

TRANSPORT FOR NSW (TfNSW)

QA SPECIFICATION TfNSW M258

SLAB REPLACEMENT (CONCRETE PAVEMENT)

NOTE: TfNSW 3201 IS AN ESSENTIAL COMPANION TO TfNSW M258

NOTICE

This document is a Transport for NSW QA Specification. It has been developed for use with roadworks and bridgeworks contracts let by Transport for NSW or by local councils in NSW. It is not suitable for any other purpose and must not be used for any other purpose or in any other context.

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REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
M270 Ed 1/Rev 0		First edition	GM, RNIC	09/07/04
Ed 1/Rev 1	Notes & 1 Foreword	New clause re Intended use added New Foreword	GM, IC	31.08.07
Ed 1/Rev 2	Most	Format corrected	GM, IC	24.10.07
M258 Ed 2/Rev 0	All 5.2 5.3	To match new Maintenance Activities: <ul style="list-style-type: none">• Changed number• Changed Pay Items• Changed references to other similarly changed specifications Removed Deduction mechanisms Changed internal referencing format Introduced warranty. Added clause re Accomplishment reporting.	GM, IC	04.08.08
Ed 3/Rev 0	All	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Ed 3/Rev 2	4.9.4.4 Annex M	Clause reference to spec SI/TCS/8 (withdrawn) replaced with spec TS101.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

GUIDE NOTES

(Not Part of Contract Document)

THESE NOTES ARE NOT PART OF THE SPECIFICATION, CONTRACT OR AGREEMENT.

The following notes are intended to provide guidance to TfNSW personnel on the application of the Specification. They do not form part of the Specification, Contract or Agreement.

USING TfNSW M258

This specification has been specifically developed for TfNSW maintenance works. It must not be used without a review of its suitability for the application and in the contractual environment.

It is a QA specification. The use of QA specifications requires the implementation of a quality system by the service provider which meets the quality management system requirements specified in TfNSW Q.

OUTLINE

M258 Concrete Slab Replacement has been written for pavement works involving replacement of a few individual concrete slabs at different locations.

The specification is based on TfNSW Specification R83. It contains revised and updated clauses.

M258 specifies all requirements for slab replacement on site including excavation, replacement of subbase and paving the concrete base. Concrete is to be supplied to TfNSW Specification 3201 Concrete for Maintenance and it is recommended that you read the guide notes in that Specification before completing Annexure A in this Specification.

The work details usually contained in Annexure A of maintenance specifications must be included as a schedule attached to the Work Order. The details that need to be completed in the schedule are itemised at the end of the notes.

All requirements in the Specification must be completed by the Contractor unless otherwise specified.

In M258, the assumption is that Work will be conducted under lane closure but must be reopened to traffic quickly, often within 12 hours or less. Therefore, the limited time for Work has been considered in the development of M258 and a compromise between speed of operations and quality of work has been reached.

Annexure E provides the sealant reservoir dimensions for tied and untied joints. Refer to TfNSW Rigid Pavement Standard Details – Maintenance drawings for the details and locations of joint types. Silicone sealants supplied and used for new pavements in accordance with TfNSW R83 Specification are likely to be suitable for the reinstatement of sealed joints.

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.

When diamond grinding is proposed after slab replacement, the joints should be sealed after grinding to minimise damage to the sealant and ensure the sealant is kept below the final ground surface. In addition, if tining is proposed for the slab replacement, the tining should be carried out in the longitudinal direction to match the grinding direction.

M258 is NOT SUITABLE for reconstruction of concrete pavements where more than a few adjoining slabs are to be replaced. Such Work would normally use an extended lane closure. For reconstruction of concrete pavements, the appropriate construction specification must be used to ensure that the full design life, suitable roughness and finished surface profile are achieved.

TECHNICAL REFERENCE NOTES

Technical information on slab replacement is available in the TfNSW Rigid Pavement Standard Details – Maintenance drawings. The Contract Manager and Surveillance Officer should be familiar with the specific requirements and underlying reasons to maintaining concrete pavements.

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

- .1 Site location and slabs to be replaced including utility and drainage locations.
- .2 Location and dimensions of reinforcement and dowels.
- .3 Joint configuration including type and treatment of joints (that is, backer rod, joints, sealants, etc).
- .4 Dimensions, clearances, spacing etc of replacement slab.
- .5 Special requirements, such as geotextile.

The technical aspects of this Specification must not be changed without prior consultation with TfNSW Pavement Structures Section.

Additional requirements for special slabs (Clause 3.4) must be considered by the Contract Manager before issuing a Work Order to ensure work is properly scoped and requirements included in the Drawings.

- a Odd-shaped and mismatched slabs
- b Anchor Slabs
- c Slab Anchors

WORK ORDER

Work Orders must contain all the relevant details for the work and include the following schedule attached to the Work Order.

Note that the schedules have been removed from M258 so that it can be issued once and then referred to in future Works Orders without the need to reissue M258.



Transport
for NSW

QA SPECIFICATION M258

SLAB REPLACEMENT (CONCRETE PAVEMENT)

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IC-QA-M258

VERSION FOR: DATE:

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FOREWORD

TfNSW COPYRIGHT AND USE OF THIS DOCUMENT

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When this document forms part of a contract

This document should be read with all the documents forming the Contract.

When this document does not form part of a contract

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REVISIONS TO PREVIOUS VERSION

This document has been revised from TfNSW Specification M258 Edition 3 Revision 2.

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 have been indicated in the following manner:

- Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- 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 TfNSW M258
SLAB REPLACEMENT (CONCRETE PAVEMENT)

1 GENERAL

- | | | |
|-----|---|-----------------------------|
| 1.1 | This Specification has been developed specifically for TfNSW maintenance works. It must not be used in any type of contract without consideration of its suitability in the prevailing circumstances. | Intended use |
| 1.2 | The work to be executed under this Specification consists of whole or partial removal and replacement of CONCRETE road pavement SLABS. The required processes may include:

.1 Excavation of the existing pavement.

.2 Treatment of unsuitable material below the BASE.

.3 Construction of BASE course as one of the following:

.a Plain CONCRETE pavement (PCP).

.b Jointed reinforced CONCRETE pavement (JRCP).

.c Continuously reinforced CONCRETE pavement (CRCP).

.d Steel-fibre reinforced CONCRETE pavement (SFCP).

.4 Reinstate any existing access to a utility or drainage system. | Scope |
| 1.3 | Details of work are described in Annexure A. | Details of work |
| 1.4 | Some words, abbreviations or symbols have a special meaning in this specification and they are defined in Annexure M. Defined words are highlighted in capitals e.g. DEFINED TEXT. | Definitions |
| 1.5 | The standards, specifications and test methods referred to by this specification are referenced using an abbreviated form (eg TfNSW 3061). The titles are given in Annexure M. | Referenced documents |
| 1.6 | Unless otherwise specified, the issue of an Australian Standard or TfNSW Test Method to be used is the issue current one week before closing date for tenders. The TfNSW specification to be used is the issue contained in the contract documentation. | Applicable issue |
| 1.7 | YOU must provide all responsibilities, such as actions, works, supply of materials, unless specifically stated otherwise. Accordingly, this specification does not generally use wording such as " YOU shall ..." or "YOU must ..." because this is the underlying requirement. However, it is used where actions in a clause involve both YOU and the PRINCIPAL and the roles need to be unambiguous. | Interpretation |

- | | | |
|-----|--|--------------------------------|
| 1.8 | Payment for the activities associated with completing the work detailed under this Specification must be made using the Pay Item(s) and interpretation listed in Annexure B. | Measurement and payment |
| 1.9 | Provide the identified records specified in the TfNSW Quality System Specification included in the Contract Documents (TfNSW Q) and summarised in Annexure C.2. | Records |

2 PLANNING

2.1 PROJECT QUALITY PLAN

- | | | |
|-------|--|--------------------------------|
| 2.1.1 | The requirements of the PROJECT QUALITY PLAN are defined in TfNSW Q. In addition, the PROJECT QUALITY PLAN must: | General |
| .1 | Address the HOLD and WITNESS POINTS required by this Specification and summarised in Annexure C.1. The PRINCIPAL will consider the submitted documents prior to the release of any HOLD POINT. | Hold and Witness Points |
| .2 | Address each of the construction process requirements listed in this Specification and summarised in Annexure D.1. The construction process must include a detailed process description, inspection and test plans for the work. The process descriptions must be appropriate for the time allowable before reopening the work to traffic. | Construction process |
| .3 | Include a requirement for the routine submission of conformity data, which will certify compliance of all work and materials to the requirements of this Specification and include supporting documentation. | Conformity data |
| .4 | Be submitted to the PRINCIPAL at least 5 BUSINESS DAYS prior to commencement of work. | |
| .5 | In all cases where this Specification requires reference to the manufacturer's written recommendations, include copies of such recommendations in the PROJECT QUALITY PLAN. | Submission |

