

# TRANSPORT FOR NSW (TfNSW)

## QA SPECIFICATION M258

### SLAB REPLACEMENT (CONCRETE PAVEMENT)

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#### REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1/Rev 0		First issue, published as M270.	GM, RNIC	09.07.04
Ed 1/Rev 1	Notes & 1 Foreword	New clause on “Intended Use” added. Foreword added.	GM, IC	31.08.07
Ed 1/Rev 2	Global	Format corrected.	GM, IC	24.10.07
Ed 2/Rev 0	Global  5.2 5.3	Spec reference no. changed to M258. Reference numbers, Pay Items, referenced documents, changed to match new Maintenance Activities. Deduction mechanisms removed. Internal referencing format changed. Warranty requirements introduced. Clause on accomplishment reporting added.	GM, IC	04.08.08
Ed 3/Rev 0	Global	General technical review, and revision of some technical requirements. Format revised.	GM, IAM	19.02.13
Ed 3/Rev 1	3.3.1.2	Internal bend radius for steel reinforcement changed from 6 times to 5 times diameter of bar.	GM, CPS	18.10.13
Ed 3/Rev 2	4.9.4.4  Annex M	Clause reference to spec SI/TCS/8 (withdrawn) replaced with spec TS101. Referenced Documents updated.	MCQ	14.10.19
Ed 3/Rev 3	Global	References to “Roads and Maritime Services” or “RMS” changed to “Transport for NSW” or “TfNSW” respectively.	DCS	22.06.20
Ed 4/Rev 0	All	New edition, totally rewritten to align with other concrete pavement specs. Major technical changes are highlighted below.	EDCS	11.05.21
Ed 4/Rev 0 (cont'd)	2.5	Self-expanding cork not permitted for use as joint sealant. Neoprene joint sealants permitted where approved by Principal.		

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
	3.3	Added qualification that if underlying material is not lean-mix concrete, then base thickness must be 200 mm minimum.		
	3.4.2	Requirement for sand cement mix as subbase revised.		
	3.7.4	PCP replacement slabs must be reinforced by SL82 mesh.		
	3.9.4	Base curing with polyethylene sheeting prohibited as it will damage concrete surface.		
	3.10	Clarified that trial paving is only required where specified.		
	3.14	New sub-clause added for opening to traffic strength requirement. Maturity test option added.		
	Annex F	Traceability requirement added. Spreadsheet to be completed as part of traceability requirement.		
	Annex L	Cross stitching requirement deleted; requirement covered by spec M213.		

# GUIDE NOTES

(Not Part of Contract Document)

## Specification TfNSW M258 Edition 4

Edition 4 has been totally reorganised and rewritten to improve clarity and remove duplications, and incorporate a number of changes to technical requirements.

The Revision Register provides a summary of the main changes in Edition 4. Due to the reorganisation and the rewording of the content, in many cases different parts of a clause in Edition 3 have been moved to different locations in Edition 4. Such clauses may have been reworded without changing the intent. Such changes are not specifically listed in the Revision Register.

### GN1 General

TfNSW M258 has been written for pavement works involving replacement of a few individual concrete slabs at different locations. TfNSW M258 is not suitable where more than three adjoining Plain Concrete Pavement (PCP) slabs or more than one adjoining Jointed Reinforced Concrete Pavement JRCPC slabs are to be replaced. Such works would normally require extended lane closures and other TfNSW construction specifications may be more appropriate.

This Specification is based on the previous version of TfNSW M258 Ed 3 Rev 3 and TfNSW R83.

TfNSW M258 specifies all requirements for slab replacement at the Site, including excavation, replacement of unsuitable material below the base and placing the concrete base. Concrete used must be in accordance with TfNSW 3201, which is an essential companion to TfNSW M258.

Under TfNSW M258, it is assumed that the Works will be completed within a short time period of lane closure, i.e. within 12 hours or less. The limited time available for the Works imposes a compromise between speed of operation and quality of work under TfNSW M258.

### GN2 Joints

TfNSW Standard Drawings for Rigid Pavement Maintenance provide details and locations of joint types. Silicone sealants supplied and used for new pavements in accordance with TfNSW R83 are permissible for the reinstatement of sealed joints. The TfNSW Project Manager may approve other options based on time and noise constraints, such as:

- (a) Early entry sawcut and installation of neoprene joint sealants.
- (b) Pre-installation of crack inducers.

Generally, crack inducers are used either in a top down or combination of top down and bottom up arrangement. There is a risk of crack inducers not creating a smooth straight joint. There is also an increased risk of arris failure if the concrete is not thoroughly re-compacted around the inducer. The bottom up crack inducers come with a voided triangular shape, which acts as a wick area as there is no concrete in the triangular void. If crack inducers are used, only top down inducers are recommended.

The material for crack inducers is generally PVC or metal. When selecting the inducer material, the Project Manager should consider possible future diamond grinding, carried out for restoration of concrete pavement surface properties of older pavements. If steel crack inducer is used, after the diamond grinding process, the remaining steel crack inducer may generate a significant noise with tyre slap whenever a vehicle passes the joint and will become a safety hazard. Hence, while these crack inducers can avoid noise from the sawcutting which will occur over one night, it may well result in noisy pavement in the long term.

When diamond grinding is proposed just after the slab replacement work, the joints should be sealed after grinding to minimise damage to the sealant and ensure that the sealant is kept below the final

ground surface. In addition, if tining is proposed for such slab replacement work, the tining should be carried out in the longitudinal direction to match the grinding direction.

When asphalt is to be placed over the sealed joint, verify with the sealant manufacturer that hot mix asphalt can be placed directly onto the sealant.

### **GN3 Paving Trial**

Paving trial may not be required for individual slab replacement work. For large scale rehabilitation work which requires multiple slab replacements or lane widening work over 10 m in length, paving trial will be required. The TfNSW Project Manager should specify paving trial requirements for such projects in Annexure M258/A2.

### **GN4 Subbase Surface Debonding Material**

Polyethylene sheeting is the most practical option for use as subbase surface debonding material for overnight slab replacement work. Wax emulsion and sprayed seal options were included in previous editions. These options are still kept in Edition 4 for situations where the lane can be closed for 24 hours.

### **GN5 Maturity Testing**

For night time work, it is not practical to test the concrete strength in the laboratory before opening to traffic. Maturity testing is a quicker way of assessing the concrete strength of the pavement at opening to traffic. It is becoming a more acceptable method of assessing early strength of concrete.

The correlation between concrete maturity and compressive or flexural strength is established by testing concrete specimens moulded in the laboratory and tested at various maturity stages. The insitu concrete strength at opening to traffic is determined from the established correlation.

### **GN6 Technical Reference Notes**

Technical information on slab replacement is available in TfNSW Standard Drawings for Rigid Pavement Maintenance. The TfNSW Project/Contract Manager and Surveillance Officer should be familiar with the specific requirements and underlying reasons for slab replacement.

Drawings are the preferred means of detailing the Works and should include:

- (a) Site locations and slabs to be replaced, including utility and drainage locations.
- (b) Locations and dimensions of steel reinforcement and dowels.
- (c) Joint configurations, including types and treatment of joints (i.e. backer rod, joints, sealants, etc).
- (d) Dimensions, clearances, spacing etc of replacement slabs.
- (e) Special requirements, such as geotextile.

Do not change the technical aspects of this Specification without prior consultation with TfNSW Rigid Pavements Manager.



