working days of the concrete pour.

6.7.2 Inspections

The Contractor shall notify The Council's Representative at least twenty-four (24) hours prior to any concrete being placed to enable an inspection of excavation, formwork, and reinforcement and to arrange supervision of the concreting works. No concrete shall be placed until these inspections have been completed and approval has been granted.

The following Hold Points shall apply during the construction of Concrete Structures:

H-CS1	Completion of excavation and preparation of foundation surfaces.
H-CS2	Completion of formwork and installation of reinforcement.
H-CS3	Approval of Concrete mix design.
H-CS5	Completion of concrete curing period for verification of curing records and surface condition.

6.7.3 Quality Testing

The sampling and testing of concrete shall be undertaken in accordance with AS 1012.

All aspects of sampling, site treatment and testing of concrete specimens shall be carried out by a NATA registered laboratory and personnel. Where this is not practicable, The Council's Representative may approve of suitably experienced personnel proposed by the Contractor, provided such personnel are acceptable to concrete supplier. The Contractor shall allow for the whole of the costs involved in this section.

Where concrete is liable to rejection, the Contractor shall bear the costs of any additional checking or testing permitted by The Council's Representative to demonstrate the compliance with the specification and drawings.

6.7.3.1 Location of Sampling

All concrete samples shall be taken at the point of discharge from the agitator. Where directed by The Council's Representative, additional sampling shall be carried out at the point of discharge into the forms.

6.7.3.2 Method of Sampling

Sampling and identification of concrete specimens shall be carried out in accordance with AS 1012, Part 1.

6.7.3.3 Frequency of Sampling

For project assessment the minimum frequency of sampling of the concrete shall be in accordance with the following table:

Table 19: Quality Testing for Concrete

Number of Batches per Day	Number of Samples
1	1
2 to 5	2
6 to 10	3
11 to 20	4
For each additional 10 batches	1 additional sample

For elements identified as critical on the drawings or other documents, the sampling frequency for strength testing shall be one sample per batch. Where directed by The Council's Representative, testing facilities are to be available on site at agreed times during a concrete pour.

6.7.3.4 Test Specimens

At least two specimens shall be taken from each sample to represent a test property and be prepared and cured in accordance with AS 1012.

6.7.3.5 Characteristic Compressive Strength f'c & Characteristic Flexural Strength f'cf

At least two specimens, each 200 mm high and 100 m diameter, shall be taken from each sample. Specimens shall be tested at 28 days in accordance with the relevant clauses of AS 1012.

6.7.3.6 Slump

The slump of the concrete shall be determined in accordance with AS 1012. Tolerance on slump shall be in accordance with AS 1379.

6.7.3.8 Drying Shrinkage

Three specimens shall be taken in accordance with AS 1012, and the assessment of drying shrinkage shall be based on the average results of these three specimens.

The manufacturer shall sample and test each type of concrete supplied for drying shrinkage at least every three (3) months during the project or for every 3000 m3 placed, whichever occur first. A report shall be provided to the Contractor, who shall be forwarded it to The Council's Representative.

Where drying shrinkage results in accordance with Clause 5.6 of AS 1379 are not available, at least two (2) samples of trial mixes shall be taken in accordance with AS 1012. Each sample shall provide a result based on the average of three (3) specimens at fifty-six (56) days.

These results shall demonstrate a maximum drying shrinkage as specified. Project assessment of shrinkage using specimens prepared in the field may show a maximum tolerance of 150 μm on the production assessment results or the results from trial mixes.

6.7.4 Tolerances

The surface of the concrete shall be finished to tolerance Class C as specified below. Compliance shall be determined using a straight edge placed anywhere on the surface in any direction, unless otherwise specified on the contract drawings.

Table 20: Tolerances on Finished Concrete

Class	Tolerance (mm)
A	3 Maximum deviation from a 3 m straight edge
B	6 Maximum deviation from a 3 m straight edge
C	6 Maximum deviation from a 0.6 m straight edge

Note: As per AS 3610 - Formwork for Concrete, concrete surface finishes are classified into Class A, B & C:

Class A: High-quality architectural finish, requiring smooth, uniform surfaces with minimal blemishes and very tight tolerances, suitable for exposed concrete walls and architectural features.

Class B: Standard structural finish, with good uniformity but minor surface imperfections allowed, commonly used in structural elements like retaining walls or substructures.

Class C: General or commercial finish, where surface regularity and appearance are less critical, tolerating minor irregularities and blemishes, typically applied for footpaths, base slabs, and other non-architectural concrete works

6.8 Acceptance Criteria

Concrete specified to satisfy certain performance requirements and tested accordingly shall be deemed to comply if the criteria specified in this section are met. Otherwise, it will be liable to rejection.

The Council's Representative may permit rejected concrete to be retained, subject to a structural investigation, additional testing, or approved remedial work. The costs associated with any further checking, testing or remedial work shall be borne by the Contractor.

Rejected concrete shall be removed to the extent determined by The Council's Representative.

Acceptance criteria shall be as follows:

6.8.1 Defective Formwork

Should any formwork be displaced during concreting, or within the period specified retention period, such that the tolerance on finished concrete is exceeded, any concrete already poured may be rejected.

In such cases, concrete shall be removed to the extent determined by The Council's Representative, and following remedial actions shall be undertaken:

- Construction joints shall be formed.
- Formwork shall be strengthened and adjusted.
- The affected section of work shall be reconstructed.

6.8.2 Characteristic Compressive Strength f'c and Characteristic Flexural Strength f'cf

The concrete shall be deemed to comply with the strength requirements of this specification if its characteristic strength at 28 days complies with AS 1379.

6.8.3 Slump

The slump shall be deemed to comply if it lies within the specified tolerances. Concrete found to have slump outside these tolerances shall be rejected and removed from the site.

6.8.4 Drying Shrinkage

The concrete shall be deemed to comply if the average test results for drying shrinkage do not exceed the specified value.

6.8.5 Other Criteria

Hardened concrete shall also be liable to rejection if any of the following defects occur:

- It does not comply with AS 3600.
- Construction joints made at a location or in a manner not in accordance with the specification.
- Construction tolerances not achieved.
- Reinforcing steel displaced from its correct position.
- Waterstops, inserts, or other embedded items displaced from their correct position.
- Required surface finish not achieved.
- Concrete work otherwise shown to be defective.

7. HOT MIX ASPHALT

This section of the specification details the requirements for the supply, spreading, compaction and testing of Hot Mix Asphalt. This section shall be read in conjunction with the contract drawing set, the granular pavement section of this specification and the CoA Standards Suite.

7.1 General

This specification shall be read in conjunction with the following Standards and references, which are deemed to form a part of this specification.