2.1.2	Process Held: Use of a new, additional, or changed construction method whenever:	HOLD POINT
	<ul style="list-style-type: none"> .1 A new construction method is proposed. .2 An additional construction method is proposed. .3 Any aspect of the NOMINATED CONSTRUCTION METHOD is changed. .4 The mix design or supplier for BASE CONCRETE is changed. <p>Submission: At least five BUSINESS DAYS before proposed use, the PROJECT QUALITY PLAN containing the detailed process descriptions, and inspection and test plans for the work. The minimum details are outlined in Annexure D.1.</p> <p>Release of Hold Point: The Principal will consider the submitted documents before authorising the release of the Hold Point.</p>	
2.1.3	Once the HOLD POINT is released, the proposed construction method becomes the NOMINATED CONSTRUCTION METHOD.	Nominated methods
2.2	PAVEMENT DESIGN	
	The design and details for the replacement SLAB are detailed in Annexure A.	Design of base
2.3	SURFACE LEVEL AND THICKNESS	
2.3.1	<p>The Finished BASE Levels (FBL) of the SLAB must:</p> <ul style="list-style-type: none"> .1 Match the existing surface levels around the perimeter of the SLAB replacement. .2 Make allowance for any surfacing on existing SLABS. .3 Even out surface irregularities to produce an even surface for the SLAB replacement. 	Base surface levels
2.3.2	The thickness of SLABS adjoining the SLAB replacement must be measured and recorded.	Existing slab thicknesses
2.3.3	Where the design thickness of the SLAB replacement is less than the measured thickness, the design thickness must be increased to the measured thickness.	Design thickness less than adjoining base slabs
2.3.4	PAVEMENT COURSE POSITION and type of material for each course must be determined for each underlying course at locations as typically shown in Figure 1. These locations must be agreed with the PRINCIPAL prior to commencement of work on the replacement SLAB.	Pavement course position

- 2.3.5 The PROJECT QUALITY PLAN must include the method to determine: **PQP**
- .1 The Finished BASE Levels (FBL).
 - .2 The thickness of adjacent SLABS.
 - .3 Pavement course position and assessment of material in each course.

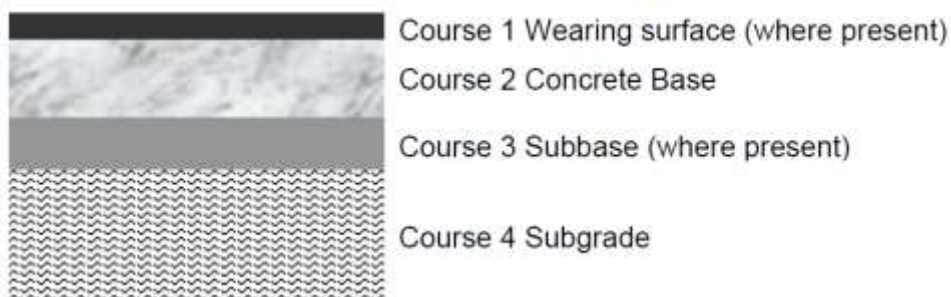


Figure 1 Pavement course position

2.4 SURFACE SHAPE

- 2.4.1 The finished surface of the replacement SLAB and any FIXED SURFACES must be constructed to meet the straightedge requirements in Clause 5. **Finished surface of the base**

The surface level of a cover on a public utility or drainage system, which is altered, must meet the straightedge requirements of the Specification, with any allowance made for bituminous surfacing.

- 2.4.2 Work must not result in depressions that could pond water on the replacement SLAB. **No depressions**
- 2.4.3 Tie-in of the pavement surface with FIXED SURFACES must not pond water or create a potential hazard for vehicles or pedestrians. **Tie-in with fixed surfaces**

2.5 SPECIAL SLABS

- 2.5.1 Odd-shaped and MISMATCHED SLABS must: **Odd-shaped and mismatched slabs**
- .1 Be reinforced if and as shown on the Drawings.
 - .2 If not shown on the Drawings, be reinforced with SL82 reinforcing fabric, unless transverse construction JOINTS are responsible for the odd-shape or mismatch.
 - .3 Be marked by imprint into the surface at the SLAB EDGE with the letter “R” according to the Drawings.

- 2.5.2 ANCHOR SLABS must: **Anchor slabs**
- .1 Be reinforced as shown on the Drawings.
 - .2 Be marked by imprint into the surface at the SLAB EDGE with the letter “A”. The stamp must be placed 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 ± 1 mm below the circular surround.
- TERMINAL ANCHOR SLABS must be constructed adjoining bridge APPROACH SLABS and at changes from rigid to flexible pavement.
- 2.5.3 Bridge APPROACH SLABS as shown on the Drawings must be constructed at bridge abutments. **Bridge approach slabs**
- 2.5.4 SLAB ANCHORS must be constructed as shown on the Drawings, and subject to the following conditions: **Slab anchors**
- .1 The ANCHOR must be cast at least 24 hours before the overlying SLAB.
 - .2 The trench must be trimmed to neat lines, be free of loose soil material, and be recompacted at the bottom to form a firm working platform.
 - .3 CONCRETE must be strength grade N32, 20 mm aggregate, and slump at the point of placement between 40 mm and 80 mm.
 - .4 CONCRETE must be placed and compacted using internal vibration in accordance with Clause 4.6.1.
 - .5 ANCHOR stirrups must be LAPPED (as defined) to the BASE reinforcement, which must not have other LAPS within 1.3 m of the anchor axis.
 - .6 At the junction with an existing flexible pavement, a straight sawcut to the full depth of any flexible pavement (including asphalt) must be made in the flexible pavement along the JOINT line. Excavation of the trench must then take place without disturbance or damage to the existing flexible pavement. Any disturbance or damage to the flexible pavement must be made good. Drainage of the interface between flexible and rigid pavements must be as shown on the Drawings. **Slab anchors**

2.6 TRIAL PAVEMENT

- 2.6.1 One TRIAL PAVEMENT must be constructed at the location specified in Annexure A. The TRIAL PAVEMENT must demonstrate that the NOMINATED CONSTRUCTION METHOD achieves the requirements of this Specification. Include details of the NOMINATED CONSTRUCTION METHOD for the TRIAL PAVEMENT in the PROJECT QUALITY PLAN. **TRIAL PAVEMENT**

2.6.2 In addition, the PRINCIPAL may direct a TRIAL PAVEMENT whenever: **Additional TRIAL PAVEMENTS**

- .1 The composition of the BASE SLAB CONCRETE mix is changed.
- .2 Nonconformity occurs in a trial pavement.
- .3 YOU significantly change the NOMINATED CONSTRUCTION METHOD, including changed compaction method.
- .4 Work does not comply with this Specification.

2.6.3 A TRIAL PAVEMENT must: **Requirements**

- .1 Have an area of at least 10 m².
- .2 Be constructed according to the NOMINATED CONSTRUCTION METHOD detailed in the PROJECT QUALITY PLAN and:
 - Use the NOMINATED CONSTRUCTION METHOD.
 - Use the nominated materials.
 - Use the nominated CONCRETE mix.
 - Use the inspection and sampling procedure.

2.6.4	Process Witnessed: Construction of TRIAL PAVEMENT. Submission: Notification of the time and date of the TRIAL PAVEMENT at least 3 BUSINESS DAYS before the start of construction of the TRIAL PAVEMENT.	WITNESS POINT
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2.6.5 A TRIAL PAVEMENT that conforms to this Specification is considered to be part of the work. **Accept as part of work**

3 RESOURCES

3.1 BASE CONCRETE

- 3.1.1 The CONCRETE mix for the work is specified in Annexure A. **Concrete mix**
- 3.1.2 The CONCRETE mix design must comply with Specification TfNSW 3201. **Concrete mix design**

3.1.3	Process Held: Supply of CONCRETE.	HOLD POINT
	Submission: At least five BUSINESS DAYS before proposed use, certification that the CONCRETE mix complies with TfNSW 3201.	
	Release of Hold Point: The Principal will consider the submitted documents before authorising the release of the Hold Point.	
3.1.4	The CONCRETE supplied and delivered to the work must be: .1 The mix specified. .2 Supplied by a premix CONCRETE supplier Quality Assured to meet TfNSW 3201 unless otherwise approved by the PRINCIPAL. .3 Freshly BATCHED for use on the work and without any recycled mix. .4 Maximum DELIVERY TIME of 45 minutes unless otherwise nominated in Annexure A. .5 Delivered by TRANSIT MIXER.	Supply and delivery requirements
3.1.5	Each LOAD of CONCRETE must be accompanied by an identification certificate (delivery docket) which: .1 Is pre-numbered and issued sequentially in the order of BATCHING. .2 Shows the source, type of mix and strength of mix. .3 Shows the time COMPLETION OF BATCHING.	Identification certificate (delivery docket)
3.1.6	The mixer must be run at full mixing speed for at least 3½ minutes on site: .1 After all materials are added to the drum, such as retempering water or admixtures. .2 Before any CONCRETE is used. If materials are added later to the drum, then the mixer must be run at full mixing speed for another 3½ minutes.	Mixing time on site
3.1.7	CONCRETE that has hydrated to a slump outside the specified range must not be used in the Work.	Hydration
3.1.8	Insufficient slump caused by a dry mix, but not due to hardening, may be corrected using retempering water or by adding an appropriate admixture according to TfNSW 3201.	Insufficient slump

3.1.9 Water (that is, retempering water) must only be added to the TRANSIT MIXER drum according to the following requirements: **Retempering water**

- .1 Retempering must only take place within 60 minutes of the COMPLETION OF BATCHING and in the presence of YOU at the point of placement.
- .2 The quantity of water added must not make the BATCH exceed the specified WATER/BINDER RATIO.
- .3 The retempering and the quantity of water added (± 1 litre) must be recorded on the identification certificate for that BATCH. If water is added after the commencement of discharge, the remaining quantity of CONCRETE at that time must also be recorded.
- .4 Immediately after retempering, the mixer must be operated at full mixing speed for at least 3½ minutes until the mix is uniform.
- .5 The slump must be checked for compliance.
- .6 Any test specimens moulded from CONCRETE prior to retempering must be ignored for acceptance purposes and new specimens must be made from the retempered mix in accordance with TfNSW 3201.