Transport  
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QA SPECIFICATION M258

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# SLAB REPLACEMENT (CONCRETE PAVEMENT)

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VERSION FOR: DATE:
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## FOREWORD

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### REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW M258 Edition 3 Revision 3.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

### PROJECT SPECIFIC CHANGES

Any project specific changes are indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.



# **TfNSW QA SPECIFICATION M258**

## **SLAB REPLACEMENT (CONCRETE PAVEMENT)**

### **1 GENERAL**

#### **1.1 SCOPE**

This Specification sets out the requirements for full or partial removal and replacement of concrete road pavement slabs. It includes the requirements for:

- (a) excavation and removal of existing pavement;
- (b) treatment of any unsuitable material below the base;
- (c) construction of base slab;
- (d) reinstatement of any existing access to a utility or drainage system.

This specification is not applicable where more than three adjoining PCP slabs or more than one adjoining JRCP slabs are required to be replaced.

This Specification is to be used in conjunction with Specification TfNSW 3201 and TfNSW Standard Drawings for Rigid Pavement Maintenance (Volumes MP, MJ and MC).

#### **1.2 STRUCTURE OF THE SPECIFICATION**

This Specification includes a series of annexures that detail additional requirements.

##### **1.2.1 Project Specific Requirements**

Project specific details of work are shown in Annexure M258/A.

##### **1.2.2 Measurement and Payment**

The method of measurement and payment is detailed in Annexure M258/B.

##### **1.2.3 Schedules of HOLD POINTS, WITNESS POINTS and Identified Records**

The schedules in Annexure M258/C list the **HOLD POINTS** and **WITNESS POINTS** that must be observed. Refer to Specification TfNSW Q for definitions of **HOLD POINTS** and **WITNESS POINTS**.

The records listed in Annexure M258/C are **Identified Records** for the purposes of TfNSW Q.

##### **1.2.4 Planning Documents**

The PROJECT QUALITY PLAN must include each of the documents and requirements listed in Annexure M258/D and must be implemented.

In all cases where this Specification refers to the manufacturer's recommendations, these must be included in the PROJECT QUALITY PLAN.

### 1.2.5 Frequency of Testing

The Inspection and Test Plan must nominate the proposed frequency of testing to verify conformity of the item, which must not be less than the frequency specified in Annexure M258/L. Where a minimum frequency is not specified, nominate an appropriate frequency. Frequency of testing must conform to the requirements of TfNSW Q.

You may propose to the Principal a reduced minimum frequency of testing. The proposal must be supported by a statistical analysis verifying consistent process capability and product characteristics. The Principal may vary or restore the specified minimum frequency of testing, either provisionally or permanently, at any time.

### 1.2.6 Referenced Documents

Unless otherwise specified, the applicable issue of a referenced document, other than a TfNSW Specification, is the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 1234). For convenience, the full titles are given in Annexure M258/M.

## 1.3 DEFINITIONS, ACRONYMS AND SYMBOLS

### 1.3.1 Definitions

The terms “you” and “your” mean “the Contractor” and “the Contractor’s” respectively.

The term “Standard Drawings” refers to the “TfNSW Standard Drawings for Rigid Pavement Maintenance”.

The following definitions apply to this Specification:

<b>Anchor</b>	A restraining beam cast in the ground, on which a base slab is later cast.
<b>Anchor slab</b>	The base slab which lies over an anchor.
<b>Completion of batching</b>	For delivery by agitator vehicles (mobile mixers), this will be the time at which mixing and slump adjustment ceases, or 10 minutes after the completion of charging, whichever occurs first.
<b>Edge, free</b>	This term is used in the context of limiting all restraint against the free movement of joints which intersect that edge or joint. A free edge is provided by an isolation joint or by an outer edge. Untied butt joints and dowelled expansion joints do not constitute free edges.
<b>Fixed surfaces</b>	Fixed Surfaces are surfaces that remain unaltered by the work. Fixed Surfaces include most existing structures, the existing pavement adjacent to the work, an existing cover on a public utility or an existing drainage system.
<b>Formed joint</b>	All joints except for induced joints. This includes slipformed and fixed-formed joints.
<b>Joint</b>	A planned discontinuity in the concrete.
<b>Load</b>	A single truckload of concrete comprising one or more batches.

**Lot** A continuous concrete pour of volume of up to 30 m<sup>3</sup> for hand-paved base.

### **1.3.2 Acronyms**

<b>CRCP</b>	Continuously reinforced concrete pavement (base)
<b>CSA (cement)</b>	Calcium sulfoaluminate (cement)
<b>HES (concrete)</b>	High early strength (concrete, using CSA cement)
<b>JRCP</b>	Jointed reinforced concrete pavement (base), dowelled
<b>LCS</b>	Lean-mix concrete subbase
<b>PCP</b>	Plain concrete pavement (base)
<b>PQP</b>	PROJECT QUALITY PLAN
<b>SFCP</b>	Steel fibre reinforced concrete pavement (base)

## **1.4 CONCRETE PAVING CREW TRAINING**

Arrange Concrete Paving Crew Training and maintain records of this training as follows:

- (a) The nominated person in charge of the concrete paving crew and at least half the remainder of the crew present at each separate concrete paving site for the Works must have successfully completed the TfNSW Training Course “Concrete Paving Crew Training”. These crew members are qualified to carry out TfNSW concrete paving work.
- (b) Establish and maintain a list of the names of all crew members that have successfully completed the TfNSW training courses (qualified crew members) for the Contract works.
- (c) In addition to any other records held by you, maintain at each separate concrete paving site a copy of the list of the names of all qualified crew members. Provide this information to the Principal when requested at any time.

## **1.5 ENVIRONMENTAL AND TRAFFIC MANAGEMENT**

Any materials used, and slab replacement work activities must not cause nuisance to people, property or the environment.

Materials from the work must not adhere to vehicles, surrounding pavement, drainage structures, and other road fixtures or enter into the drainage system.

The construction processes must be appropriate to comply with all constraints, including traffic management constraints, such as:

- (a) Time available to start and complete the work.
- (b) Time of day when work is carried out.

# **2 MATERIALS**

## **2.1 REPLACEMENT MATERIAL FOR UNSUITABLE MATERIAL**

Material for use as replacement material for unsuitable material below the base must be one of the material type shown in Table M258.3.

## **2.2 CONCRETE**

The concrete mix for use in the work is specified in Annexure M258/A2. The concrete mix design must comply with Specification TfNSW 3201.

Comply with the Hold Point in TfNSW 3201 for production of each new or changed concrete mix and submit the documents specified in the Hold Point at least 5 working days before the proposed use of the concrete.

## **2.3 STEEL REINFORCEMENT AND DOWELS**

Steel reinforcement, including bars, mesh, tiebars and drill-ties, must conform to AS/NZS 4671. Reinforcement must be readily identified as to its grade and origin.

Mechanical bar splices used must be approved by the Principal. When tested in tension or compression, the mechanical bar splice must develop at least the nominal ultimate tensile or compressive strength of the smaller of the bars being tested.

Dowel bars must comply with AS 3679.1 and be hot-dip galvanized in accordance with AS/NZS 4680.

## **2.4 ADHESIVE SYSTEM**

The adhesive system (whether epoxy or polyester) for drill-ties and drill-dowels must meet the requirements in the Standard Drawings.

## **2.5 JOINT SEALANT**

Joint sealants for use in slab replacement work must be one of the following types:

- (a) silicone sealant in accordance with Specification TfNSW R83;
- (b) polyurethane sealant (only for joint widths greater than 18 mm) in accordance with the Standard Drawings;
- (c) hot poured elastomeric joint sealant in accordance with Specification TfNSW 3263;
- (d) preformed neoprene joint sealant.