AS 1160	Bituminous emulsions for the construction and maintenance of pavements
AS 1289.5.3.5	Methods of testing soils for engineering purposes
AS 2008	Bitumen for pavements
AS 2150	Hot mix asphalt – A guide to good practice
AS 2157	Cutback bitumen
AS 2706	Numerical values – Rounding and interpretation of limiting values
AS 2758	Aggregates and rock for engineering purposes
AS/NZS 2891.3.3	Methods of sampling and testing asphalt
DIT Master Specification RD-PV-S1	Supply of Pavement Materials
DIT Master Specification RD-BP-S1	Supply of Bituminous Materials
DIT Master Specification RD-BP-C5	Application of Sprayed Bituminous Surfacing
DIT Master Specification RD-BP-S2	Supply of Asphalt
DIT Master Specification RD-BP-C3	Construction of Asphalt Pavements
ASTM D3549	Standard Test Method for Thickness or Height of Compacted Asphalt Mixture Specimens
DIT Test Procedure TP 226	Sampling of Soils, Aggregates and Rocks
DIT Test Procedure TP 425	Sampling of Asphalt
EPA (SA)	Stormwater pollution prevention, code of practice for the building and construction industry

7.2 Materials

The properties of the materials, mixing, manufacture, and transport of Hot Mix Asphalt shall comply with the following requirements.

7.2.1 Asphalt Aggregate and Sand

Asphalt aggregate shall be sourced from clean, hard, and durable crushed rock and free from lumps of clay, aggregations of fine materials, organic material and any other deleterious substances.

Asphalt aggregates and sand shall comply with the DIT Master Specification RD-PV-S1.

The production of aggregate and sand shall provide a material that meets the grading requirements specified for asphalt in the approved asphalt mix design.

7.2.2 Mineral Filler

Mineral filler (mineral matter passing a 75-micron sieve) shall include rock dust derived from coarse and fine aggregates, and any other materials added to supplement the quantity and properties of filler in the mix.

Mineral Filler shall comply with the requirements of the DIT Master Specification RD-PV-S1.

7.2.3 Bitumen

Standard classes of bitumen shall comply with the requirements of AS 2008. In addition, bitumen shall meet the additional requirements detailed in the DIT Master Specification RD-BP-S1.

7.2.4 Bitumen Emulsion

Bitumen emulsion shall comply with the requirements of AS 1160.

7.2.5 Asphalt Hot Mix Design

The Contractor shall provide and be responsible for the asphalt hot mix design. The Contractor's mix design shall be assessed by The Council's Representative for compliance with this specification and shall be approved by The Council's Representative prior to use.

The mix design shall comply with the requirements of the DIT Master Specification RD-BP-S2 - Supply of Asphalt.

7.2.6 Fine or Coarse Dense Graded Asphalt

The dense graded asphalt mix properties, design, aggregate grading, bitumen content, Marshall stability, Marshall flow, air voids and production control shall comply with the requirements of the DIT Master Specification RD-BP-S2 - Supply of Asphalt.

The control of the mix design shall be in accordance with the requirements of the DIT Master Specification RD-BP-S2 - Supply of Asphalt.

7.2.7 Approval of Asphalt Hot Mix Design

At least seven (7) days before commencing production of asphalt, the Contractor shall submit details of each asphalt hot mix proposed to The Council's Representative for review. The submission shall include:

- Details of constituent materials, including aggregate, binder, filler, and additives (if used).
- The nominated aggregate grading, binder content, design air voids and the proportion of each component in the mix.

- Test results verifying the constituent material properties.
- Test results on proposed mix design, including binder content, maximum density and air voids percentage at the laboratory design compaction level.

The submission shall constitute a HOLD POINT.

The asphalt hot mix designation and binder type shall be in accordance with the City of Adelaide standard pavement details.

Records of materials shall be maintained in the form of delivery dockets or similar documentation to enable full traceability of materials incorporated into the pavement.

7.3 Construction and Workmanship

Asphalt hot mix shall be placed in accordance with the DIT Master Specification RD-BP-C3 - Construction of Asphalt Pavement.

7.3.1 Environmental protection

The Contractor shall prevent pollutants such as tack coat, binder, asphalt, or other materials from entering waterways, including creeks, rivers, drainage pits, stormwater retention/detention basins or pipelines, in accordance with the EPA (SA) Stormwater Pollution Prevention Code of Practice for the Building and Construction Industry.

The Contractor shall prevent tack coat, prime, binder, aggregate, asphalt, or other material used in the works from adhering or obstructing gratings, hydrants, valve boxes, inspection pit covers, kerbs and other road fixtures.

7.3.2 Adjacent Structures

The Contractor shall adjust all sewer castings, water supply top stones and other service covers to the finished pavement design levels prior to installation of the asphalt wearing course.

7.3.3 Acceptance of Pavement

Placement of Hot Mix Asphalt shall not commence until the previous pavement layers have been inspected by The Council's Representative, and any preceding Hold Points have been released.

7.3.4 Notice

The Contractor shall provide a minimum of 24 hours' notice to The Council's Representative before commencing tack coat and asphalting operations.

The Contractor shall obtain approval from the Council's Representative prior to commencing these operations.

7.3.5 Preparation of Surface

Prior to placing a prime or tack coat, the surface shall be cleaned free of loose stones, dirt, and any deleterious material.

Where required, the Contractor shall sweep clean the area on which asphalt is to be placed. The Contractor shall take care to limit damage or disturbance to the surface to the minimum practicable. Wire brooms shall not be used for cleaning operations.

7.3.6 Priming

The class grade and rate of application of the prime shall be as detailed in the contract drawing set and the CoA Standards Suite.

Primer shall be applied by means of a mechanical sprayer where practical. The sprayer shall hold a current sprayer certificate issued by a NATA accredited testing authority or state road authority.

Spraying of prime shall commence on a heavy paper laid across and held securely to the pavement surface to avoid overspray. The sprayer shall maintain a constant speed throughout the length of each spray run to ensure the correct application rate is attained.

Priming shall not take place unless the following conditions are met:

- Pavement temperature is 10°C or above,
- Wind speed is no greater than 20 km/hr; and
- Field moisture content of the underlying granular pavement layer is less than 70% of the Optimum Moisture Content (OMC).

After the application of the primer, the surface shall be a thoroughly dry prior to the application of the asphalt surface. A minimum curing period of 48 hours shall be allowed for cutback bitumen with volatile solvents. An emulsion prime (minimum wait time 2 hours) can be used as an alternative if approved by The Council's Representative.

Traffic shall be kept off the primer surface until it has dried sufficiently to minimise the risk of damage to the surface. The Contractor shall supply, place, and maintain the traffic management necessary to comply with this requirement.

7.3.7 Tack Coating

Tack coat shall be applied to the cleaned surface prior to placing asphalt. Where the hot mix asphalt is to be spread over clean, freshly placed asphalt, or over a clean primed surface, The Council's Representative may direct the Contractor to omit the tack coat.

Tack coat shall consist of bituminous emulsion complying with AS 1160. The type and breaking rate shall be suitable to the climatic and surface conditions of use, ensuring the tack coat is fully broken, free of surface water, and intact before the commencement of asphalt spreading.

Tack coat shall be applied by spray bar fitted to a mechanical sprayer to provide a uniform application rate of residual binder as detailed in the contract drawing set and the CoA Standards Suite. Hand spraying shall only be carried out in areas where it is impracticable to use a spray bar.

7.3.8 Transportation and Delivery of Asphalt

Hot mix asphalt shall be transported to works inside clean vehicle bodies coated with a thin film of an appropriate release agent. During transportation the body of the vehicle shall be covered to prevent contamination and reduce the rate of cooling of the mix.

Where the length of the haul, weather or local conditions are such that the temperature of the hot mix asphalt may drop below a suitable placing temperature the transportation vehicles shall be suitably insulated.