3.1.10 Record the location where each load of concrete was used.

Record location

3.2 MATERIALS FOR REPLACING UNSUITABLE MATERIAL BELOW THE BASE

The pavement material used to replace unsuitable material below the BASE is specified in Annexure A. The requirements are summarised in Table 1.

Requirements

Table 1 Materials for use below the BASE

Material Type	Requirement
Lean mix concrete	Compressive strength between: 6.0 MPa minimum @ 28 days (F_{28Min}), and 15.0 MPa maximum @ 28 days (F_{28Max}).
Sand cement mix	Mix proportion of 8:1 Sand to Cement mix, with a moisture content of approximately 8% and to suit compaction, freshly plant mixed, and delivered to site in a transit mixer not more than 45 minutes after batching.
Cement bound granular material	Granular pavement material, stabilised with 4% GP cement, with a moisture content of approximately 8% and to suit compaction, and freshly plant mixed.

3.3 STEEL REINFORCEMENT AND DOWELS

- 3.3.1 Steel reinforcement, which includes bars, mesh, tiebars and drill-ties, **Steel reinforcement** must:
- .1 Be of the sizes, dimensions and shapes specified in Annexure A.
 - .2 Where required, be bent to an internal bend radius of five times the diameter of the bar.
 - .3 Be without any unwanted kinks or bends.
 - .4 Not be bent or straightened in a manner that will damage the material.
- 3.3.2 Steel reinforcement and dowels supplied and delivered to the work must be supplied by a steel manufacturer Quality Assured to supply according to AS/NZS 4671. **Supply and delivery**
- The reinforcement material supplier must be certified by the Australian Certification Authority for Reinforcing Steels (ACRS) for the supply of reinforcement material.
- 3.3.3 Where a galvanised treatment is specified, steel reinforcement and dowels must be hot dipped in accordance with AS/NZS 4680. **Hot dipped**
- 3.3.4 Steel reinforcement must have a surface condition that does not impair its bond to the CONCRETE or its performance in the SLAB. **Surface condition**
Steel reinforcement must be free from surface contamination.
- Steel reinforcement must be cleaned of contaminants including loose or thick rust, grease, bitumen, paint, oil, mud, mortar, but must not be brought to a smooth or polished surface condition.
- 3.3.5 Dowels and drill-dowels must be: **Dowels**
- .1 Galvanised steel.
 - .2 Straight, 450 mm long and the diameter specified in Annexure A.
 - .3 Free of irregularities, such as crimped ends, burrs and protrusions, which could hinder movement of the SLAB. Guillotining to length is not permitted.
 - .4 Coated at one end with a tough, durable debonding agent of thickness $0.75 \text{ mm} \pm 0.25 \text{ mm}$ over a minimum length of 275 mm. At formed joints, the debonding must be within the second-placed slab.

3.4 ADHESIVE

- 3.4.1 A suitable epoxy or polyester adhesive system must be used to anchor drill-ties or drill-dowels into an existing SLAB. The adhesive system must develop anchorage strength of at least 85% of the yield strength of the bar. **Anchor drill-ties or drill-dowels**
- 3.4.2 Certification demonstrating that the adhesive system is suitable for the purpose must be supplied from the adhesive manufacturer. **Manufacturer certification**

3.5 JOINT SEALANT

- 3.5.1 The sealant type is specified in Annexure A.5. **Sealant type**
- 3.5.2 The sealant must form a permanent bond with the BASE CONCRETE on both sides of the JOINT consistent with the service life of the sealant. **Bond with concrete**
- 3.5.3 One of the following types of sealant must be used: **Joint sealant**
- .1 Silicone designated as highway grade by the manufacturer and packaged for use using an extrusion system.
 - .2 Urethane designated as highway grade by the manufacturer and packaged for use using an extrusion system.
 - .3 A hot poured elastomeric joint sealant that complies with Specification TfNSW 3263.
- 3.5.4 Certification demonstrating that the sealant is suitable for the purpose must be supplied from the sealant manufacturer. **Manufacturer certification**

3.6 PREFORMED JOINT FILLER

- 3.6.1 The backer rod must be continuous closed-cell polyethylene. **Backer rod**
- 3.6.2 One of the following types of preformed joint filler must be used: **Joint filler**
- .1 Bitumen impregnated fibreboard.
 - .2 Self-expanding cork.
 - .3 Closed cell foam.
- The preformed joint filler must comply with Specification TfNSW 3204.
- 3.6.3 Certification demonstrating that the preformed joint filler is suitable for the purpose must be supplied from the joint filler manufacturer. **Manufacturer certification**

3.7 SUBBASE SURFACE DEBONDING MATERIALS

- 3.7.1 Subbase surface debonding materials must comply with the requirements in Table 2. **Surface debonding compounds**

- 3.7.2 Certification demonstrating that the surface debonding material is suitable for the purpose must be supplied by the surface debonding material manufacturer.

Manufacturer certification**Table 2 Subbase surface debonding materials**

Type	Requirements
Wax emulsion (i)	AS 3799 Type 2 Class A TfNSW T862 stability - the rate of separation in seven days less than or equal to 4%.
Sprayed Bituminous Seals Hot bitumen	Bitumen Class 170 cut back with cutter oil according to TfNSW 3253. The rate of net bitumen application must be between 0.60 and 0.80 L/m ² , measured at 15°C. Spread aggregate with nominal size 5 mm which is either free of dust or precoated to provide a dense mat of single stone thickness without excessive loose stones.
Bitumen emulsion	Emulsion CRS 170 according to TfNSW 3254. Thinly spread with aggregate.
Polyethylene sheeting	200 µm (0.2 mm) thick polyethylene sheeting in accordance with AS 2870.
Note to Table 2: (i) Wax emulsion can be slippery and must not be used if the surface is to be used by the public.	

3.8 CURING COMPOUNDS

- 3.8.1 Curing compounds must comply with the requirements in Table 3.

Curing compounds**Table 3 Curing compound requirements**

Type (i)	Australian Standard or Test Method	Requirements
Bitumen emulsion		Grade CRS/170 complying with TfNSW 3254
Wax emulsion (ii) (only for use on lean mix concrete)	AS 3799 TfNSW T862	Type 2 Class A When tested for stability in accordance with TfNSW T862, the rate of separation in seven days must not exceed 4%.
Water-borne hydrocarbon resin or styrene butadiene resin (SBR) compounds	AS 3799	Class Z Type 1-D or Type 2
C5 hydrocarbon resin compound	AS 3799	Class B Type 1-D with no added aromatic hydrocarbons.
Notes to Table 3: (i) Where the concrete BASE is to be surfaced with asphalt or a sprayed bituminous surfacing, the curing compound must be bitumen emulsion. Attention is also drawn to Specification TfNSW R145 regarding compatibility of curing compound under line marking. (ii) Wax emulsion can be slippery and must not be used if the surface is to be used by the public.		

- 3.8.2 Certification demonstrating that the curing compound is suitable for the purpose must be supplied by the curing compound manufacturer. **Manufacturer certification**

3.9 ASPHALT WEARING COURSE

Asphalt used in the wearing course must conform to Specifications TfNSW R116 for dense graded asphalt, TfNSW R119 for open graded asphalt, and TfNSW R121 for stone mastic asphalt, as applicable to the Work under the Contract.

4 EXECUTION

4.1 GENERAL

- 4.1.1 Any activity or material used on the work must not cause a nuisance to people or property. Material must not enter or adhere to vehicles, surrounding pavement, drainage structures, and other road fixtures. **Avoid nuisance**
- 4.1.2 Excavation must be performed without damage to adjoining FIXED SURFACES, utilities, drainage lines, or underlying Subbase course. Any such damage must be repaired at YOUR cost. **Excavation**

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| 4.1.3 Process Held: Placing and compaction of CONCRETE BASE pavement other than the TRIAL PAVEMENT. HOLD POINT |
| Submission: Documentation confirming conformity of TRIAL PAVEMENT with this Specification in accordance with the PROJECT QUALITY PLAN. Results from process control and conformity testing. |
| Release of Hold Point: The Principal will consider the submitted documents before authorising the release of the Hold Point. |

- 4.1.4 CONCRETE must not be placed during rain or when rain appears imminent or when the air temperature measured outdoors in the shade is either less than 5°C or greater than 36°C. **Temperature and rain**

The temperature of the fresh BASE CONCRETE must not fall below 5°C within the first 24 hours after placement or until the time of opening to traffic, whichever occurs first.

Equipment to protect the CONCRETE from low temperature must be kept on site ready for use and must be used when required.