Joint sealant type must be approved by the Principal, unless specified in Annexure M258/A.

## **2.6 BACKER ROD AND PREFORMED JOINT FILLER**

Backer rod for temporary sealing of joints must be continuous and made of closed-cell polyethylene.

Preformed joint filler must comply with Specification TfNSW 3204, and must be one of the following types:

- (a) bitumen impregnated fibreboard;
- (b) self-expanding cork;
- (c) closed cell foam.

**2.7 SUBBASE SURFACE DEBONDING MATERIALS**

Subbase surface debonding materials must demonstrate compliance with the requirements in Table M258.1.

**Table M258.1 – Subbase Surface Debonding Material**

<b>Type</b>	<b>Requirement</b>
Wax emulsion <sup>(1)</sup>	AS 3799 Class A Type 1-D with minimum 30% non-volatile solids content. Stability - the rate of separation in 7 days $\leq$ 4% when tested to Test Method TfNSW T862.
Sprayed bituminous seals	7 mm cutback bitumen seal or bitumen emulsion seal. For hot bitumen seal, bitumen must be of Class C170 or Class C240 complying with Specification TfNSW 3253. For bitumen emulsion seal, bitumen must be of Class CRS/170 complying with Specification TfNSW 3254. The rate of residual bitumen application must be between 0.60 and 0.80 L/m <sup>2</sup> , measured at 15°C. Spread aggregate with nominal size 7 mm which is either free of dust or pre-coated at a rate of approximately 250 m <sup>2</sup> /m <sup>3</sup> to provide a dense mat of single stone thickness without excessive loose stones.
Polyethylene sheeting	200 $\mu$ m (0.2 mm) thick polyethylene sheeting in accordance with AS 2870.

**Note:**

<sup>(1)</sup> Wax emulsion can be slippery and must not be used if the surface is to be used by pedestrian traffic.

**2.8 CURING COMPOUND**

Where used, curing compounds must comply with the requirements in Table M258.2. Provide to the Principal evidence of compliance of the curing compounds with the requirements in Table M258.2 and AS 3799.

**Table M258.2 – Curing Compound Requirements**

<b>Type</b>	<b>Application</b>	<b>Requirement</b>
Hydrocarbon resin (HCR)	Base concrete where no asphalt or bitumen seal to be placed	AS 3799 Class B Type 1-D, with minimum 30% non-volatile content.
Waterborne hydrocarbon resin (WHCR)	Base concrete where no asphalt or bitumen seal to be placed	AS 3799 Class B Type 1-D or Type 2, with minimum 30% non-volatile content.
Bitumen emulsion binder (BE)	Base concrete with asphalt or sprayed bituminous surfacing	AS 3799 Class Z, complying with TfNSW 3254 Grade CRS/170 or CRS/240.
Blended bitumen and waterborne hydrocarbon resin (B-HCR)	Base concrete with asphalt or sprayed bituminous surfacing	AS 3799 Class Z, with minimum 40% residual bitumen. Bitumen either Class C170 or C240 conforming to TfNSW 3253.
Wax emulsion <sup>(1)</sup> (only for use on lean-mix concrete)	Lean-mix concrete subbase where overlying base layer is to be concrete	AS 3799 Class A Type 1-D, with minimum 30% non-volatile content. TfNSW T862 stability - the rate of separation in 7 days ≤ 4%. Softening point of non-volatile material not less than 45°C, when tested in accordance with AS 2341.18.

**Note:**

<sup>(1)</sup> Wax emulsion can be slippery and must not be used if the surface will be used by pedestrian traffic.

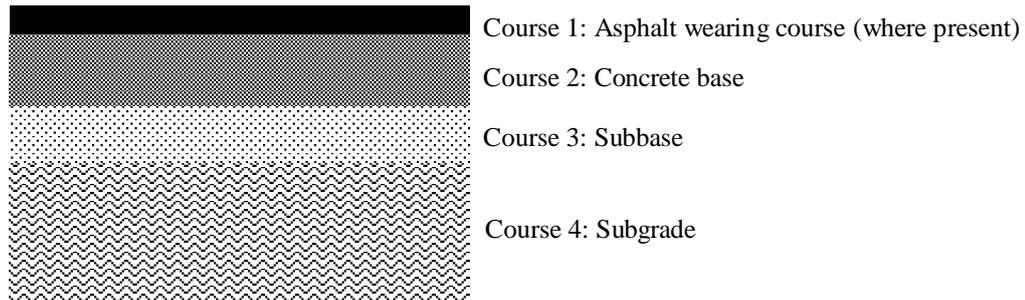
**2.9 ASPHALT**

Asphalt used in wearing course must conform to Specifications TfNSW R116, TfNSW R119 and/or TfNSW R121, as applicable to the Work under the Contract.

**3 CONSTRUCTION****3.1 PAVEMENT CONDITION ASSESSMENT**

The locations for the slab replacement work, and details of the existing pavement condition at those locations, are shown in Annexure M258/A.

Carry out an inspection of the pavement at these slab locations, and confirm that the pavement condition at these locations are as stated in Annexure M258/A. Obtain the concurrence of the Principal to the material in each pavement course, prior to commencement of work. A typical pavement profile showing the individual pavement courses is shown in Figure M258.1.



**Figure M258.1 – Typical Pavement Profile**

### **3.2 SAWCUTTING AND REMOVAL OF BASE**

Sawcut and remove the slab to be replaced in accordance with the Standard Drawings.

Remove the slab within 2 weeks of sawcutting. If the pavement after sawcutting is considered to be hazardous to traffic, remove the slab as soon as possible after sawcutting.

Implement measures to prevent any damage to adjoining fixed surfaces, utilities, drainage lines, or the underlying subbase course during the slab replacement work. Repair any damage to existing facilities at your costs.

### **3.3 THICKNESS OF BASE SLAB**

After removal of the base slab, measure and record the thickness of slabs adjoining the replacement slab.

The thickness of the replacement slab must match that of adjoining slabs. If the underlying material is not lean-mix concrete, the minimum base thickness must be 200 mm.

For widening work where the design thickness of the additional slab is less than the measured thickness of the adjoining slabs, increase the design thickness to match the measured thickness.

### **3.4 TREATMENT OF UNSUITABLE MATERIAL BELOW BASE**

#### **3.4.1 General**

Where the “condition” of the courses below the base is shown as “unsuitable” in Table M258/A.2, or where directed by the Principal, remove and replace the unsuitable material(s) below the base with material specified in Table M258/A.3 or as directed by the Principal.

Carry out excavation of the unsuitable material vertically to the sawn edge of existing concrete base.

Remove and dispose of all unsuitable material in accordance with EPA requirements.

#### **WITNESS POINT**

Process Witnessed: Assessment of excavated area.

Submission Details: Notification of the date and time of excavation at least 3 working days before the commencement of excavation.

### **3.4.2 Replacement Material**

Select as replacement material one of the material types from Table M258.3 as agreed with or directed by the Principal. Place and compact the replacement material in accordance with Table M258.3, to create a firm and even course, including areas adjacent to fixed surfaces.

### **3.4.3 Impacts on Utility Infrastructure**

Where the treatment impacts on utility infrastructure including drainage lines, notify the relevant authority immediately. Proceed with the work only after receiving approval from the authority. Keep records of such communication details with the relevant authority.