7.3.9 Ambient Conditions for Placing

The surface on which the hot mix asphalt is to be placed shall be dry and free from free-standing water.

Hot mix asphalt shall not be placed when the underlying pavement surface temperature is less than 10°C.

7.3.10 Granular Pavement Dry-Back

Unless specified otherwise on the Drawings, hot mix asphalt placement shall not commence until the field moisture content of the underlying granular pavement layer is less than 70% of the Optimum Moisture Content (OMC) in Modified Compaction.

I.e. (Field Moisture Content) / (Optimum Moisture Content) x 100 < 70%.

Field moisture content tests shall be undertaken at the minimum frequency of 1 per field dry density test (refer Granular Pavement section of this Specification).

Provision of field moisture content test results shall constitute a HOLD POINT.

7.3.11 Placing

The hot mix asphalt shall be placed by means of a self-propelled mechanical paving machine capable of evenly distributing the hot mix asphalt over the full width of the strip being spread and adjustable for slope and depth as required.

The asphalt shall be spread in layers of sufficient thickness to provide the design thickness after compaction as detailed in the contract drawing set and CoA Standards Suite.

The Contractor shall conduct spreading operations to ensure that the paver speed matches the rate of supply so that the number of paving stops is minimised.

Areas inaccessible to the paving machine shall be spread using approved hand methods. Hand work shall not be excessively raked.

7.3.12 Compaction

The compaction of the hot mix asphalt shall be commenced as soon as the placed asphalt mix will support the compaction equipment without undue displacement. Rolling shall start longitudinally at the low side of the road cross fall and proceed towards the high side of the run.

Initial rolling shall be carried out with a steel drum roller and the final rolling with a pneumatic tyred multi-wheeled roller. Rolling shall be carried out continuously until such time to achieve the required standard of compaction.

In areas inaccessible to rollers, the mix shall be compacted to the specified standard by tamping with heated iron tampers or mechanical tampers.

Following compaction, the completed surface shall be a tight dense surface, free of “bony” or “fatty” areas ravelling and loose material, surface cracking, shoving and ruts.

Asphalt shall be compacted in accordance with the DIT Master Specification RD-BP-C3 - Construction of Asphalt Pavement.

7.3.13 Joints

Construction joints shall be provided longitudinally (where the width of the pavement is such that more than one paving run is necessary) and transversely (after the completion of a day's paving operations, or where a delay in paving operation allows asphalt to cool and adversely affect placing).

The location of joints shall be planned before work commences. The number of joints shall be minimised. All joints shall comply with the specified shape requirements.

Hot Joints: Where hot mix asphalt is placed against a joint edge that has not cooled below 100°C it shall be considered a hot joint. Hot joints shall be constructed by leaving a 150 mm strip of asphalt unrolled along the free edge until the adjoining lane is placed and compacting the unrolled strip simultaneously with the material in the adjoining lane.

Warm Joints: Where asphalt is placed against a joint edge that has not cooled below 60°C it shall be considered a warm joint. Warm joints shall be constructed by rolling the full width of the first lane being placed, prior to placing the adjoining lane.

Cold Joints: Where asphalt is placed against a joint edge that has cooled below 60°C it shall be considered a cold joint. Asphalt placed against a cold edge should overlap the previous edge by 25 mm to 50 mm. The overlap should be pushed back immediately after spreading using lutes to form a slight ridge that is compacted with the steel wheel roller.

7.4 Quality Requirements

Hot mix asphalt shall be meet the requirements in the DIT Master Specification RD-BP-C3 - Construction of Asphalt Pavement.

7.4.1 Materials

Hot mix asphalt materials and binder shall be sampled and tested for product control and verification purposes during manufacture. Samples shall be selected randomly throughout the day's production for each mix type shall at the frequency detailed in quality testing section.

7.4.2 Inspections

The following HOLD POINTS are required during the construction of hot mix asphalt:

H-AC1	Approval of asphalt hot mix design
H-AC2	Approval of underlying pavement (including prime as applicable) prior to the commencement of the asphalt and granular pavement dry back
H-AC3	Ambient conditions prior to the placement of asphalt

7.4.3 Quality Testing

The Contractor shall undertake quality testing of hot mix asphalt to meet the requirements in the DIT Master Specification RD-BP-C3 - Construction of Asphalt Pavement:

In addition to the DIT Master Specification requirements a minimum of 1 core samples tests for a lot of production.

The testing shall also cater for of all the following requirements:

- At least one core shall be taken on each footpath, on each day of asphalt surfacing.
- At least 1 core adjacent to a cold joint, on the more recently laid side.

The relative compaction of a core shall be expressed as the in-situ density of the compacted asphalt as a percentage of the reference density.

The reference density shall be the arithmetic mean of the 5 most recent test results of the same mix design, provided that:

- They are from tests done within the past 4 weeks.
- The binder content of the samples tested are within ±0.3% of the job mix binder content.
- There has been no change in mix components or proportions.

Where five test results are not available the Contractor shall carry out a minimum of five tests to ascertain the reference density value.

Relative compaction data shall be calculated and reported to one decimal place and rounded to one unit in the last figure as described in AS 2706.

The above-mentioned test procedures shall be used for Quality Testing.

7.4.4 Tolerances

Construction tolerances on Hot Mix Asphalt are as set out the DIT Master Specification RD-BP-C3 - Construction of Asphalt Pavement.

Asphalt shall be placed to the specified design levels in the drawings, or where not specified, the following applies:

- Wearing course: +5, 0mm adjacent to kerb and gutter, and +/-5mm elsewhere.
- Base and intermediate courses: +/-10mm.
- Critical layer: 0, -10mm.

The finished surface shall meet the requirements of the Master Specification RD-BP-C3 and be self-draining.

The contractor shall ensure that surface irregularities of asphalt courses, as measured by maximum deviation from a 3m straight edge shall comply with the following:

- Wearing course: 3mm at joints, 5mm elsewhere.
- Levelling and intermediate courses: 5mm at joints, 10mm elsewhere.
- Base courses: 10mm (where there are no levelling and intermediate courses), and 15mm otherwise.

7.4.5 Crack Treatment Requirements

All cracks, surface defects, and reflective cracking within the profiled pavement surface shall be assessed and treated in accordance with the following requirements to ensure adequate structural performance and to prevent premature failure of the overlying asphalt layer:

7.4.5.1 Crack Sealing

Any cracks remaining on the profiled surface with a width greater than 3 mm shall be sealed using a crack sealant conforming to DIT Master Specification Part RD-BP-C8. The crack sealing material shall be applied in accordance with the manufacturer's recommendations, ensuring full penetration and a watertight seal prior to overlay placement.

7.4.5.2 Reflective Cracking

Where the existing pavement exhibits reflective cracking, such as extensive block-type crack patterns or interconnected longitudinal and transverse cracking, additional reinforcement and crack mitigation measures shall be considered. The selection of the final treatment methodology shall be based on an inspection and engineering assessment by a suitably qualified civil or pavement engineer, ensuring the proposed solution effectively mitigates crack propagation into the new asphalt layer.