- 4.1.5 The construction processes must be appropriate to address all project constraints, including: **Site constraints**
- .1 Time available to start and complete the work.
 - .2 Time of day when work is being conducted.

- 4.1.6 The PROJECT QUALITY PLAN must include the method to: **PQP**
- .1 Monitor fresh BASE CONCRETE temperature.
 - .2 Monitor and record site temperatures.
 - .3 Protect fresh BASE CONCRETE if the temperature falls below 5°C.

4.2 SAWCUTTING BASE

- 4.2.1 The SLAB to be replaced must be sawcut: **Sawcut the base**
- .1 To the full depth of the BASE and not extend more than 10 mm vertically into an underlying subbase unless the subbase is to be replaced.
 - .2 Along existing transverse or longitudinal JOINTS.
- 4.2.2 Sawcuts at longitudinal and transverse JOINTS must not extend horizontally more than 250 mm beyond the SLAB to be replaced. **Sawcuts at longitudinal and transverse joints**
- 4.2.3 Transverse sawcuts required to make a construction JOINT must not extend horizontally beyond the SLAB to be replaced. **Transverse sawcuts mid-slab**
- 4.2.4 Sawcutting within the SLAB to be replaced must not extend horizontally beyond this SLAB. **Sawcutting for excavation**

4.3 TREAT UNSUITABLE MATERIAL BELOW BASE

4.3.1 Unsuitable Material

- 4.3.1.1 Nominated areas of unsuitable material included in the work and the required treatment is specified in Annexure A.2. **Nominated areas**
- 4.3.1.2 The PRINCIPAL may identify and direct the type of treatment for additional areas of unsuitable material. YOU must advise whether the additional work can be completed within the time available. **PRINCIPAL nominates additional areas**
- 4.3.1.3 Include details of the method to assess the suitability of the material below the BASE in the PROJECT QUALITY PLAN. **Assess existing pavement**
- Assess the suitability of the material below the BASE in accordance with the PROJECT QUALITY PLAN. The material below the BASE must provide a firm, smooth working platform on which to construct the BASE. Notify the PRINCIPAL immediately where the proposed treatment is not appropriate for the site conditions found.

4.3.1.4	Process Witnessed: Assessment of working platform.	WITNESS POINT
Submission: Notification of the time and date of excavation at least 3 BUSINESS DAYS prior to work starting.		
4.3.1.5	Where the treatment involves a utility or drainage line, the relevant authority must be advised immediately. Work cannot proceed until a clearance has been issued by the relevant authority. Such details of communication with the relevant authority must be recorded in writing.	Action involving a utility or drainage line
4.3.1.6	Where the proposed treatment involves extra work and the PRINCIPAL is unavailable, YOU must:	Principal is unavailable
.1 Record the time that YOU attempted to notify the PRINCIPAL and the method of attempted notification.		
.2 Record the assessment.		
.3 Take samples to represent the unsuitable material.		
One of the following actions must then be taken and the PRINCIPAL must be informed of the action taken and its justification as soon as possible:		
.a Where the proposed treatment can be completed within the time constraint YOU must proceed with the proposed treatment.		
.b Where the proposed treatment cannot be completed within the time constraint YOU must cease operations and make the site safe and, where required, trafficable.		
4.3.2	Replace Material Under BASE	
4.3.2.1	Where excavation of unsuitable material below the BASE is required, unsuitable material must be excavated vertically at the EDGE of existing CONCRETE BASE.	Excavation of unsuitable material
4.3.2.2	Nominated areas of unsuitable material below the BASE must be treated according to Annexure A and Clause 2.	Replacement material
4.3.2.3	All replaced material must be well compacted to create a firm and even course under the BASE to meet the requirements in Table 4. Material near FIXED SURFACES must similarly be well compacted.	Compaction

4.3.2.4 Where lean mix CONCRETE is used for the subbase, the subbase CONCRETE surface must be cured with either: **Curing Subbase**

- (a) a bitumen emulsion, wax emulsion, or hydrocarbon resin curing compound selected from Table 3; or
- (b) polyethylene sheeting in accordance with Table 2. The polyethylene sheeting must completely cover the subbase and be secured around the perimeter and elsewhere as required to prevent evaporation from the subbase surface and to prevent the sheeting from being dislodged by wind.

Where a wax emulsion or hydrocarbon resin curing compound is used, it must be applied at an application rate of at least 0.30 L/m².

Where a bitumen emulsion curing compound is used, it must be applied at an application rate of not less than 0.50 L/m² residual bitumen.

Table 4 Requirement for reinstating material under BASE

Material Type	Requirement
Lean mix concrete	Place, spread and compact concrete mix using internal vibrators.
Sand cement mix	Compact using at least 3 passes with a vibrating plate compactor.
Cement bound granular material	Compact using at least 3 passes with a vibrating plate compactor.

4.4 PREPARING THE EXCAVATED OPENING

4.4.1 Preparing Surface Underlying the BASE

4.4.1.1 The surface under the BASE must be free of any loose debris or irregularity that would restrain the overlying BASE CONCRETE from horizontal movement. **Surface irregularities**

Bumps, defects or protrusions must be removed.

Wide cracks and spalls in sand-cement or lean mix concrete must be rendered with a sand cement mix.

- 4.4.1.2 Where lean mix CONCRETE is the subbase, the surface must have a surface debonding treatment applied before placing steel reinforcement for the BASE. **Debonding over lean mix concrete**

The surface must be free of all loose, foreign and deleterious material before the treatment is applied. The debonding treatment must comply with the relevant requirements in Table 2.

In the case where polyethylene sheeting is selected as a debonding treatment, the sheeting must be placed so that it is smooth and free of creases, tears, or holes. Overlaps at edges of the sheeting must not be less than 200 mm and must be secured with tape to prevent mortar or concrete from passing through the overlap.

4.4.2 Preparing Adjoining Joints and Edges

- 4.4.2.1 The location of JOINTS in the replacement SLAB must be consistent with those in the existing adjoining BASE SLABS. JOINTS must be according to the details provided in Annexure A. **Details of joints**

- 4.4.2.2 Transverse construction JOINTS of adjoining CONCRETE BASE SLABS must be scabbled on the vertical face to expose coarse aggregate, except for the top and bottom 45 mm. **Preparation of construction joint**

New untied JOINTS and existing butt JOINT faces (tied or untied) need not be scabbled.

- 4.4.2.3 At FORMED transverse construction JOINTS and longitudinal JOINTS the vertical faces of CONCRETE BASE must be debonded to avoid induced spalling at arrises. The JOINT face must be sprayed with a wax emulsion curing compound prior to placing the abutting CONCRETE. The coating must be intact and effective at the time of CONCRETE placement. Steel reinforcement must not be sprayed. **Debonding transverse construction joints and longitudinal joints**

- 4.4.2.4 Kerb and gutter is to be separated by a longitudinal JOINT (including debonding of FORMED JOINTS) but the rounding of the kerb or gutter lip must not be greater than 5 mm even if a larger rounding is shown in the Drawings. **Kerb and gutter**

- 4.4.2.5 All inlet pits must be separated from adjoining BASE CONCRETE by an isolation JOINT in accordance with the Drawings. **Inlet pits**

- 4.4.2.6 At existing SLAB EDGES and JOINTS that are adjacent to the SLAB being replaced, a permanent silicone seal must extend down the vertical faces of JOINTS and any underlying cracks that exceed 2 mm in width to prevent entry of mortar into the existing adjacent JOINTS and underlying cracks. **Prevent penetration of mortar into adjacent SLABS**

4.5 PLACING STEEL

4.5.1 Tiebars and Drill-Ties

4.5.1.1 The layout, size and spacing of tiebars or drill-ties is given in the Drawings referred to in Annexure A. **Layout**

4.5.1.2 The procedure of inserting tiebars and drill-ties must: **Procedure**

- .1 Produce the alignment and spacing specified in the Drawings referred to in Annexure A.
- .2 Not disturb the finished CONCRETE surface.
- .3 Vertically locate them in the central third of a SLAB and evenly space them horizontally.

4.5.1.3 Where there is an adjacent SLAB without tiebars, each drill-tie must be securely fixed using an adhesive system according to Clause 3.4. **Drill-tie fixed in drilled holes**

The diameter and length of the drill hole must be selected to suit the size of drill-tie, thickness of adjacent SLAB and type of adhesive system used.

The drilled hole must be cleaned and prepared and drill-ties fixed according to the adhesive manufacturer's recommendations.

4.5.1.4 Any drilling must not cause damage to the adjacent SLAB such as cracking, broken EDGES or spalled CONCRETE. Any damage and holes drilled but not used must be repaired at YOUR cost. **Damage to the adjacent slab**

4.5.1.5 Tiebars and drill-ties must be: **Placement of tiebars and drill-ties**

- .1 at least 300 mm clear of any crack or transverse JOINT for longitudinal tied JOINTS, and
- .2 at least 150 mm away from a longitudinal JOINT or EDGE of SLAB in transverse tied JOINTS.