### **3.4.4 Additional Work**

Where the proposed treatment involves additional work not identified in Annexure M258/A or directed by the Principal, and the Principal is unavailable within the time constraint, you must:

- (a) record the time that you attempted to notify the Principal and the method of the attempted notification;
- (b) record the assessment;
- (c) take samples of the unsuitable material.

Take one of the following actions and inform the Principal of the action taken and its justification as soon as possible:

- (i) Where the proposed treatment can be completed within the time constraint, proceed with the proposed treatment.
- (ii) Where the proposed treatment cannot be completed within the time constraint, cease operations and make the Site safe and, where required, trafficable.

**Table M258.3 – Suitable Replacement Materials and Placing Requirements**

<b>Material Type <sup>(1)</sup></b>	<b>Details</b>	<b>Placing and Compaction Requirements</b>
High early strength (HES) lean-mix concrete	Special class SP10HES, as specified in TfNSW 3201.	Compact using internal vibrators.
Lean-mix concrete	Special class SP6, as specified in TfNSW 3201.	Compact using internal vibrators.
Sand cement mix <sup>(2)</sup>	Mix proportion of 8:1 sand to cement mix, with a moisture content of approximately 8% to suit compaction, and freshly plant mixed and delivered to site in a mobile mixer.	Deliver, place and compact sand cement mix within 90 minutes of batching. Compact using at least 3 passes of a vibrating plate. Maximum compacted thickness of each layer of sand cement mix is 100 mm. Minimum total compacted thickness of sand cement mix is 200 mm.
Cement bound granular material	Granular pavement material, stabilised with 4% GP cement, with a moisture content of approximately 8% to suit compaction, and freshly plant mixed.	Compact using at least 3 passes of a vibrating plate.
Roller compacted concrete	Compressive strength grade RCC5, as specified in Specification TfNSW 3221.	Place and compact in accordance with Specification TfNSW R90.

**Notes:**

- <sup>(1)</sup> Selection of material type as replacement material below the base will be based on constructability, and time limits arising from Road Occupancy Licence conditions.
- <sup>(2)</sup> Compromised solution for single slab replacement up to 8 m length.

**3.4.5 Lean-mix Subbase Curing**

Where the course replaced is lean concrete subbase (LCS), cure the newly placed LCS with a curing compound in accordance with Table M258.2. Apply the curing compound at a rate of not less than 0.30 L/m<sup>2</sup>.

For night works, you may cover the newly placed LCS with polyethylene sheeting in lieu of curing compound, where approved by the Principal.

**3.5 SLAB ANCHORS**

Construct slab anchors in accordance with the Drawings, and the following:

- (a) Concrete must conform either to this Specification or AS 1379 for normal-class concrete with strength grade N32 and 20 mm aggregate, and slump at the point of placement between 40 mm and 80 mm.
- (b) Cast the anchor at least 24 hours before the overlying base slab.

- (c) At the junction with an existing flexible pavement, make a straight sawcut to the full depth of any asphalt in the flexible pavement along the joint line. When excavating for the trench, do not disturb or otherwise damage the existing flexible pavement. Make good any damage to the flexible pavement.
- (d) Provide drainage of the interface between flexible and rigid pavements as shown on the Drawings.
- (e) Trim the trench to neat lines, free of loose soil material, and compact the bottom to at least match the adjacent undisturbed material.
- (f) Lap the anchor stirrups with the base reinforcement.
- (g) Place and compact the concrete using internal vibration in accordance with Clause 3.9.2.
- (h) Mark the anchor slabs with an imprint of the letter “A” with a circular surround, on the surface at the slab edge, above the anchor centreline and within 0.5 m of each end of the anchor in a relatively low trafficked area. The imprint must be to a depth of  $4 \pm 1$  mm.

### **3.6 PREPARATION**

#### **3.6.1 Preparation of Surface Underlying Base**

Remove any loose debris or irregularity, e.g. bumps, defects or protrusions from the surface underlying the base, that would restrain horizontal movement of the overlying base.

Render any wide cracks and spalls in sand-cement or lean-mix concrete with sand cement mix.

Apply debonding treatment to the surface of the underlying course (which may be either the existing subbase, or newly placed subbase) in accordance with Table M258.1 before placing steel reinforcement for the base.

Where polyethylene sheeting is used as a debonding treatment, place the sheeting such that it is smooth and free of creases, tears, or holes. Provide overlaps of not less than 200 mm at edges of the sheeting and secure them with tape to prevent mortar or concrete from passing through the overlaps. Fully cover the subbase with polyethylene sheeting and secure it around the perimeter and elsewhere as required to prevent the polyethylene sheeting from being dislodged by wind.

#### **3.6.2 Preparation of Adjoining Joints and Edges**

Provide a longitudinal joint to separate the kerb and channel (gutter) and the base (including debonding of any formed joints).

Scabble the vertical faces of adjoining base at transverse construction joints to expose coarse aggregate in accordance with the Standard Drawings. New untied joints and existing butt joint faces (whether tied or untied) need not be scabbled.

Debond the vertical faces of all formed joints to avoid induced spalling at arrises. Spray the joint face with wax emulsion curing compound prior to placing the abutting concrete. The coating must be intact and effective at the time of concrete placement. Implement measures to prevent coating of the steel reinforcement and tiebars with wax emulsion.

Extend the silicone seal down the now exposed vertical faces of existing joints and any underlying cracks in the adjoining existing base slab that exceed 2 mm in width to prevent mortar entry into these joints and cracks during concreting of the replacement slab.

Separate all inlet pits from adjoining base by an isolation joint in accordance with the Drawings.

### **3.7 TIEBARS AND DOWELS**

#### **3.7.1 General**

Install the tiebars, drill-ties, dowels and drill-dowels to the layout, size, spacing and fixing details shown on the Standard Drawings.

Avoid damage to the adjacent slab during drilling, such as cracking, broken edges or spalled concrete. Repair any damage, and fill fully any drilled holes which are not used, at your costs.

Clean and prepare the drilled holes to enable secure fixing of the drill-ties or drill-dowels.

Install the drill-ties or drill-dowels using a conforming adhesive system (refer Clause 2.4) and in accordance with the adhesive manufacturer's recommendations.

#### **3.7.2 Tiebars and Drill-ties**

When installing tiebars and drill-ties, vertically locate them in the central third of the slab thickness, but with a minimum vertical clearance of 30 mm from any crack inducer or sawcut. This clearance also applies to any bar or mesh which is required to function as a tiebar.

#### **3.7.3 Dowels and Drill-dowels**

Install dowels and drill-dowels with the debonded end capped to provide a clearance for movement equal to the width of the joint plus 15 mm.

Do not use drill-dowelled joints if the existing base thickness is less than 200 mm. If specified on the Drawings, modify the jointing layout to include a combination of partial slab replacement with drilled-tied construction joint J7d and sawn-dowelled joints J9, as shown in Case 10 - Sheet 12 of the Standard Drawings DS2013/001890.

If you intend to modify the jointing layout, submit to the Principal details of proposed modifications and supporting design documentation. Do not carry out any such modifications without the prior approval of the Principal.

#### **3.7.4 REINFORCEMENT**

Provide SL82 reinforcing mesh as reinforcement in replacement slabs in plain concrete pavements. Provide the reinforcement type shown on the Drawings for other concrete pavement types.

Install the steel reinforcement to the layout, cover and lapping shown on the Standard Drawings.

Support the reinforcement on either concrete or plastic chairs. Do not use wire chairs, timber or aggregate as support for the reinforcement.