7.4.5.3 Approved Crack Mitigation Treatments

The following treatment options may be adopted depending on site conditions and pavement distress characteristics:

- Placement of Bitac Tape:
    - Bitac tape shall be installed strictly in accordance with the manufacturer's technical data sheet and installation guidance**.**
    - The surface shall be thoroughly cleaned, ensuring removal of all loose, foreign, or deleterious materials prior to installation.
    - Cracks wider than 10 mm shall be cleaned and filled with an approved filler prior to placement of Bitac.
    - Larger cracks or potholes shall be patched using the design-specified asphalt mix before the Bitac application.
- Placement of HaTelit® BL 50 (HaTelit-BL) Asphalt Reinforcement Grid:
    - HaTelit-BL shall be installed in strict compliance with the manufacturer's installation guidelines and technical specifications.
    - The grid shall be placed between new asphalt layers, ensuring compliance with minimum cover thickness and surface bonding requirements to achieve full mechanical interlock.
    - Installation on a profiled surface is permissible where the profiling grooves do not exceed 10 mm in depth, and the contractor can demonstrate adequate bond between the reinforcement grid and asphalt layers.

7.4.6 Acceptance Criteria

The finished surface of the hot mix asphalt shall be smooth and uniform in texture, with no steps at joints. If the material supplied does not meet the tolerances and quality requirements specified in this document and relevant pavement design standards, The Council's Representative may require one of more of the following:

Removal of the non-complying material.

Adjustment of payment to reflect the reduced service life caused by the non-complying material, using a method determined by The Council's Representative,

Implementation of any other remedial treatment deemed necessary to achieve the required service level.

8. SEGMENTAL PAVING

This section of the specification details the requirements for supply, placing and finishing of segmental paving units. This includes concrete (including flagstone), clay and masonry segmental pavers. This section shall be read in conjunction with the contract drawing set, CoA Standards Suite, and granular pavement section of this specification.

8.1 General

This specification shall be read in conjunction with the following Standards and references, which are deemed to form a part of this specification.

CMAA PA01	Concrete Segmental Pavements Detailing Guide
CMAA PA02	Concrete Segmental Pavements Design Guide for Residential Accessways, Roads and Commercial Spaces
CMAA P03	Specifying Concrete Segmental Pavers
AS 4663	Slip resistance measurement of existing pedestrian surfaces
AS 4455.2	Masonry units, pavers, flags and segmental retaining wall units – Pavers and flags
AS 4586	Slip resistance classification of new pedestrian surface material

8.2 Materials

8.2.1 Granular Base Materials

The material to be used for the paving base course shall be in accordance with the granular pavement sections of this specification.

8.2.2 Bedding Sand

Bedding sand shall be a natural pit material, dune sand or crushed quarry product as approved by The Council's Representative. The sand shall be free of pebbles, clay lumps, organic matter or deleterious soluble salts or other contaminants likely to cause efflorescence or lead to reduced skid resistance.

The bedding sand shall comply with the following design criteria requirements:

Table 21: Bedding Sand Material Classification Properties

Characteristic		Requirement
Particle Size Distribution	6.7 mm sieve	95-100%
	0.075 mm sieve	0–10 %
Liquid Limit		<25 %
Plasticity Index		<6%
Linear Shrinkage		<3%

8.2.2.1 Joint Filling Sand

Paving jointing sand shall be a proprietary product specifically formulated to stabilise and lock pavers in position while providing resistance to weed growth and wash-out. The material shall consist of a controlled blend of graded sands and bonding additives which, when activated by water, form a semi-pliable joint. The product, such as "*Pavelock"* or approved equivalent, shall be suitable for use in flexible pavements and is particularly recommended for domestic driveways and footpaths, including areas susceptible to wind action, weed intrusion, or insect activity.

The sand for joint filling shall be well graded and free of deleterious material such as soluble salts.

The joint filling sand shall comply with the following design criteria requirements:

Table 22: Joint Sand Material Classification Properties - Particle Size Distribution

Characteristic		Requirement
Particle Size Distribution	2.36 mm sieve	100 %
	1.18 mm sieve	90-100 %
	0.60 mm sieve	60-90 %
	0.30 mm sieve	30-60 %
	0.15 mm sieve	15-30 %
	0.075 mm sieve	5-10 %

8.2.2.2 Joint Mortar

Joint mortar shall be an approved flowable non-shrink grout.

8.2.2.3 Segmental Paving Units

Concrete paving units shall comply with Concrete Masonry Association of Australia publications (PA01/PA03/PA05) Concrete Segmental Pavements - Detailing Guide, Concrete Segmental Pavements - Specifying Guide and Concrete Flag Pavements - Design and Construction Guide.

Pavers shall achieve an in-situ strength exceeding 60 kN or comply with the relevant City of Adelaide standards. In such cases, compliance with the characteristic breaking load requirements specified in the CMAA guidelines is not mandatory.

8.3 Construction and Workmanship – Block Paved Pavements

8.3.1 Subgrade

The subgrade for the block paving shall be constructed as specified in the Site Preparation and Earthworks sections of this specification.

8.3.2 Sub-Base and Base Course

The sub-base and base course layers for the block paving shall be placed and compacted in accordance with the requirements of the granular pavement section of this Specification.

The finished surface of the base course shall be constructed to within the specified tolerances and shall be suitable to receive the bedding layer without further adjustment.

The sub-base and base course layers for block paving shall be placed and compacted in accordance with the requirements of the granular pavement section of this Specification.

The finished surface of the base course shall be constructed to within the specified tolerances and shall be suitable to receive the bedding layer without further adjustment.

8.3.3 Bedding Sand

Bedding sand shall be spread in a uniform layer to achieve the specified compaction thickness. The sand shall be screeded in an uncompacted condition to the design levels, grades and crossfalls to ensure a consistent bedding layer.

Bedding sand shall not be used to correct or make up level deficiencies in the base course surface.

8.3.4 Bedding Mortar

Bedding material shall be MAPESTONE TFB 60 or similar product approved by The Council's Representative.

The material shall be placed in accordance with the manufacture's specifications.

Mixing shall comply with the requirements of AS 3958.1 (2007), Clause 2.15, or an equivalent method approved by The Council's Representative.

Table 23: Characteristic Requirements for Mortar

Characteristic	Requirement
Minimum Compressive Strength	40 MPa
Flexural Strength	4.5 MPa
Minimum Adhesive Strength	2.0 MPa
Modulus of Elasticity	18,000 ±3,500 MPa
Maximum Shrinkage	Not greater than 0.10%
Slump	150 mm

8.3.5 Grout

Grout shall consist of "Mapai" product or an approved equivalent product by the Council Representative.

Table 24: Characteristic Requirements for Grout

Characteristic	Requirement
Minimum Compressive Strength	40 MPa
Minimum Flexural Strength	6.0 MPa
Minimum Adhesive Strength	1.5 MPa
Modulus of Elasticity	20,000 ±4,000 MPa
Minimum Density	2,000 kg/m3
Maximum Shrinkage	Not greater than 0.10%
Maximum Aggregate Particle Size	3mm
Slump	150 mm

8.3.6 Laying of Units

Paving units on concrete pavement shall be laid on the specified bed in the approved pattern. Gaps of 2 mm to 5 mm wide shall be maintained between adjoining joint filled sand units and between units and bordering construction. For pavers without spacer nibs and with chamfered top edge, joint spacing may be reduced after consultation with The Council's Representative.