4.5.1.6 Details of the proposed drill-tie installation method must be included as part of the PROJECT QUALITY PLAN. **PROJECT QUALITY PLAN**

4.5.2 Dowels and Drill-Dowels

4.5.2.1 The layout, size and spacing of dowels and drill-dowels is given in the Drawings referred to in Annexure A. **Layout**

- 4.5.2.2 Dowels and drill-dowels must be installed: **Dowels and drill-dowels**
- .1 At expansion JOINTS, with the debonded end capped to provide a clearance for movement equal to the width of the JOINT plus 15 mm.
 - .2 At a depth which is the middle of the adjoining SLAB face.
 - .3 More than 150 mm away from a longitudinal JOINT or SLAB corner.
- 4.5.2.3 At FORMED JOINTS, dowels must be installed: **Dowels**
- .1 With the debonded end in the second-placed SLAB.
 - .2 Be supported so that no part of the assembly, except the dowel, crosses the JOINT.
- 4.5.2.4 Where there is an adjacent SLAB without dowels each drill-dowel must be securely fixed using an adhesive system according to Clause 3.4. **Drill-dowels fixed in drilled holes**
- The diameter and length of the drill hole must be selected to suit the size of drill-dowels, thickness of adjacent SLAB, and type of adhesive system used.
- The drilled hole must be cleaned and prepared, and drill-dowels fixed according to the adhesive manufacturer's recommendations.
- 4.5.2.5 Any drilling must not cause damage to the adjacent SLAB such as cracking, broken EDGES or spalled CONCRETE. Any damage and holes drilled but not used must be repaired at YOUR cost. **Damage to the adjacent slab**
- 4.5.2.6 Details of the proposed dowel support system, drill-dowel installation, and the method of debonding must be included as part of the PROJECT QUALITY PLAN. **PROJECT QUALITY PLAN**
- 4.5.3 Steel Fixing**
- 4.5.3.1 The detail for steel reinforcement is shown in the Drawings referred to in Annexure A. **Placing in position**
- Unless otherwise specified, steel reinforcement must:
- .1 Be located within the central third of the SLAB.
 - .2 Have 80 ± 20 mm cover to top and bottom, and joints and edges.
 - .3 Be placed to enable compaction of the enveloping CONCRETE.

- 4.5.3.2 Reinforcement must be secured in place by tying the bars and/or fabric together with annealed steel wire having a diameter at least 1.2 mm. Tack welding may be used instead of wire ties on reinforcing bars. **Securing**
- 4.5.3.3 Reinforcement must:
- .1 Be supported and secured in the specified position by either CONCRETE or plastic chairs. **Support reinforcement**
 - .2 Remain in position during placing and compaction of the CONCRETE.
 - .3 Not be supported by wire chairs, timber, or aggregate.
- 4.5.3.4 Fabric sheets when overlapped must mechanically engage each other so that the bottom sheet has transverse wires uppermost and the top sheet has them underneath. **Overlapped fabric sheets**
- 4.5.3.5 Splices must conform to the Drawings. The ends of bars forming a LAPPED splice must be either welded, or securely tied together in at least two places, or secured with an approved mechanical bar splice. Mechanical bar splices when tested in tension or compression must develop at least the nominal ultimate tensile or compressive strength of the smaller of the bars being tested. **Splices and securing ends**
- 4.5.3.6 In welded splices, bars may only be welded by an electrical welding method. Welding must comply with AS 1554.3. The welded splice must meet requirements of tensile and bend tests specified for the parent metal. **Welded splices**

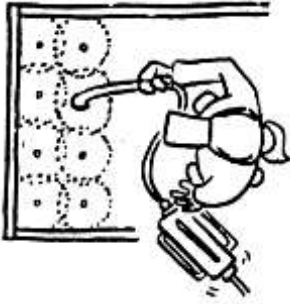
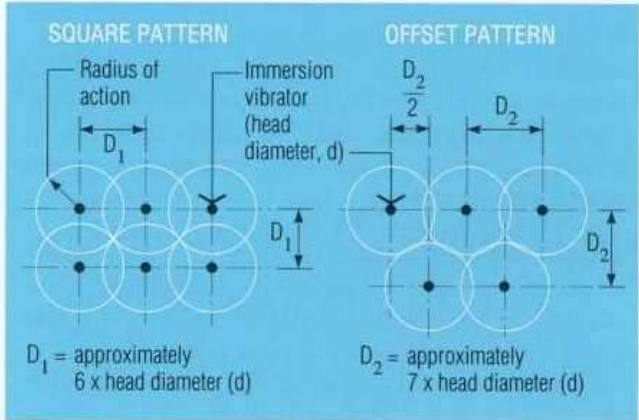
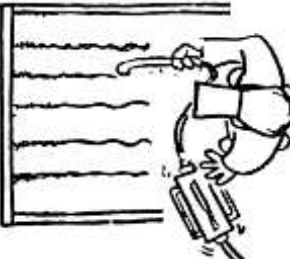
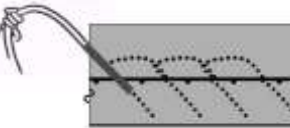
4.6 BASE CONCRETE

4.6.1 Placing and Compacting

- 4.6.1.1 The underlying surface on which BASE CONCRETE is to be placed must be prepared according to Clause 4.5. **Underlying surface**
- 4.6.1.2 Forms must be designed and constructed to:
- .1 Achieve specified dimensions and the finished BASE surface level; **Forms**
 - .2 Retain all CONCRETE;
 - .3 Be removed after setting without damaging or adhering to the CONCRETE.

- 4.6.1.3 CONCRETE must be placed and compacted before stiffening to: **Place and finish concrete**
- .1 Achieve specified dimensions and the finished BASE surface level.
 - .2 Produce uniform, dense, and homogeneous CONCRETE throughout the BASE by:
 - Expelling entrapped air.
 - Closely surrounding any reinforcement and embedment with concrete.
 - Avoiding segregation or loss of material.
- 4.6.1.4 Internal vibrators must be used to compact the CONCRETE by regular and systematic insertions using one of the methods shown in Table 5. **Use of internal vibrators**
- Vibration near unsupported EDGES of CONCRETE or when the CONCRETE is moving is not included as part of the compaction time or effort.
- 4.6.1.5 An alternative pattern using internal vibrators that is not shown in Table 5 may be proposed in the Construction Method. The alternative method must be demonstrated to conform to the requirements in Clause 5.1.9 following use in a TRIAL PAVEMENT. **Alternative vibration pattern**
- 4.6.1.6 Internal vibrators must meet the following requirements: **Requirements for internal vibrators**
- .1 Have a minimum diameter of 50 mm.
 - .2 Operate at a frequency of between 8,000 and 12,000 vibrations/minute (130–200 Hz).
- 4.6.1.7 The number of vibrators used for the work must be at least one for every 10 m³ or part thereof of concrete placed per hour. There must be at least one operational vibrator unit on stand-by at the site. **Number of vibrators**
- 4.6.1.8 A transverse construction JOINT must be formed when a loss of integrity in the CONCRETE mass is likely such as when an interruption to paving occurs. **Construction JOINT**
- 4.6.1.9 Hand finishing, including trowelling and bull-floating, of the surface must be minimised. Power trowelling of the surface is not permitted. **Surface finishing**

Table 5 Internal vibration methods

Method	Diagram	Guideline Parameters (i)
1. Dip method	 <p>Plan view of method</p>	<p>Insertions using one of the patterns in the diagram below, where the spacings D_1 and D_2 must be 300 mm maximum, and</p> <p>Insertion durations of 10 secs minimum, and</p> <p>Withdrawal speed not exceeding 1.5 m/min.</p>  <p>Source: "Concrete Practice on Building Sites". SAA Handbook HB67 – 1995, jointly as Cement & Concrete Association publication C&CAA T43 (1995).</p>
2. Drag method	 <p>Plan view of method</p>	<p>Vibrator paths at spacings of 350 mm maximum, and</p> <p>Travel speed of 1.5 m/min maximum.</p>
2M. Modified Drag method (for reinforced pavement)	 <p>Section view of method</p>	<p>Vibrator paths at spacings of 350 mm maximum, and</p> <p>Insertion spacings of 350 mm maximum, and</p> <p>Nett horizontal travel speed of 1.5 m/min maximum, and</p> <p>Withdrawal speed not exceeding 1.5 m/min.</p>
<p>Notes to Table 5:</p> <p>(i) The vibration intensity required to achieve compaction conformity will vary according to the workability of the concrete. The guideline parameters are specified as minimum levels only, and higher compaction levels may be required to produce conforming results.</p>		