Secure the reinforcement so that they remain in position during placing and compaction of concrete by tying the bars and/or mesh together with annealed steel wire having a diameter at least 1.2 mm. You may use tack welding instead of wire ties on reinforcing bars.

When lapping mesh sheets, install them such that the bottom sheet has transverse wires uppermost and the top sheet has them underneath.

When splicing reinforcement bars, either securely tie the bars together at two or more locations of the lap, or connect them using an approved mechanical bar splice.

Use only electrical welding, complying with AS/NZS 1554.3, for welding splices. The welded splice must meet the requirements of tensile and bend tests specified for the parent metal.

### **3.8 TEMPERATURE AND WEATHER CONDITION**

The temperature of newly placed concrete must not fall below 10°C or over 35°C within the first 24 hours after placing, or until the time of opening the pavement to traffic, whichever occurs first.

Include in the PQP procedures:

- (a) method for monitoring and recording site temperature;
- (b) method for monitoring temperature of newly placed concrete;
- (c) measures for protecting the placed concrete if its temperature falls below 10°C.

Keep on hand and ready for use when required, appropriate equipment to protect the concrete from low temperature after placing. Such equipment may include radiant heater or thermal blanket.

Do not place concrete during rain or when rain appears imminent, or when the air temperature measured outdoors in the shade is above 35°C.

### **3.9 FORMING, PLACING AND FINISHING BASE CONCRETE**

#### **3.9.1 Formwork**

Where formwork is used construct the formwork so that it is braced in a substantial and unyielding manner.

Debond the formwork so that it can be removed without damaging the concrete.

Set the formwork up such that the screeding surface will be within the tolerances of the required surface levels.

Limit gaps in formwork such that the specified systematic vibration and compaction can be achieved throughout the slab with only minimal mortar losses.

#### **3.9.2 Placing Concrete**

Place and compact the concrete before it stiffens to produce a uniform, dense, and homogeneous concrete slab.

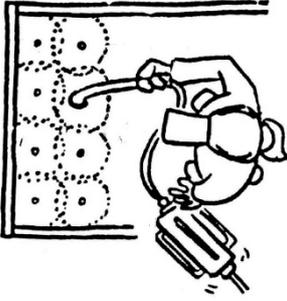
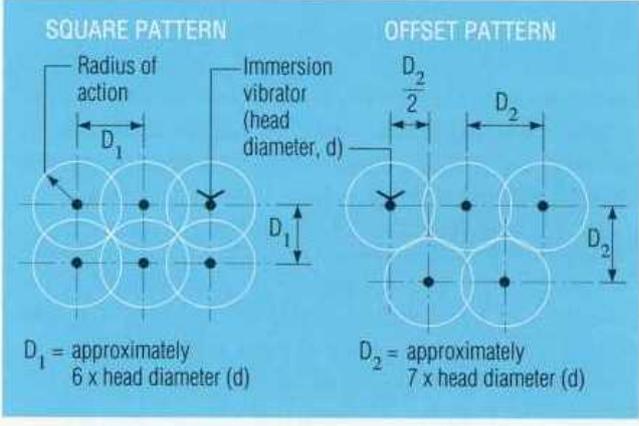
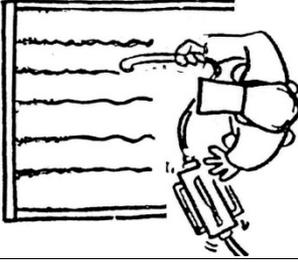
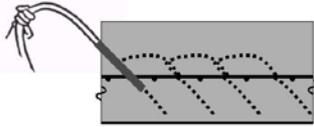
Avoid segregation or loss of material during placing and compaction of the concrete.

Provide adequate compaction of the concrete around the tiebars by either internal vibration or by vibrating screed board.

Place the concrete such that the finished surface levels match the existing surface levels around the perimeter of the replacement slab; making due allowance for any subsequent surfacing to be placed on the existing slabs.

Compact the concrete using internal vibrators with regular and systematic insertions, using one of the methods shown in Table M258.4. Vibration near unsupported edges of concrete or when the concrete is moving is not included as part of the compaction time or effort.

Table M258.4 – Internal Vibration Methods

Method	Diagram	Guideline Parameters <sup>(1)</sup>
1 Dip method		<p>(a) the spacing <math>D_1</math> is not greater than 300 mm, and <math>D_2</math> is not greater than 350 mm;</p> <p>(b) insertion durations are 10 seconds minimum; and</p> <p>(c) withdrawal speed does not exceed 1.5 m/minute.</p>  <p>Source: “Concrete Practice on Building Sites”. SAA Handbook HB67 – 1995, jointly as Cement &amp; Concrete Association publication C&amp;CAA T43 (1995)</p>
2 Drag method		<p>(a) vibrator paths at spacings not greater than 350 mm; and</p> <p>(b) travel speed not exceeding 1.5 m/minute.</p>
3 Modified drag method (for reinforced pavement)	 (Section view)	<p>(a) vibrator paths at spacings not greater than 350 mm; and</p> <p>(b) insertion spacings not greater than 350 mm; and</p> <p>(c) nett horizontal travel speed not greater than 1.5 m/minute; and</p> <p>(d) withdrawal speed not greater than 1.5 m/minute.</p>

**Note:**

<sup>(1)</sup> The vibration intensity required to achieve compaction conformity will vary according to factors such as the workability of the concrete and the characteristics of the compaction equipment. The guideline parameters are specified as minimum levels only, and higher compaction levels may be required to produce conforming results.

Use internal vibrators with the following operating parameters:

- (a) minimum diameter of 50 mm;
- (b) operating at a frequency of between 8,000 and 12,000 vibrations/minute (130 - 200 Hz).

The number of vibrators used for the work must be one for every 10 m<sup>3</sup>, or part thereof, of concrete placed per hour, with at least one operational vibrator unit on standby at the Site.

Remove any build-up of mortar during paving and do not incorporate it into the work.

Finish compaction of the concrete using at least two passes of a hand-guided vibratory screed traversing the full width of the slab on each pass. Maintain a suitable head of concrete in front of the screed over its whole length for uniform transmission of vibration into the slab, to produce a dense and homogeneous slab with a surface finish that requires minimum hand finishing, including trowelling and bull-floating, of the surface.

Do not finish the surface of the placed concrete using power trowelling.

Record the location where each load of concrete was used. Include the traceability information of each load of concrete in a spreadsheet in accordance with Annexure M258/F.

Form a transverse construction joint when loss of integrity in the concrete mass is likely, such as when an interruption to paving occurs.

### **3.9.3 Texturing of Surface**

Use hessian drag or broom to produce initial texturing. Apply additional texturing by transverse tining, unless diamond grinding is proposed after slab replacement, in which case the tining must be in the longitudinal direction.

The surface texturing process must produce a uniform and consistent finish without rounding of the paved edges; and with minimal ravelling of the surface.

Space the tines at random spacing between 10 mm and 21 mm apart, with mean spacing between 13 mm and 14 mm. A typical pattern is shown below:

10	14	16	11	10	13	15	16	11	10	21	13	10
----	----	----	----	----	----	----	----	----	----	----	----	----

The width of texturing comb must be at least 750 mm and must have rectangular-shaped tines of flat spring steel, approximately 0.6 mm thick and 3 mm wide.

### **3.9.4 Curing**

Carry out curing in accordance with the concrete supplier's recommendations.

Where a curing compound is used, apply it in a uniform application rate of 0.3 L/m<sup>2</sup> within 15 minutes of the surface reaching the "low sheen" bleed water condition.