Pavers shall be cut using a masonry saw. Infill spaces too small for cut units (minimum 75 mm width x 75 mm depth) shall be filled with dry packed mortar. An oxide additive shall be used into the mortar to closely match the colour of the pavers.

The disturbance of paving units prior to the compaction shall be prevented.

Immediately after placement of paving units, joints shall be filled flush with dry joint filling sand and broomed into the joints. Paving units shall be compacted using at least two passes of a vibratory plate compactor. Any units damaged during compaction shall be immediately removed and replaced by the Contractor.

After initial compaction, joints shall be topped and filled flush with jointing sand and compacted with an additional pass of the vibratory plate compactor.

Except within 1.0 m of the lying face, all work shall be fully compacted at the end of each day's laying. Prior to completion the Contractor shall ensure that all joints are filled flush and that excess sand is removed from the surface of the pavers.

8.4 Quality Requirements

Individual pavers shall meet the 'Paver Properties & Criteria' outlined on the City of Adelaide Footpath 'Construction Standards'. The contractor shall provide evidence, in the form of test results, demonstrating that the specified criteria have been met.

The Supplier shall provide written certification confirming that the supplied paver meets the minimum performance criteria stipulated within the CoA Design Standards.

8.4.1 Materials

The Contractor shall submit colour and paver samples to The Council's Representative for approval prior to commencement of paving works.

Supplied paving units shall comply with the dimensional tolerances and requirements as detailed in CMAA PA05 and any recently developed design standards approved by the Council's Representative.

8.4.2 Inspections

The following HOLD POINTS shall apply during the construction of segmental unit pavements. Work shall not proceed beyond each HOLD POINT until the Council's Representative has inspected and approved the relevant stage:

H-SP1	Approval of paving units' colour and shape
H-SP2	Completion of subgrade trimming, compaction, and proof-rolling prior to placement of bedding material.
H-SP3	Placement and levelling of bedding sand or mortar bed prior to laying pavers.
H-SP4	Construction of a sample panel of paving units demonstrating approved pattern, joint spacing, and compaction method.
H-SP5	Completion of initial laying of pavers in the approved pattern prior to joint filling.
H-SP6	Approval of completed paved units

8.4.3 Tolerances

The following tolerances shall apply to the construction of segmental unit pavements:

Table 25: Tolerances on Block Pavement

Item	Tolerance	
Top of Pavers	Absolute	±5 mm
	Relative	±10 mm from a 3.0 m straight edge
	Alignment of pavers	±10 mm over a 5 m length or 20 mm over a 50 m length for large areas
Depth of bedding sand	+ 10 mm – 5 mm	
Joints between paving units	Max of 6 mm	

8.4.4 Acceptance Criteria

Areas of pavement that fail to meet the specified requirements, including but not limited to:

- Specified colour, pavers type or laying pattern.
- Level tolerances and pavement shape.
- Paving joints and alignment.
- Paving cuts and in-fills.

May be rejected, as directed by The Council's Representative.

Where an area of pavement is rejected, The Council's Representative may direct the Contractor to undertake remedial works at the Contractor's cost. Remedial works may include:

- Removal and re-laying of non-complying areas.
- Re-working of non-complying areas.
- Any other remedial treatment that is expected to provide the required level of service.

9. IN-SITU CONCRETE PAVING

This section of the specification details the requirements for in-situ concrete pavements. This section shall be read in conjunction with the contract drawing set, CoA Standards Suite, and granular pavement section of this specification.

9.1 General

This specification shall be read in conjunction with the following Standards and references, which are deemed to form a part of this specification.

AS 3600	Concrete Structures
AS 3610	Formwork for Concrete
AS 3972	General purpose and Blended Cements
AS 1379	Specifications and supply of concrete
AS 1478.1 & AS 1478.2	Chemical admixtures for concrete, mortar and grout – Admixtures for concrete
AS 1012	Methods of Testing Concrete
AS 2758	Concrete Aggregates
AS 3799	Liquid membrane-forming curing compounds for concrete
AS 4671	Steel for the reinforcement of concrete

9.2 Materials Concrete Pavement

The Contractor shall be responsible for the supply of the concrete in accordance with this specification and the associated contract documents. Upon the request of The Council's Representative and prior to the supply of concrete the Contractor shall supply copies of NATA endorsed test certificates covering the relevant tests from the current Australian Standards.

In-situ concrete paving is to consist of coloured exposed aggregate concrete and coloured in-situ concrete.

9.2.1 Exposed Aggregate Concrete

In accordance with Council requirements, the concrete mix shall be as nominated on the contract drawings, CoA Construction Standards Suite or similar equivalent approved by The Council's Representative.

9.2.2 Aggregates

Aggregates shall comply with AS 2758 concrete aggregates. The maximum nominal size of aggregate shall be 10 mm or as shown on the drawings. Nonferrous - metallurgical slag aggregate shall not be used.

9.2.3 Water

Water shall be potable, free from matters harmful to concrete, reinforcement and other embedded items.

9.2.4 Chemical Admixtures

Refer to Section 6.2.4 for Chemical Admixtures.

9.2.5 Joint Sealants

Joint sealants shall be Silyl Modified Polymer sealant for use in concrete pavements. The sealant shall have a durometer hardness between 34 - 42, minimum 35N average peel strength and enable joint movement capability of +/-20% (40% total).

9.2.6 Reinforcement

All reinforcing fabric, reinforcing bars and hand drawn steel wire shall comply with the requirements of AS 4671 Steel Reinforcing Materials. The Contractor shall provide copies of the Manufacturer's test certificates required by the relevant Australian Standards for the steel reinforcing materials.

9.2.7 Concrete Mix Design

In accordance with Council requirements, the concrete mix shall be as nominated on the drawings, CoA Construction Standards Suite or similar equivalent approved by The Council's Representative.

The Contractor shall be responsible and provide the concrete mix design to meet the project performance requirements. The Contractor's mix design shall be reviewed by The Council's Representative for compliance with this specification and approved by The Council's Representative prior to use.

The following information on the concrete mix design shall be provided as a minimum:

- Material constituents (aggregate, cement).
- Relevant test data, including flexural strength (7 & 28 days), compressive strength (7 & 28 days), dry shrinkage (21 days).
- Any proposed admixtures.
- Curing method and compounds.

9.2.8 Performance Requirements

The concrete for the various parts of the work shall be designed and produced to meet the performance requirements of this specification.

The selection, proportioning and mixing of the concrete materials shall produce a mix that readily works into corners and angles of the formwork and around reinforcement using the specified method of placement, without segregation or accumulation of excess free water on the surface. The resultant concrete shall be sound and shall meet all other specified requirements.

The minimum performance requirement of the concrete for the various concrete elements shall be as follows, or as shown otherwise on the drawings:

Table 26: Concrete Performance Requirements

Element	Compressive Strength f'c	Flexural Strength f'cf (@ 21 days)	Slump	Drying Shrinkage (@ 21 days)
Concrete Base - Slipformed	32 MPa	4.5 MPa	20 - 40 mm	450 µm
Concrete Base – Fixed from	32 MPa	4.5 MPa	55 - 65mm	450 µm

9.2.9 Transportation

Refer to Section 6.2.8 for Transportation.