4.6.1.10 Any build-up of mortar during paving must be removed and not incorporated into the work.

Mortar build-up

4.6.1.11	<p>The BASE CONCRETE must finally be compacted and finished by at least two passes of a hand-guided vibratory screed traversing the full width of the SLAB on each pass.</p> <p>A suitable volume of fresh CONCRETE must be maintained in front of the screed over its whole length to ensure the uniform transmission of vibration into the CONCRETE.</p>	Final compaction of base
4.6.2	Texturing of Surface	
4.6.2.1	<p>The texture to be applied to the BASE CONCRETE is specified in Annexure A.3.</p>	Type of texture
4.6.2.2	<p>The surface texturing process must produce:</p> <ol style="list-style-type: none"> .1 A uniform and consistent finish without rounding of the paved EDGES. .2 Minimal ravelling of the surface. 	Surface texturing process
4.6.2.3	<p>Where longitudinal texturing is specified in Annexure A.3, it must produce a uniform texture using a hessian-drag or an equivalent. The length of the drag must be adjusted to produce the specified texture. The drag must be replaced when texture is inconsistent.</p>	Longitudinal texture
4.6.2.4	<p>Where specified in Annexure A, and after any longitudinal texturing, the surface of the plastic CONCRETE must be transversely textured using a texturing comb:</p> <ol style="list-style-type: none"> .1 At least 750 mm wide. .2 With rectangular-shaped tines of flat spring steel, approximately 0.6 mm thick and 3 mm wide. .3 Having tines randomly spaced between 10 mm and 21 mm apart, with an average spacing between 13 mm and 14 mm. A typical pattern is: 10, 14, 16, 11, 10, 13, 15, 16, 11, 10, 21, 13, 10 mm. 	Transverse texture
4.6.2.5	<p>Areas where transverse texture is nonconforming must be rectified by sawcut grooves with the following requirements:</p> <ol style="list-style-type: none"> .1 3 mm wide and 3 mm deep. .2 Cut transversely in a random pattern: <ol style="list-style-type: none"> .a With a spacing between 10 mm and 18 mm, and .b With a mean spacing between 12 mm and 15 mm. <p>Grooving residue must be controlled and removed from the pavement. It must not flow into the drainage system or across lanes that are in public use.</p>	Non-conforming texture to be rectified

4.6.3 Protection and Curing of the Work

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| 4.6.3.1 | The BASE must be protected from damage, including water, temperature, vehicular and pedestrian traffic until opened to traffic. | Protect the base |
| 4.6.3.2 | Where an evaporation retarder is used to restrict the evaporation of water, it must be applied uniformly as a fine spray. Any subsequent finishing operations must not incorporate the evaporation retarder into the surface mortar. | Evaporation retarder |
| 4.6.3.3 | The CONCRETE curing method and minimum duration for curing is specified in Annexure A.3. The curing method must comply with the requirements in Table 6.

Curing must not damage the finished and textured surface of the SLAB. | Curing |
| 4.6.3.4 | Work that uses an accelerated mix must have the surface temperature of the new SLAB kept at a temperature of at least 35°C from the time of final set to the time of opening to traffic.

A temperature system, such as thermal covers, must be employed within 20 minutes of texturing. | Surface temperature of accelerated mix |
| 4.6.3.5 | Details of the proposed protection methods, curing method and temperature system must be included as part of the PROJECT QUALITY PLAN.

The new CONCRETE must be regularly inspected to ensure the effectiveness of the construction methods as stated in the PROJECT QUALITY PLAN. | PROJECT QUALITY PLAN |

Table 6 Requirement for curing methods

Curing Method	Requirement
Polyethylene sheeting	<p>Polyethylene sheeting must be installed after texturing and not later than:</p> <ul style="list-style-type: none"> ■ 20 minutes after texturing 40 MPa accelerated mixes, or ■ Within 15 minutes of the surface reaching the “low sheen” bleed water condition for other mixes. <p>The polyethylene sheeting must:</p> <ul style="list-style-type: none"> ■ Provide a waterproof covering. ■ Completely cover the SLAB and extend a minimum distance of 0.3 m beyond the SLAB on all EDGES. ■ Be secured around the perimeter and elsewhere as required to prevent evaporation from the SLAB surface and to prevent the sheeting from being dislodged by wind.
Sprayed curing compound	<p>A sprayed curing compound must be applied:</p> <ul style="list-style-type: none"> ■ Within 15 minutes of the surface reaching the “low sheen” bleed water condition, ■ In a uniform application to create a continuous and unbroken film. ■ Within 30 minutes of stripping fixed-formed surfaces. ■ At an application rate which is the greater of: <ul style="list-style-type: none"> - 0.4 L/m², or - 1¼ times the rate stated on the test certificate for curing efficiency.

4.7 INSTALLING AND SEALING JOINTS

4.7.1 Initial Forming of Joint

4.7.1.1 Where specified, JOINTS must be FORMED or sawcut to control cracking. **Joints**

4.7.1.2 FORMED JOINTS must use pre-formed joint filler according to Clause 3.6 and the joint filler must be secured in place. **Formed joints**

4.7.1.3 Where JOINTS are to be sawcut, an initial sawcut must be made to the depth specified: **Sawn joints**

.1 After the CONCRETE has gained initial set.

.2 Before unplanned cracking develops.

Within two hours of the initial sawcut, the JOINT must be:

.a Prior to sealing, washed clean of debris produced by the saw.

.b Sealed by installing a continuous closed-cell polyethylene backer rod or PVC spline rubber seal. The top of the backer rod or seal must be placed from 0 to 5 mm below the CONCRETE surface.

- 4.7.1.4 The backer rod or seal must remain in sound condition until the JOINT is sealed permanently. A damaged or disturbed backer rod or seal must be removed, the JOINT cleaned and a new temporary backer rod or seal installed. **Maintain temporary sealant**

4.7.2 Permanent Sealing of Joint

- 4.7.2.1 A permanent seal must be placed in a JOINT within 10 BUSINESS DAYS of pouring the SLAB or initial sawing. **Timing**

- 4.7.2.2 The dimensions of the installed joint sealant and backer rod are given in the Series MP Drawings referenced in Annexure M. **Dimensions**

- 4.7.2.3 Where specified in the Series MP Drawings referenced in Annexure M, JOINTS are to be widened by sawcutting to form a sealant reservoir of the required size. In a two-cut operation to widen the JOINT: **Widening narrow joints**

- .1 The existing seal must remain in the JOINT.
- .2 The existing seal must be pushed to the bottom of the initial sawcut immediately prior to commencing the widening sawcut.

- 4.7.2.4 Clean debris from JOINTS prior to installing backer rod or joint sealant. The method of cleaning must not damage the sawcut or arrises (for example, must not use grit blasting) and must not leave any coating that would inhibit adhesion of the sealant. **Clean joints**

- 4.7.2.5 A backer rod must be located: **Backer rod**

- .1 At a depth to keep the sealant at the planned location and enable the correct shape.
- .2 Over the top of any longitudinal JOINT seal already in place.

If the backer rod is damaged in any way it must be replaced:

- .a For the full length of any transverse JOINT.
- .b For the damaged length of any longitudinal JOINT.

- 4.7.2.6 At the time of installing the joint sealant: **Sealing joint**

- .1 The CONCRETE surface temperature near the JOINT must be at least 5°C.
- .2 The JOINT faces must be clean and surface dry.
- .3 Any recommended primer has been applied.
- .4 The sealant must be installed in the JOINT according to the manufacturer's recommendations.

- 4.7.2.7 In the case where two or more SLABS are to be replaced side by side across the pavement, a permanent silicone seal must extend down the vertical faces of SLAB JOINTS and any underlying cracks that exceed 2 mm in width to prevent entry of mortar into the SLAB JOINTS and underlying cracks when the adjacent SLABS are placed. **Prevent penetration of mortar into adjacent SLABS**
- 4.7.2.8 A silicone sealant must be: **Silicone sealant**
- .1 Introduced into the reservoir by extrusion.
 - .2 Tooled to promote bonding to the vertical faces of the reservoir.
 - .3 Tooled to achieve the required upper surface shape.
 - .4 Trimmed and any excess sealant removed.
 - .5 Completed before a surface skin forms.
- 4.7.2.9 Self-expanding cork that complies with Specification TfNSW 3204 may be used as an alternative to silicone to seal the JOINTS. Self-expanding cork must be installed in accordance with the manufacturer's recommendations. **Self-expanding cork sealant**
- A proposal to use self-expanding cork as an alternative to silicone to seal the JOINTS must be included as part of the PROJECT QUALITY PLAN.
- 4.8 ASPHALT WEARING COURSE**
- Construct asphalt wearing courses in accordance with Specification TfNSW M250 Clause 4.8. Placement of the asphalt wearing course must not occur until such time as the CONCRETE SLAB is strong enough to carry traffic.
- 4.9 OPENING TO TRAFFIC**
- 4.9.1 Submit a checklist and conformity certificate that verifies that the work was completed in accordance with this Specification and the PROJECT QUALITY PLAN. **Conformity certificate**
- 4.9.2 Before opening to traffic, make the work and the vicinity safe including removal of: **Remove equipment and material**
- .1 All plant and equipment.
 - .2 All excess and loose material.
 - .3 Curing compound from areas where pavement marking material is to be directly applied.