Where an evaporation retarder is used, apply it uniformly as a fine spray. Any subsequent finishing operations must not incorporate the evaporation retarder into the surface mortar.

## **3.10 CONCRETE PAVING TRIAL**

Where specified in Annexure M258/A, conduct one paving trial at the location specified in Annexure M258/A. The paving trial must demonstrate that the construction methodology included in the PQP (refer Annexure M258/D) achieves the requirements of this Specification.

The paving trial must involve at least one slab and constructed using the same concrete mix, equipment and methodology as detailed in the PQP.

## **WITNESS POINT**

Process to be Witnessed: Paving trial.

Submission Details: Notification of the time and date of the paving trial at least 3 working days before commencing the paving trial.

## **HOLD POINT**

Process Held: Base paving other than paving trial.

Submission Details: Documentation confirming conformity of the paving trial with this Specification, and results from the conformity testing.

Release of Hold Point: The Principal will consider the submitted documents prior to authorising the release of the Hold Point.

### **3.11 PROTECTION OF WORK**

Protect the Works from damage, including water, temperature, vehicular and pedestrian traffic until opening of pavement to traffic.

Protect concrete from low temperatures in accordance with Clause 3.8.

### **3.12 INSTALLING AND SEALING JOINTS**

#### **3.12.1 Initial Forming of Joint**

Where specified, form or sawcut joints to control cracking. Do not use crack inducers unless approved by the Principal.

For isolation joints, use preformed joint filler complying with Clause 2.6 and secure it in place prior to placing the concrete.

Where joints are to be sawcut, make an initial sawcut, using the early-entry dry cut method, to the depth specified after the concrete has gained initial set and before unplanned cracking develops.

When using early entry saws cuts, remove the residue powder ensuring that the powder does not enter the joint. Inspect the skid plates and saw blades at regular intervals and ensure that they are cleaned as required and, as a minimum, at the end of every shift.

Within 2 hours of the initial sawcut, wash the joint, clean of debris produced by the sawcut, and seal the joint by installing a continuous closed-cell polyethylene backer rod, with the top of the backer rod placed at between 0 to 5 mm below the concrete surface.

The backer rod must remain in sound condition until the joint is sealed permanently. If damaged or disturbed, remove the backer rod, clean the joint and install a new temporary backer rod.

### **3.12.2 Permanent Sealing of Joint with Silicone Sealant**

Install permanent seal in joints within 10 days of pouring (for single cut operation) the slab or initial sawcutting (for two-cut operation).

The dimensions of the installed joint sealant and backer rod must be as shown on the Standard Drawings.

For the two-cut operation to widen the joint, widen the initial sawcut by sawcutting to form a sealant reservoir of the required size. Push the existing backer rod in the joint to the bottom of the initial sawcut immediately prior to commencing the widening sawcut.

If the backer rod is damaged in any way, replace it at your costs for the full length of any transverse joint and for the damaged length of any longitudinal joint.

Clean debris from joints prior to installing backer rod or joint sealant. Do not use a method of cleaning which would damage the sawcut or arrises (such as grit blasting) or leave a coating that would inhibit adhesion of the sealant.

When installing the joint sealant, the concrete surface temperature near the joint must be at least 5°C and the joint faces must be clean and surface dry.

Apply first a joint primer, if recommended by the sealant manufacturer, and install the sealant in the joint in accordance with the manufacturer's recommendations.

If using silicone sealant, insert it inside the joint by extrusion; then tool to promote bonding to the vertical faces of the reservoir and to achieve the required upper surface shape. Trim the top of the installed sealant and remove any excess sealant. Complete the entire process before a surface skin forms.

### **3.12.3 Permanent Sealing of Joint with Neoprene Sealant**

Where approved by the Principal, you may use neoprene joint sealants as permanent sealant. Where neoprene joint sealants are used, install them after the early entry sawcuts.

## **3.13 ASPHALT WEARING COURSE PLACEMENT**

If asphalt wearing courses are required, construct them in accordance with Specification TfNSW M250. The thickness of asphalt course must not be less than that of the adjacent asphalt.

Do not place asphalt until the concrete slab strength is sufficient to carry traffic.

## **3.14 OPENING TO TRAFFIC**

### **3.14.1 General**

Determine the concrete strength(s) of the slab at opening to traffic either by testing representative cylinders or flexural beams, or by using concrete maturity testing in accordance with ASTM C1074.

For the situation where there are more than two adjacent undowelled jointed slabs, more than one adjacent dowelled jointed slabs, and for CRCP replacement work, do not allow any trafficking of the base until the strength of the Lot has reached minimum compressive strength of 15 MPa or minimum flexural strength of 2.6 MPa.

### **3.14.2 Make Safe**

Before opening to traffic, make the work area and the surroundings safe, including removal of:

- (a) all plant and equipment;
- (b) all excess and loose material.
- (c) curing compound from areas where pavement marking material will be directly applied.

### **3.14.3 Reinstatement**

Unless otherwise directed, reinstate the following:

- (a) Guide posts in accordance with Specification TfNSW M3.
- (b) Signposting in accordance with Specifications TfNSW R143 and TfNSW 3400.
- (c) Pavement marking and raised reflective pavement markers in accordance with Specifications TfNSW R145 and TfNSW R142 respectively. Provide temporary delineation using a removable paint system that does not damage the pavement, temporary tapes, or “stick and stomps”.
- (d) Traffic signal detector loops and other traffic facilities loops in accordance with Specification TfNSW TS101 within a timeframe agreed with the Principal.
- (e) Entrances to private property in accordance with Specification TfNSW M1.

Rectify any damage caused by your operation to any part of the Works at your costs.

## **4 CONFORMITY**

### **4.1 GENERAL**

Submit a completed inspection and test plan (ITP), associated test results in accordance with Annexure M258/L and traceability information in accordance with Annexure M258/F for the Works.

### **4.2 FINISHED SURFACE LEVEL**

The finished surface level of replacement slabs and tie-ins to fixed surfaces must meet the requirements in Annexure M258/L.

The surface level of a fixed surface must meet the straightedge requirements specified in Annexure M258/L, with allowance for bituminous surfacing.

Slab replacement works must not result in any depression in surface levels with existing pavement which can pond water.

### **4.3 CONCRETE CRACKING**

Cracking is categorised as follows:

- (a) **Plastic shrinkage cracks:**

- discrete cracks of length less than 500 mm and of depth less than 50% of the base thickness which form during the plastic stage and which do not intersect a longitudinal edge or a formed

joint (i.e. not an induced joint).

- (b) **Planned drying shrinkage cracks in mesh-reinforced slabs (PCP-R, SFCP-R and JRCP):**  
cracks occurring in the central part of the slab, extending full depth and continuous between joints and/or edges. Restraint cracks over anchors fall in this category.
- (c) **Planned drying shrinkage cracks in CRCP:**  
full depth discrete transverse cracks without branches or convergences over the full width between longitudinal joints or edges.
- (d) **Planned induced cracks resulting from joint construction** (e.g. sawcuts are used to induce cracks).
- (e) **Unplanned cracks:**  
all other cracks not categorised above.

Categorise cracking of each new base slab. Estimate its extent and document results with all non-conforming cracks marked.

Slabs will be accepted as conforming if they contain only:

- (i) plastic shrinkage cracks with cumulative length of 1 m or less in any slab in jointed pavements or in any 5 m x 5 m square area in CRCP within 7 days of casting of concrete;
- (ii) planned drying shrinkage cracks and do not contain any unplanned cracks.