Table 27: Concrete Transportation Requirements

Concrete Temperature at Time of Discharge (degrees)	Maximum Elapsed Time (hours)
less than 24	2.0
24 - 27	1.5
27 - 30	1.0
30 - 32	0.75
greater than 32	not permitted

9.3 Construction and Workmanship – Formwork

Formwork shall be of steel or timber faced with a smooth hard surface to the lines, shapes and dimensions of the concrete as called for by the plans. Forms shall be mortar tight to prevent leakage and shall have sufficient rigidity to prevent distortion due to the pressure of the concrete, vibration or any incidental construction loads.

Formwork shall be set, strutted and tied so that the finished concrete shall conform accurately to the lines and dimensions shown on the plan.

9.3.1 Release Agents

Internal faces of the forms shall be coated, before placing reinforcement, with an approved release agent compatible with the contact surfaces. No part of the reinforcement or construction joints shall be coated with the release agent.

9.3.2 Cleaning of Formwork

All forms shall be thoroughly cleaned prior to placing concrete. All dust, debris and rust or other stains shall be removed.

9.4 Construction and Workmanship – Reinforcement

Refer to Section 6.5 for Construction and Workmanship - Reinforcement.

9.5 Construction and Workmanship – Concrete Placement and Curing

The Contractor shall be responsible for the placement of concrete in a manner that complies with the requirements of this specification and all associated documents.

Care shall be taken to prevent segregation of the concrete during placing operations. All parts of the formwork shall be completely filled, and concrete shall be worked under and around the reinforcement without causing displacement.

Coarse aggregate shall be worked back from the face of formwork, and all air bubbles and voids shall be removed from the concrete. Concrete shall not be dumped in heaps and spread using vibrating equipment under any circumstances.

During concrete placement, the slump shall be maintained within the limits required by this specification. No water shall be added to the concrete after discharge from the agitator has commenced.

Concrete shall not be placed at times or under such conditions that would not prevent compliance with the requirements of this specification.

9.5.1 Addition of Water to the Concrete Mix

No water shall be added to the concrete mix on-site unless approved in writing by The Council's Representative.

9.5.2 Compaction

Concrete shall be compacted using immersion and screed vibrators to remove air bubbles and fill all voids. At least one reserve vibrator shall be provided in working order. Care shall be taken to avoid over vibration, which may cause segregation.

9.5.3 Disturbance after Placing

Under no circumstances shall formwork or projecting reinforcement be shaken, displaced, or disturbed within twenty minutes after placing the concrete. Concrete shall not be walked on or otherwise disturbed for at least 48 hours thereafter.

9.5.4 Weather Requirements

In addition to the requirements for Cold Weather and Hot Weather concreting as mentioned in AS 3600, concretes shall not be poured if the shade air temperature at the site is below 10°C or above 35°C

9.5.5 Saw Cut Joints

Transverse saw cut joints shall be made within 24 hours of placing the concrete to prevent unwanted shrinkage cracking.

9.5.6 Construction Joints

When placing of concrete is delayed until the concrete has reached its initial set, the stopping point shall be considered a construction joint. The location of construction joints shall be planned and approved by The Council's Representative before they are made.

The placing of the concrete shall be carried out continuously from joint to joint, irrespective of any meal breaks, to form a single, uninterrupted unit of work.

Construction joints on exposed faces shall be truly horizontal or vertical.

Prior to placing new concrete against a construction joint, the joint surface of the hardened concrete shall be thoroughly roughened and cleaned to remove all loose or soft material, foreign matter and laitance. The prepared surface shall be dampened with clean water and coated with neat cement slurry immediately before placing the new concrete.

Sealants shall extend down the vertical edge of the slab at all joints to prevent the ingress of incompressible materials.

Refer to CoA Construction Standard 434 to 436 In situ Concrete - Joint Details for further information.

9.5.7 Exposed Aggregate Finish

The exposed aggregate finish shall be Medium, with a preferred 4mm exposure, where the exposed stone is 40/60 with the concrete (top course exposed half stone width). I.e., where a 10mm aggregate stone is utilised, 4m of the stone shall be exposed.

The contractor shall allow for and prevent the flow of removed concrete into the local stormwater network to the satisfaction of The Council's Representative.

Refer to CoA Construction Standard 461 Insite Concrete - Wearing Surface Requirements for further information.

9.5.8 Charcoal Finish

The charcoal in-situ concrete shall be 'Circular Paddle / Wood Trowel finished' perpendicular to the kerb. The concrete should be oxide coloured concrete from Hanson in 'Raven' colour or similar approved by The Council's Representative.

9.5.9 Curing of Concrete

Refer to Section 6.6.8 for Curing of Concrete.

9.5.9.1 Curing Methods

Refer to Section 6.6.8.1 for Curing Methods.

9.5.9.2 Cold and Hot Weather Curing

Refer to Section 6.6.9 for Cold and Hot Weather Curing.

9.5.9.3 Curing Compound

Refer to Section 6.6.10 for Curing Methods.

9.6 Quality Requirements

9.6.1 Quality Control

Refer to Section 6.7.1 for Quality Control.

9.6.2 Inspections

The Contractor shall notify The Council's Representative at least 24 hours prior to any concrete being placed to enable an inspection of excavation, formwork, and reinforcement, and to arrange supervision of concreting works. No concrete shall be placed until these inspections have been completed and approved has been granted.

The following HOLD POINTS shall apply during the construction of Concrete Structures:

H-CS 1	Approval of excavation
H-CS 2	Approval of formwork and reinforcement
H-CS 3	Approval of embedded items and services
H-CS 4	Approval of concrete mix and delivery documentation
H-CS 5	Approval of curing arrangements

Release of each Hold Point shall be subject to written approval by the Council's Representative.

9.6.3 Quality Testing

Sampling and testing of concrete shall be in accordance with AS 1012, Methods of Testing Concrete.

All aspects of sampling, site treatment and testing of concrete specimens shall be carried out by NATA registered laboratory and personnel. Where this is not practicable, The Council's Representative may approve suitably experienced personnel proposed by the Contractor, provided the manufacturer also agree. The Contractor shall bear all costs associated with this work.

If concrete is found to be liable for rejection, the costs of any additional checking or testing that may be permitted by The Council's Representative shall be borne by the Contractor.

9.6.3.1 Location of Sampling

All concrete samples shall be taken at the point of discharge from the agitator. Where required by The Council's Representative additional sampling shall be carried out at the point of discharge into the forms.

9.6.3.2 Method of Sampling

Sampling and identification shall be carried out in accordance with AS 1012, Part 1.

9.6.3.3 Characteristic Compressive Strength f'c & Characteristic Flexural Strength f'cf

At least two specimens shall be taken from each sample to represent a particular property and shall be prepared and cured in accordance with the relevant section of AS 1012.

Test Specimen size shall be as follows:

- Compressive strength: 100mm diameter cylinder.
- Flexural strength: beam 100mm x 100mm x 350mm.

9.6.3.4 Slump

The slump of the concrete shall be determined in accordance with AS 1012.3. Tolerance on slumps shall be in accordance with AS 1379.

9.6.3.5 Drying Shrinkage

Three specimens shall be taken in accordance with AS 1012.13, and the assessment of drying shrinkage shall be based on the average results of the 3 results.