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| 4.9.3 | All loose material generated by trafficking of the work, either in a finished or partly finished state, must be promptly removed for a period of 48 hours after each opening to traffic. | Remove loose material for 48 hours |
| 4.9.4 | Unless otherwise directed: | Reinstate assets |
| .1 | Reinstate guide posts in accordance with Specification TfNSW M600 Clause 4.610. | Guide posts |
| .2 | Reinstate signposting in accordance with Specifications TfNSW R143 and TfNSW 3400. | Signposting |
| .3 | Reinstate pavement marking and raised reflective pavement markers in accordance with Specifications TfNSW R145 and TfNSW R142. Provide temporary delineation using a removable paint system that does not damage the pavement, temporary tapes, or stick and stomps, which must be maintained until permanent pavement marking is completed. | Pavement marking and temporary delineation |
| .4 | Reinstate traffic signal detector loops and other traffic facilities loops in accordance with Specification TfNSW TS101 within a timeframe as agreed with the Principal. | Traffic signal detector loops |
| .5 | Reinstate private entrances in accordance with M1 Clause 4.5.5. | Private entrances |
| 4.9.5 | Any damage YOUR operations cause to any part of the work must be rectified to comply with this Specification. YOU must bear the cost of rectifying such damage. | Rectify damage |

5 CONFORMITY

5.1 GENERAL

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|-------|---|--|
| 5.1.1 | Construction of pavement and replacement SLABS must comply with the process controls and conformity criteria listed in Table 7. | Construction process control and conformity |
| 5.1.2 | A LOT is defined as a continuous pour of volume of up to 30 m ³ for hand-paved BASE. | Lot |
| 5.1.3 | The PROJECT QUALITY PLAN must include inspection procedures for: | Inspection procedures |
| .1 | Placement of tiebars, drill-ties, dowels, drill-dowels, and reinforcement. | |
| .2 | Compaction of CONCRETE. | |
| .3 | Cracking in BASE SLABS; refer to Annexure L.1. | |

- .4 Tie-in of pavement with FIXED SURFACES.
- .5 Depressions capable of causing water to pond on the pavement surface.

- 5.1.4 Do not take cores without the prior approval of the PRINCIPAL. **Coring**
- 5.1.5 All core holes must be restored using a low-shrink mix, similar in colour and with a compressive strength of not less than specified for the BASE. The mix must attain a compressive strength of at least 10 MPa before being trafficked. **Repair of core holes**
- 5.1.6 The cost of restoring core holes will be borne by YOU, except in the case of additional cores ordered by the PRINCIPAL. **Cost of restoring core holes**
- 5.1.7 The minimum testing frequency requires that any residual part of a LOT be tested. Where a testing interval is in metres, it is to be measured along the LOT unless otherwise stated. **Minimum testing frequency**

Table 7 Requirements for Conformity and Minimum Frequency of Testing

Clause	Cross Ref	Property	Test Method	Criteria	Testing Frequency
Process control criteria					
1. CONCRETE slump	3.1	CONCRETE slump	See TfNSW 3201	According to TfNSW 3201	1 per batch
2. Horizontal EDGE Ravelling	4.4.2	Horizontal EDGE ravelling on each side of the joint assessed separately	Inspection	≤ 10 mm	Each joint
		<ul style="list-style-type: none"> ■ Maximum extent of ravelling ■ Cumulative length of ravelling with a dimension > 3 mm 	Inspection	≤ 300 mm in any 3.0 m	Each joint
3. Stitch-bars and drill-ties	4.5.1	Layout, size and location	Inspection	Annexure A	All
4. Dowels and drill-dowels	4.5.2	Layout, size and location	Inspection	Clause 5	All
		<ul style="list-style-type: none"> ■ Alignment tolerance of individual dowels 	Inspection	± 2 mm	All
5. Steel	4.5.3	Layout, size and location Clear cover	Inspection	Annexure A	All
6. Uniform compaction	4.6.1	Uniformity of placed CONCRETE.	Inspection	Clause 5	All LOTS
7. Curing compound	4.6.3	Application rate	Tray Inspection	Table 6	Trial Pavement All
Conformity criteria					
8. Layer thickness	2.3	BASE Layer thickness	PQP	-0 to +20 mm	1 midway along EDGE of SLAB
9. Pavement course position	2.3	Distance from FBL to pavement course	PQP	± 10 mm	All SLABS

Clause	Cross Ref	Property	Test Method	Criteria	Testing Frequency
10. BASE surface evenness	2.4	Deviation from a straightedge laid in any direction on the pavement surface.	3 m edge 1.5 m edge	≤ 7 mm ≤ 3 mm	All SLABS
		Depression capable of causing water to pond on the pavement surface.	Inspection	No potential for water to pond	All SLABS
11. Tie-in	2.4.3	Tie-in of pavement with FIXED SURFACES	Inspection	No abrupt change of levels	Each FIXED SURFACE
		Deviation from a 3 m straightedge with one end supported on the FIXED SURFACE and the other end on the pavement surface.	3 m straight edge	≤ 7 mm	Each FIXED SURFACE
12. CONCRETE strength	3.1	Strength of CONCRETE delivered to site			
		<ul style="list-style-type: none"> ■ Compressive cylinder strength ■ CONCRETE flexural strength 	See TfNSW 3201 See TfNSW 3201	See TfNSW 3201 See TfNSW 3201	See TfNSW 3201 See TfNSW 3201
13. CONCRETE compaction	4.6.1	Compaction of CONCRETE using an alternative compaction pattern: <ul style="list-style-type: none"> ■ Relative compaction ■ Within-core variability 	Coring according to R 83	$\geq 98\%$ ≤ 40 kg/m ³	In Trial Pavement
14. Cracking	5.1.3.3	Cracking in new BASE CONCRETE			
		<ul style="list-style-type: none"> ■ Crack type and extent in PCP SLAB ■ Crack type and extent in CRCP, JRCP, SFCP-R or PCP-R SLAB 	Annexure L.1 Annexure L.1	Only plastic shrinkage cracks with a cumulative length ≤ 1 m Only plastic shrinkage cracks with a cumulative length ≤ 1 m, and drying shrinkage cracks.	Each SLAB Each SLAB

5.2 WARRANTY PERIOD

YOU must warrant the work for the period set out in Annexure A.6. The PRINCIPAL will inspect the work at the end of that period. Any failure will be repaired to the satisfaction of the PRINCIPAL at YOUR cost within a one month period.

Repairs

The Rework accomplishment must be recorded against Maintenance Activity 991 Rework Heavy Patching.

Accomplishment in warranty work

5.3 ACCOMPLISHMENT REPORTING

The accomplishment of conforming work must be reported as specified in Table 8.

Table 8 Accomplishment reporting

Code	Description	Units	Accomplishment Reporting
258	Report surface area of existing concrete wearing surface to be heavy patched	m ²	Report area of existing concrete pavement treated.
259	Heavy patching – Concrete layer	m ³	Report volume of patch layer.
991	Rework - Heavy patching	m ²	Report area of rework due to nonconformity.
Notes	<ul style="list-style-type: none"> ■ Code 258 can only be used in conjunction with Code 259. However each of these items is to be reported separately. ■ If recording accomplishment against re-work do not report it against any other activity, because to do so will be doubling up. 		

ANNEXURE M258/A – DETAILS OF WORK**A.1 LOCATION AND DETAILS OF WORK**

Slab No.	Pavement Design Reference	Road No.	Segment	Chainage (L/R)	Size length x width (m)	Area (m ²)	Drawing Reference (i)
Note: (i) Drawings which describe the location and details for all SLABS to be replaced.							

A.2 PRINCIPAL'S ASSESSMENT OF THE TYPE AND CONDITION OF EXISTING MATERIAL

Slab No.	Course 2 (BASE)		Course 3 (Subbase)		Course 4 (Subgrade)	
	Depth	Material	Depth	Material (i)	Depth	Material (i)
Note: Clause 4.3.1 refers to the PRINCIPAL's assessment of existing pavement. Course defined in Clause 2.3.						
(i) Unsuitable material refer to Clause 4.3.1.						

A.3 CONCRETE AND REPLACEMENT MATERIAL REQUIREMENTS

Material Ref.	Concrete mix ⁽ⁱ⁾ / replacement material ⁽ⁱⁱ⁾	Texture ⁽ⁱⁱⁱ⁾	Curing ^(iv)	Other requirements ^(v)

Note: Table 1 refers

(i) Refer Clause 3.1 for BASE CONCRETE mix or Clause 3.2 for lean-mix CONCRETE

(ii) Refer Clause 3.2 for replacement materials

(iii) Refer Clause 4.6.2 – Tining is commonly in the transverse direction but when diamond grinding is proposed after slab replacement, the tining must be in the longitudinal direction.

(iv) Type of curing and minimum duration prior to trafficking. Only for BASE CONCRETE or subbase lean mix CONCRETE otherwise 'Not applicable'. Refer Clause 4.6.3.

(v) Include the maximum DELIVERY TIME in minutes; refer to Clause 3.1. A DELIVERY TIME has been included to avoid 'fresh' CONCRETE that is delivered but is starting to harden. Unless specified here it is 45 minutes. The time needs to consider the type of mix, distance and expected temperature.

Where lean mix CONCRETE is specified a debonding treatment must be specified. (Refer to Clause 3.7)

A.4 PAVEMENT DESIGNS

Design Ref	Course 1 (Wearing)		Course 2 (BASE)		Course 3 (Subbase)		Course 4 (Subgrade)	
	Thickness	Material Ref	Thickness (i)	Material Ref	Thickness	Material Ref	Thickness	Material Ref

Note: Refer to Clause 2.1. Course defined in Clause 2.3

(i) To be increased where required in Clause 2.2

A.5 PAVEMENT DESIGN REQUIREMENTS

Pavement Design Ref	Trial pavement location ⁽ⁱ⁾	Submission of new Project Quality Plan required ⁽ⁱⁱ⁾	Sealant type ⁽ⁱⁱⁱ⁾	Other pavement design requirements ^(iv)
		YES / NO ^(v)		
		YES / NO ^(v)		

Notes:

(i) Insert location/SLAB for trial or 'Not required'. Refer to Clause 2.6.