#### **4.4 CORING FOR COMPACTION TESTING**

Do not take cores without the prior approval of the Principal.

Restore all core holes using a low-shrink mix, similar in colour and with compressive strength of not less than that specified for the base. The mix must attain compressive strength of at least 10 MPa before being trafficked.

The costs of restoring core holes will be borne by you, except for additional cores ordered by the Principal.

#### **4.5 TEXTURE**

Where directed by the Principal, rectify those areas where the transverse texture is nonconforming by sawcutting grooves which are 3 mm wide and 3 mm deep, cut transversely in a random pattern, with a spacing between 10 mm and 18 mm and a mean spacing of between 12 mm and 15 mm.

Control and remove grooving residue from the pavement. Prevent the residue from flowing into the drainage system or across lanes.

#### **4.6 CONFORMITY CRITERIA**

Conformity criteria are specified in Annexure M258/L.

**ANNEXURE M258/A – PROJECT SPECIFIC REQUIREMENTS****A1 LOCATIONS AND DETAILS OF WORK**

*NOTES TO TENDER DOCUMENTER: (Delete this boxed text after completing Annexure M258/A1)*

*Complete the tables below by filling in the required details.*

*In Table M258/A.1, in the “Location” column, insert details such as direction, lane and distance from a feature (such as an intersection) for each slab to be replaced. In the “Drawing Reference” column, insert the reference for the drawings showing the locations, where available and applicable.*

*In Table M258/A.2, against the corresponding “Slab No.” stated in Table M258/A.1, for each pavement course, insert details of its depth, existing material forming the course, and its condition as either “Suitable” or “Unsuitable”.*

**Table M258/A.1 – Locations of Slab Replacement Work**

Slab No.	Road No.	Location <sup>(2)</sup>	Length x Width (m)	Area (m <sup>2</sup> )	Drawing Reference <sup>(1)</sup>

**Notes:**

<sup>(1)</sup> Drawings describing the locations and details for all slabs to be replaced.

**Table M258/A.2 Existing Pavement Condition**

Slab No.	Course 2 (Base) <sup>(1)</sup>			Course 3 (Subbase) <sup>(1)</sup>			Course 4 (Subgrade) <sup>(1)</sup>		
	Depth	Material	Condition <sup>(2)</sup>	Depth	Material	Condition <sup>(2)</sup>	Depth	Material	Condition <sup>(2)</sup>

**Notes:**

<sup>(1)</sup> For a typical pavement profile, refer to Figure M258.1.

<sup>(2)</sup> Refer also Clause 3.4.

**A2 OTHER REQUIREMENTS**

*NOTES TO TENDER DOCUMENTER: (Delete this boxed text after completing Annexure M258/A2)*

*Refer also the Guide Notes in TfNSW 3201.*

*Complete the table below by filling in the required details. Where “Yes / No” options are shown, delete whichever is not applicable.*

*Where paving trials are required, provide details of their locations in the Table below.*

**Table M258/A.3 – Materials and Other Requirements**

<b>Clause</b>	<b>Description</b>	<b>Requirement</b>
	<b>Replacement material:</b>	
	Under base course	
	Base course	
	Joint sealant	
3.10	Paving trial required	Yes / No
	If paving trial required, location of paving trial	

## **ANNEXURE M258/B – MEASUREMENT AND PAYMENT**

Refer to Clause 1.2.2.

Payment will be made for all costs associated with completing the work detailed in this Specification in accordance with the following Pay Items.

Where no specific pay items are provided for a particular item of work, the costs associated with that item of work are deemed to be included in the rates and prices generally for the Work Under the Contract.

Unless otherwise specified, a lump sum price for any of these items will not be accepted.

Payment will not be made for matters such as the following:

- (a) Tolerances allowed for in the course thickness.
- (b) Areas outside the area specified for treatment.
- (c) Removing and replacing rejected work with conforming work.
- (d) Rework required to achieve conformity.
- (e) Retesting.

### **Pay Item M258P1 - Lean-mix Concrete Subbase (SP6)**

The unit of measurement is the “cubic metre”.

The rate covers all costs associated with supply, placing, compaction and finishing of LCS (SP6), application of curing and debonding treatments on subbase, and excavation, removal and legal disposal of unsuitable material below the base.

### **Pay Item M258P2 - High Early Strength Lean-mix Concrete Subbase (SP10HES)**

The unit of measurement is the “cubic metre”.

The rate covers all costs associated with supply, placing, compaction and finishing of high early strength LCS (SP10HES), application of curing and debonding treatments on subbase, and excavation, removal and legal disposal of unsuitable material below the base.

### **Pay Item M258P3 - Sand Cement Mix Subbase**

The unit of measurement is the “cubic metre”.

The pay item covers all costs associated with supply, spreading, compaction and trimming of sand cement mix subbase, and excavation, removal and legal disposal of unsuitable material below the base.

### **Pay Item M258P4 - Cement Bound Granular Material Subbase**

The unit of measurement is the “cubic metre”.

The rate covers all costs associated with supply, spreading, compaction and trimming of cement bound granular material subbase, and excavation, removal and legal disposal of unsuitable material below the base.

**Pay Item M258P5 - Roller Compacted Concrete Subbase**

The unit of measurement is the “cubic metre”.

The rate covers all costs associated with supply, spreading, compaction and trimming of roller compacted concrete subbase, and excavation, removal and legal disposal of unsuitable material below the base.

**Pay Item M258P6 - Concrete Base Replacement**

The unit of measurement is the “cubic metre”.

The rate covers all costs associated with sawcutting of existing base slab, excavation and removal of base concrete to recycling depot or tip, preparation of surface underlying the base, supply of concrete and all other materials necessary for base slab replacement, placing concrete, texturing and curing, and activities required to reopen work to traffic, such as restoring previous pavement markings, retroreflective raised pavement markers and traffic loops.

**Pay Item M258P7 - Asphalt in Wearing Course**

The unit of measurement is the “cubic metre”.

The area will be determined from the dimensions shown on the Drawings or by measurements on Site.

The rate covers all costs associated with supply, placing and compacting asphalt in wearing surface.

**Pay Item M258P8 - Wire Reinforcing Mesh**

The unit of measurement is the “square metre”.

The area will be determined from the dimensions shown on the Drawings or by measurements on site.

The rate covers all costs associated with supply and placing of wire reinforcing mesh.

**Pay Item M258P9 - Longitudinal Joints**

The unit of measurement is the “metre”, measured along the line of the joint.

The rate covers all costs associated with construction of the longitudinal joint between slabs, including supply and installation of tiebars including drilling for drill-ties, where applicable.

**Pay Item M258P10 - Transverse Joints**

The unit of measurement is the “metre”, measured along the line of the joint.

The rate covers all costs associated with construction of the transverse joint between slabs, including supply and installation of dowels and tiebars, including drilling for drill-dowels and drill-ties, where applicable.

**Pay Item M258P11 - Steel Bar Reinforcement**

The unit of measurement is the “tonne” of steel bar reinforcement in CRCP and anchors.

The mass is determined from the unit masses given in AS/NZS 4671 and the actual length of bar, excluding laps and splices, measured in place. Only one bar is measured at a lap or splice.

**Slab Replacement (Concrete Pavement)**

**M258**

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This pay item does not cover dowels and tiebars, which are paid under the respective Pay Items for joints.

## **ANNEXURE M258/C – SCHEDULES OF HOLD POINTS, WITNESS POINTS AND IDENTIFIED RECORDS**

Refer to Clause 1.2.3.