Where previous production testing is used to access drying shrinkage for a mix design, production tests shall have been conducted within the last 6 months.

Where drying shrinkage results in accordance with Clause 5.6 of AS 1379 are not available, at least two samples of trail mixes shall be taken in accordance with AS 1012.13. Each sample shall provide a result based on the average of 3 specimens at 56 days.

9.6.4 Tolerances

The surface of the concrete shall be finished to one of the tolerance classes as specified below, determined by a straight edge placed anywhere on the surface in any direction.

Table 28: Tolerances on Finished Concrete

Item	Tolerance
Thickness	0mm + 10mm of design thickness.
Integral Kerb Height	0mm, + 5mm of design thickness
Shape	Longitudinal ± 5 mm below a 3.0m straightedge
	Transverse ± 10 mm below a 3.0m straightedge

9.7 Acceptance Criteria

Concrete specified to meet certain performance requirements and tested in accordance with Section 6.8 shall be deemed to comply if it meets the criteria specified in this section; otherwise, it shall be liable for rejection.

The Council's Representative may allow the rejected concrete to be retained, subject to structural investigation, additional testing, or approved remedial work. The Contractor shall bear the cost of any further checks, testing or remedial work. Rejected concrete shall be removed as directed by The Council's Representative.

9.7.1 Concrete Cracking

Cracking in concrete may result from factors such as plastic or drying shrinkage, thermal movement, structural loading, or chemical reactions. The Contractor shall assess all cracks in terms of their cause, width, depth, orientation, and timing of occurrence. Fine surface cracks may be considered non-structural; however, wider or deeper cracks shall be evaluated for potential impacts on durability, water ingress, and reinforcement corrosion. Environmental conditions, including temperature, humidity, and wind, shall also be considered. Appropriate remedial or monitoring measures shall be implemented where cracking may affect the structural integrity or serviceability of the concrete element.

Concrete cracking shall be categorised as follows:

- Plastic Shrinkage cracks - discrete cracks which form during the plastic stage, not intersecting a formed joint, less than 500mm in length, and less than 50% of the concrete base thickness in depth.
- Drying Shrinkage Cracks in reinforced slabs - cracks occurring in the central part of the slab, extending full depth, and continuous between joints.
- Unplanned structural cracks - all other concrete cracks.

The Contractor shall manage the quality requirements and curing to minimise cracking of the concrete base. Concrete base slab will be accepted according to the following criteria:

Jointed Reinforced Concrete Pavement - plastic shrinkage cracks with a cumulative length of 1 metre or less per slab and drying shrinkage cracks.

All other cracked slabs shall be removed and replaced or otherwise managed as directed by The Council's representative.

9.7.2 Defective Formwork

If any formwork be displaced during concreting or within the specified retention period, causing the finished concrete to exceed tolerance limits, the affected concrete may be rejected.

9.7.3 Characteristic Compressive Strength f'c & characteristic Flexural Strength f'cf

Concrete shall be deemed to comply with the strength requirements of this specification if its characteristic strength at 28 days complies with AS 1379.

9.7.4 Slump

The slump shall be deemed to comply if it falls within the specified tolerances. Concrete with a slump outside these tolerances shall be removed from the site.

9.7.5 Drying Shrinkage

Concrete shall be deemed to comply if the average test results for drying shrinkage do not exceed the specified value.

9.7.6 Other Criteria

Hardened concrete shall also be liable for rejection if any of the following defects occur:

- It does not comply with Clause 19.1.10.2 of AS 3600.
- A construction joint has been made at a location or in a manner not in accordance with the specification.
- Construction tolerances have not been met.
- Reinforcing steel has been displaced from its correct position.
- Water stops, inserts, or other embedded items have been displaced from their correct position.
- The required surface finish has not been achieved.
- The concrete work is otherwise defective.

10. NATURAL STONE PAVING

This section of the specification details the requirements for supply, placing and finishing of natural stone paver units including Adelaide Black, Balmoral Green, Mintaro Slate and Katmantoo Bluestone. This section shall be read in conjunction with the pavement design details, CoA Construction Standards Suite, and concrete - basecourse and granular pavement sections of this specification.

10.1 General

This specification shall be read in conjunction with the following Standards and references, which are deemed to form a part of this specification.

AS 1141.5	Method for sampling and testing aggregates: Particle density and water absorption of fine aggregate
AS/NZS 4455.1, AS/NZS 4455.2, AS/NZS 4455.3	Masonry Units, pavers, flags and Segmental retaining wall units
AS/NZS 4456.0	Masonry Units and Segmental Pavers – Methods of Test
AS/NZS 4456.5	Determining Breaking Load of Segmental paver and flags
AS/NZS 4456.9	Determining Abrasion Resistance
AS/NZS 4456.10	Determining Resistance to Salt Attack
AS 4586	Slip Resistance Classification of New Pedestrian Surface Materials
ASTM C615/C615M-11	Standard Specification for Granite Dimension Stone
BS 7533 Part 12	Pavements constructed with clay, natural stone or concrete pavers-Part 12: Guide to the structural design of trafficked pavements constructed on a bound base using concrete paving flags and natural stone slabs
Concrete Masonry Association of Australia publication (PA02/03)	Concrete Segmental Pavements – Detailing Guide, Design Guide for Residential Access ways and Roads, Specifying Guide

10.2 Materials

10.2.1 Natural Stone Paver Units

Natural stone paver units shall be uniform in quality and free from defects (including vents, cracks, fissures, seams, porous inclusions, foreign material, loose surface material striations, stains and discolouration) that could compromise their strength, appearance, durability, or intended function under the expected conditions of use. Individual pavers shall meet the ‘Paver Properties & Criteria’ outlined in the City of Adelaide Footpath ‘Construction Standards Drawings’. The contractor shall provide evidence, in the form of test results, demonstrating compliance with these criteria.

Stone pavers supplied shall be selected to match colour, pattern, dimensions, and quality.

The Supplier shall provide written certification that the supplied stone paver meet the minimum performance criteria stipulated within the above-mentioned CoA Design Standards.

10.2.2 Mortar

10.2.2.1 Primer

Mortar primer shall consist of “MAPSTONE Product” or an approved equivalent by the Council Representative.

10.2.2.2 Bedding Mortar

Bedding mortar shall consist of “MAPESTONE TFB 60” or an approved equivalent product by the Council’s Representative.

Table 29: Characteristic Requirements for Bedding Mortar

Characteristic	Requirement
Minimum Compressive Strength	40 MPa
Flexural Strength	4.5 MPa
Minimum Adhesive Strength	2.0 MPa
Modulus of Elasticity	18,000 ± 3,500 MPa
Maximum Shrinkage	Not greater than 0.10%
Slump	150 mm

Cement: To AS 3972 (2010).

- Type: MAPESTONE TFB 60 or similar approved
- Iron salt content:
- White cement: ≤ 1%.
- Off-white cement: ≤ 2.5%.
- Lime: To AS 1672.1 (1997).

10.2.3 Grout

Grout shall consist of “MAPESTONE PFS PCC 2 (for heavy vehicle traffic)” or “MAPESTONE PFS 2 VISCO (for light vehicle traffic)” selection subject to approval by Council Representative, or an approved equivalent by The Council’s Representative.

Table 30: Characteristic Requirements for Grout

Characteristic	Requirement
Minimum Compressive Strength	40 MPa
Minimum Flexural Strength	6.0 MPa
Minimum Adhesive Strength	1.5 MPa
Modulus of Elasticity	20,000 ± 4,000 MPa
Minimum Density	2,000 kg/m3
Maximum Shrinkage	Not greater than 0.10%
Maximum Aggregate Particle Size	3mm
Slump	150mm

10.2.4 Sealant

Sealant shall be flexible and mould resistant, consisting of a one-part silicone or polyurethane, applied over a backing rod as indicated on the Drawings.

10.3 Construction and Workmanship

10.3.1 General

The contractor shall plan the installation of natural stone paving to ensure that all products are installed “wet-on-wet”. Sufficient allowance shall be made to coordinate the paving installation with the proposed joint layout, service pit adjustments, service pit covers, existing street furniture, and any memorial plaque reinstatement.

Natural stone paving works shall not be undertaken when the temperature is below 5°C or above 35°C.

10.3.2 Removal of Natural Stone Paving Units

Natural stone paver units shall be removed by the Contractor with care to avoid damage. Removed pavers shall be free of other excavated material and stored for later re-use to the satisfaction of the Council Representative.

10.3.3 Storage of Natural Stone Paving Units

Natural stone paver units shall be stored in a location protected from weather and atmospheric pollution, with clear separation from the ground and without overloading individual paver units (to prevent staining or damage). The Council’s Representative may reject the storage location and require an alternative location to be used.

10.3.4 Cutting of Natural Stone Paving Units

The Contractor shall ensure that cutting natural stone pavers does not produce dust or debris that settles on adjacent areas, including buildings and vegetation. All cutting works shall be carried out in an isolated area away from entrances to existing buildings.

Pavers shall be cut using a masonry saw. The Contractor shall not cut natural stone paver units on site with the dry cutting method. The contractor shall use wet methods to cut all natural stone pavers

and shall duly collect the residual water and slurry in at a location separated from the stormwater system and any irrigation points for existing street vegetation.

Any infill spaces which are of insufficient size for cut units (minimum width 75 mm) shall be filled using bedding mortar; with an oxide additive that matches the colour of the adjacent natural stone paver units to the satisfaction of the Council Representative.

Natural stone paving units shall be cut and shaped to the required size to fit neatly around all existing penetrations as per CoA Design Standards Drawings CoA 970 - 974.

10.3.5 Basecourse

The basecourse for natural stone paving shall consist of either of the following as per the contract drawings and CoA Standards Suite:

- Cement stabilised granular pavement as per the granular pavement section of this specification.
- Concrete slab as per the concrete - basecourse section of this specification.

10.3.6 Mortar Primer

Mortar primer shall be applied with either a brush or trowel to the top surface of the concrete slab and the underside surface of the natural stone paver units which have been pre-moistened with water - without evidence of ponding.

10.3.7 Bedding Mortar

Bedding mortar shall be spread in a uniform layer immediately after the application of the mortar primer to the specified thickness on the drawings.

10.3.8 Pavement Preloading

On completion of the filling of the joints in each complete section of paving, the pavement shall be preloaded to assist in the development of block lock-up. The pre-loading shall be carried out by the application of at least 6 passes of a pneumatic tyred multi-wheel roller having a gross weight not less than 10 tonnes. If it is not possible to accommodate this size machinery, alternative acceptable loading vehicles should be agreed with The Council's Representative. Any areas of block paving which show excessive deformation as a result of the preloading shall be removed and replaced to the satisfaction of The Council's Representative.

10.3.9 Laying of Natural Stone Paving Units

Natural stone paving units shall be laid immediately on the bedding mortar in the approved pattern, with gaps maintained between adjoining natural stone paving units and between existing natural stone paving units bordering the site, in accordance with the approved construction joint layout.

The approved paving pattern shall be replicated within all service pit cover infills.

As soon as practical after placement, the natural stone paver units shall be tamped down to ensure full contact with the mortar bed, while minimising displacement of adjacent paver units.

The contractor shall ensure that individual natural stone paver units are checked prior to installation for dimensional straightness and uniformity. Any units that are loose, uneven, or misaligned shall be removed, and the mortar bed and paver installation shall be repeated to ensure compliance.

10.3.10 Concrete Edge Restraint

Edge restraints shall be constructed to the edge of any natural stone paving which is not adjacent to a hard, paved surface. The form of the edge restraint shall be confirmed with the Council Representative.

The paving edge shall be restrained by hidden concrete haunching. Haunching shall extend from 5 mm below the top of the pavers to the top of base course and be battered at 45 degrees to the vertical, or as detailed in the drawings.

10.3.11 Cleaning

The Contractor shall handover the paving works to the Council Representative at the stage of Practical Completion of the project in a clean condition. If the Contractor has opened any section of new paving to the public before practical completion is issued, they must be clean and be ready for Practical Completion.

10.4 Quality Requirements

The individual pavers shall meet the 'Paver Properties & Criteria' outlined on the City of Adelaide

Footpath 'Construction Standards'. The Supplier shall provide written certification that the supplied.

Stone paver meets the minimum performance criteria stipulated within the above-mentioned CoA Design Standards.

10.4.1 Materials

The contractor shall provide a 1m x 1m paver sample on site for approval by the Council Representative. This constitutes a HOLD POINT. Where the nature of the work consists of minor works such as repair works, the Council Representative may release this Hold Point prior to works or request an alternative sample to release the Hold Point.

Stone pavers are to meet the requirements of BS 7533 Part 12.

10.4.2 Inspections

The following Hold Points are required during the construction of Natural Stone Pavement:

H-NSP1	Approval of colour for: • Grout. • Closed cell polyethylene backing rod for expansion joints. • 2-part polysulphide sealant. Oxide colour additive for bedding mortar (in areas where paving less than 75mm wide).
H-NSP2	Approval of construction joint layout
H-NSP3	Approval of concrete surface prior to installation of mortar prime. Refer to concrete – basecourse section of this specification.
H-NSP4	Approval of natural stone paver units installed before opening to public

10.4.3 Tolerances

Construction tolerances on block paved pavements are as follows:

Table 31: Tolerances on Natural Stone Pavement

Item	Tolerance	
Top of Pavers	Absolute	±5 mm
	Relative	±10 mm from a 3.0 m straight edge
	Alignment of pavers	±10 mm over a 5 m length or 20 mm over a 50 m length for large areas
	Adjacent to Kerb	+ 10 mm - 0 mm of the adjacent gutter level
Joints between paving units	6-9 mm (preference 7.5mm)	
Depth of Mortar	+ 10 mm - 5 mm	
Total Depth of pavement	+ unspecified - 5 mm	

10.4.4 Acceptance Criteria

Areas where the pavement fails to meet the specified requirements including:

- Specified colour, pavers type or laying pattern.
- Paver strength.
- Level tolerances and shape.
- Paving joints and alignment.
- Paving cuts and in-fills; may be rejected, as directed by The Council's Representative.

In the event that an area of pavement is rejected, The Council's Representative may direct the Contractor to complete the following remedial works, at the Contractor's cost:

- Removal and re-laying of the non-complying areas.
- Re-working of non-complying areas; and any other remedial treatment that is expected to provide the required level of service.