### **C1 SCHEDULE OF HOLD POINTS AND WITNESS POINTS**

<b>Clause</b>	<b>Type</b>	<b>Description</b>
3.4.1	Witness	Assessment of excavated area
3.10	Witness	Construction of paving trial
3.10	Hold	Placing of base pavement other than the paving trial

### **C2 SCHEDULE OF IDENTIFIED RECORDS**

The records listed below are Identified Records for the purposes of TfNSW Q.

<b>Clause</b>	<b>Description of Identified Record</b>
1.2.4	PQP if required by the Principal
1.4	Names of personnel for carrying out concrete paving operations, together with evidence of relevant training and experience
2.2	Concrete mix design
2.3	QA documentation from steel supplier
2.5	Certification demonstrating that joint sealant is suitable for purpose from sealant manufacturer
2.6	Certification demonstrating that preformed joint filler is suitable for purpose from joint filler manufacturer
2.7	Certification demonstrating that surface debonding material is suitable for purpose from surface debonding material manufacturer
2.8	Certification demonstrating that curing compound is suitable for purpose from curing compounds manufacturer
3.1	Assessment of finished base level, thickness of adjacent layers, pavement course position, type of materials
3.9.2	Records of traceability information of each load of concrete
4.1	Completed ITP, test results and traceability information for the Works
TfNSW Q	Conformity records and nonconformity reports as required by TfNSW Q

## **ANNEXURE M258/D – PLANNING DOCUMENTS**

Refer to Clause 1.2.4.

The following documents are a summary of documents that must be included in the PROJECT QUALITY PLAN. Review the requirements of this Specification and other contract documents to determine any additional documentation requirements.

<b>Clause</b>	<b>Description of Document</b>
3.8	Methods to: monitor fresh base concrete temperature; monitor and record site temperatures; protect fresh concrete if the temperature falls below 10°C.
1.2.4, 3.10	Construction methodology for concrete slab replacement.

## **ANNEXURE M258/E – (NOT USED)**

## **ANNEXURE M258/F – TRACEABILITY OF SLAB REPLACEMENT WORK**

Record and report traceability information in a spreadsheet. Contact the TfNSW Rigid Pavement Manager at [CMR\\_Pavements@rms.nsw.gov.au](mailto:CMR_Pavements@rms.nsw.gov.au) to obtain the traceability spreadsheet template.

## **ANNEXURES M258/G TO M258/K – (NOT USED)**

## ANNEXURE M258/L – FREQUENCY OF INSPECTION AND TESTING, AND CONFORMITY CRITERIA

Clause	Property	Test Method	Minimum Frequency of Testing	Conformity Criteria
3.7.1	Tiebars and drill-ties: Layout, size	Inspection	All	Standard Drawings
	Dowels and drill-dowels: Layout, size, alignment			
3.7.4	Steel reinforcement: Layout, size, and cover	Inspection	All slabs	Standard Drawings
3.9.2	Uniformity of placed concrete	Inspection	All slabs	
3.9.4	Curing compound: Application rate	Tray inspection	Paving trial	0.3 L/m <sup>2</sup>
3.12	Horizontal edge ravelling at sawn joint <sup>(1)</sup>			
	Maximum extent of each ravelling	Inspection	Each joint	≤ 10 mm
	Cumulative length of all ravelling with dimension > 3 mm			≤ 300 mm in any 3.0 m
4	Base thickness		One measurement, at midway along exposed edge	-0 to +20 mm
	Base surface:			
	Deviation from a straightedge laid in any direction	3 m edge	Each slab	≤ 5 mm
	Depression capable of causing water ponding	Inspection		No potential for water ponding
4.2	Tie-ins to fixed surfaces:			
	Relative levels at joint	Inspection	Each fixed surface	No abrupt change of levels
	Deviation from a 3 m straightedge across joint	3 m straightedge		≤ 5 mm

Clause	Property	Test Method	Minimum Frequency of Testing	Conformity Criteria
3201 <sup>(2)</sup>	Concrete:			
8 <sup>(3)</sup>	Slump	AS 1012.3.1	For each grade of production per day, one for each of first eight batches at start of day and after a nonconforming batch, then one every four batches	As specified in 3201, Table 3201.4
8 <sup>(3)</sup>	Compressive strength at 28 day	AS 1012.9, Annex D & E <sup>(3)</sup>	At least one sample from each 50 m <sup>3</sup> of concrete. If quantity of concrete < 50 m <sup>3</sup> for project, minimum frequency is one for each project.	
Annex D & E <sup>(3)</sup>	Flexural strength at 28 day <sup>(4)</sup>	AS 1012.11		
4	Compaction of concrete:			
	Relative compaction	Coring as per TfNSW R83	In paving trial and one in each Lot where more than 2 PCP slabs or more than one JRCP slab are replaced	≥ 98%
	Within-core variability			≤ 40 kg/m <sup>3</sup>
4.3	Cracking in new base:			
	Plastic shrinkage cracks	As per Clause 4.3	Each slab	Cumulative length ≤ 1 m
	Drying shrinkage cracks			Only planned drying shrinkage cracks

**Notes:**

- (1) Each side of the sawn joint assessed separately.  
(2) Referring to TfNSW 3201.  
(3) Clauses and Annexures stated are those of TfNSW 3201.  
(4) Where applicable.

## **ANNEXURE M258/M – REFERENCED DOCUMENTS**

Refer to Clause 1.2.6.

### **TfNSW Specifications**

TfNSW Q	Quality Management System
TfNSW R83	Concrete Pavement Base
TfNSW R90	Roller Compacted Concrete Subbase
TfNSW R116	Heavy Duty Dense Graded Asphalt
TfNSW R119	Open Graded Asphalt
TfNSW R121	Stone Mastic Asphalt
TfNSW R142	Retroreflective Raised Pavement Markers
TfNSW R143	Signposting
TfNSW R145	Pavement Marking (Performance Based)
TfNSW 3201	Concrete for Maintenance
TfNSW 3204	Preformed Joint Fillers for Concrete Road Pavements and Structures
TfNSW 3221	Roller Compacted Concrete
TfNSW 3253	Bitumen for Pavements
TfNSW 3254	Bitumen Emulsion
TfNSW 3263	Hot Poured Elastomeric Joint Sealant for Roads
TfNSW 3400	Manufacture and Delivery of Road Signs
TfNSW M1	General Maintenance Requirements
TfNSW M3	Routine Services
TfNSW M250	Heavy Patching (Flexible Pavement)
TfNSW TS101	Traffic Signals – New Installation and Reconstruction

### **TfNSW Test Methods**

TfNSW T862	Wax emulsion stability
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### **Australian Standards**

AS 1012	Methods of testing concrete
AS 1012.3.1	Determination of properties related to the consistency of concrete - Slump test
AS 1012.9	Compressive strength tests – Concrete, mortar and grout specimens
AS 1012.11	Determination of the modulus of rupture
AS 1379	Specification and supply of concrete
AS/NZS 1554.3	Structural steel welding - Welding of reinforcing steel
AS 2341.18	Methods of testing bitumen and related roadmaking products – Determination of softening point (ring and ball method)

AS 2870	Residential slabs and footings
AS 3679.1	Structural steel – Hot-rolled bars and sections
AS 3799	Liquid membrane-forming curing compounds for concrete
AS/NZS 4671	Steel reinforcing materials
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles

**Other Standards**

ASTM C1074	Standard practice for estimating concrete strength by the maturity method
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