(ii) You may submit a new PROJECT QUALITY PLAN. The PROJECT QUALITY PLAN must be current and relevant to the work proposed.

(iii) Refer to Clause 3.5.

(iv) Include type of markings, repairs to traffic loops, private entrances etc; refer to Clause 4.9.

(v) "YES" unless otherwise specified

A.6 WARRANTY PERIOD

Warranty Period:	("1 year" unless otherwise specified)
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ANNEXURE M258/B – MEASUREMENT AND PAYMENT

B.1 PAY ITEMS

- | | | |
|-------|--|--------------------------------|
| B.1.1 | Pay items are identified in Annexure B.2. | Pay Items to be used |
| B.1.2 | The price(s) of pay items with a quantity of work in the schedule must be costed with due allowance for all costs of the activity.

Any pay item with a quantity of work that is not priced is understood to be included in other priced pay items. | Prices |
| B.1.3 | Any overheads must be distributed between pay items. | Overheads |
| B.1.4 | Pay items with a quantity of work specified must not be tendered as a lump sum price | No Lump Sum |
| B.1.5 | The PRINCIPAL understands that the price(s) of pay items in the Schedule of Rates make due allowance for the cost of the activity and any activity associated with pay items with a quantity of work that were not priced. | All pay items costed |
| B.1.6 | YOU are not paid for events that include:

.1 Tolerances allowed for in the course thickness.
.2 Areas outside the area specified for treatment.
.3 Removing and replacing rejected material with conforming material.
.4 Rework required to achieve conformity.
.5 Retesting. | No payment |
| B.1.7 | The volume in cubic metres (m ³) must be determined from the width, length and layer thickness of pavement ordered by the PRINCIPAL as shown on the Drawings or as otherwise specified for the work. | Determination of volume |

B.2 SCHEDULE OF PAY ITEMS

Pay Item *	Item Name and Description	What to claim and Units
M258P1	Lean mix concrete subbase Payment includes costs associated with: Supply, place, compact and finish lean mix concrete, apply curing and debonding treatments as subbase; Excavation, removal and legal disposal of unsuitable material below the base. When provided on the WORK ORDER, a separate unit rate is to be given for each of the following quantity ranges:	m³ Volume in place
M258P1.1	Lean mix concrete subbase up to 5 m ³ within Work Zone	m ³
M258P1.2	Lean mix concrete subbase greater than or equal to 5 m ³ to less than 25 m ³ within Work Zone	m ³
M258P1.3	Lean mix concrete subbase greater than or equal to 25 m ³ within Work Zone	m ³
M258P2	Sand cement subbase Payment includes costs associated with: Supply, spread, compact and trim sand cement subbase; Excavation, removal and legal disposal of unsuitable material below the base. When provided on the WORK ORDER, a separate unit rate is to be given for each of the following quantity ranges:	m³ Volume in place
M258P2.1	Sand cement subbase up to 5 m ³ within Work Zone	m ³
M258P2.2	Sand cement subbase greater than or equal to 5 m ³ to less than 25 m ³ within Work Zone	m ³
M258P2.3	Sand cement subbase up to greater than or equal to 25 m ³ within Work Zone	m ³
M258P3	Cement bound granular subbase Payment includes costs associated with: Supply, spread, compact and trim bound pavement material as subbase; Excavation, removal and legal disposal of unsuitable material below the base. When provided on the WORK ORDER, a separate unit rate is to be given for each of the following quantity ranges:	m³ Volume in place
M258P3.1	Cement bound granular subbase up to 5 m ³ within Work Zone	m ³
M258P3.2	Cement bound granular subbase greater than or equal to 5 m ³ to less than 25 m ³ within Work Zone	m ³
M258P3.3	Cement bound granular subbase up to greater than or equal to 25 m ³ within Work Zone	m ³
M258P4	Concrete BASE replacement Payment includes costs associated with: Sawcutting of base, excavation and removal of base concrete to recycling depot or tip; Preparation of surface underlying the BASE; Supply of concrete and all materials used in the BASE SLAB replacement, placing tiebars, dowels, reinforcement, paving concrete, texturing curing and installing joints; Activities required to reopen work to traffic such as restoring previous markings (lines, pavement markings, RPMs) and previous traffic loops. When provided on the WORK ORDER, a separate unit rate is to be given for each of the following quantity ranges:	m³ Volume in place
M258P4.1	Concrete BASE replacement up to 5 m ³ within Work Zone	m ³
M258P4.2	Concrete BASE replacement greater than or equal to 5 m ³ to less than 25 m ³ within Work Zone	m ³
M258P4.3	Concrete BASE replacement greater than or equal to 25 m ³ within Work Zone	m ³

Continues overleaf

Pay Item *	Item Name and Description	What to claim and Units
M258P5	Asphalt wearing surface Payment includes costs associated with supplying materials, placing and compacting asphaltic wearing surface.	m³ Volume in place
M258P6	Supply and place wire reinforcing fabric Payment includes costs associated with supplying and placing wire reinforcing fabric.	m² Area in place
M258P7	Construct joints Payment includes costs associated with supplying materials and constructing joints between SLABS.	m Length constructed
M258P7.1	Construct dowelled joints (by placement of dowels)	m
M258P7.2	Construct sealed joints (formed or sawn)	m
M258P8	Place drill-dowels and drill-ties Payment includes costs associated with supplying materials, drilling, and placing drill-dowels and drill-ties.	Each Dowels in Place
M258P8.1	Place drill-dowels	Each
M258P8.2	Place drill-ties	Each
M258P9	Establishment – Slab Replacement (Concrete Pavement) Note: It is taken that you have included all the following in tendering your establishment rate - no further payment will be made for them: <ul style="list-style-type: none"> • Plant float to/from the site or project; • Set up and removal of site facilities (eg: office, sheds, toilets); Principal's facilities (if required), • Initial travel to site or project; • Daily travel to/from site or project; • Accommodation (eg: on site or motel/hotel). 	Item Establishment is paid once per Work Order.
<p>* Pay Items are primarily for guidance in preparing Work Orders (which can be Lump Sum or Schedule of Rates).</p> <p>When preparing a Work Order, any or all of the Pay Items may be incorporated: the aim is to improve the accuracy of the Service Provider's estimation and pricing by:</p> <ol style="list-style-type: none"> a) selecting those Pay Items which denote the activities that are to be undertaken and b) requiring the Service Provider to estimate and price each Pay Item individually. <p>When Establishment is a significant cost, the Pay Item specific to it must be incorporated in the Work Order – the cost must not be amortised / absorbed across the other Pay Items.</p> <p>Similarly, when Traffic Control is a significant cost, its Pay Item(s) must be incorporated. See Specification TfNSW G10 for a list of these.</p>		

ANNEXURE M258/C – SCHEDULE OF HOLD AND WITNESS POINTS AND IDENTIFIED RECORDS

C.1 SCHEDULE OF HOLD AND WITNESS POINTS

Reference Clause	Type	Process Held	Submission Details
2.1.2	Hold Point	Use of a new, additional or changed construction method whenever: <ul style="list-style-type: none"> .1 A new construction method is proposed. .2 An additional construction method is proposed. .3 Any aspect of the NOMINATED CONSTRUCTION METHOD is changed. .4 The mix design or supplier for BASE CONCRETE is changed. 	Five business days prior to use, the PROJECT QUALITY PLAN containing the detailed process descriptions, inspection and test plans for the work. The minimum details are outlined in Annexure D.1.
2.6.4	Witness Point	Construction of TRIAL PAVEMENT.	Notification of the time and date of the TRIAL PAVEMENT at least 3 BUSINESS DAYS prior to construction of the TRIAL PAVEMENT starting.
3.1.3	Hold Point	Supply of CONCRETE	Five BUSINESS DAYS prior to use, a certification that the CONCRETE mix complies with TfNSW 3201.
4.1.3	Hold Point	Placing and compaction of CONCRETE BASE pavement other than the TRIAL PAVEMENT.	Documentation confirming conformity of TRIAL PAVEMENT, according to the PROJECT QUALITY PLAN. In particular, results from process control and conformity testing.
4.3.1.4	Witness Point	Assessment of working platform.	Notification of the time and date of excavation at least 3 BUSINESS DAYS prior to work starting.

C.2 SCHEDULE OF IDENTIFIED RECORDS

Reference	Description of the Identified Record
2.1	Project Quality Plan.
2.1	Details of NOMINATED CONSTRUCTION METHOD(s).
2.3	Assessment of Finished BASE Level, thickness of adjacent layers, PAVEMENT COURSE POSITION, type of materials.
2.6	Verification that Trial Pavement conforms.
3.1	CONCRETE Mix Design.
3.1	Identification certificates (delivery dockets) and details of any retempering water quantity. Records of location where each LOAD was used.
3.3	QA documentation from steel supplier.
3.4	Certification, which demonstrates that the adhesive system is suitable for the purpose, must be supplied from the adhesive manufacturer.
3.5	Certification, which demonstrates that the joint sealant is suitable for the purpose, must be supplied from the sealant manufacturer.
3.6	Certification, which demonstrates that the preformed joint filler is suitable for the purpose, must be supplied from the joint filler manufacturer.
3.7	Certification, which demonstrates that the surface debonding compounds is suitable for the purpose, must be supplied by the surface debonding compounds manufacturer.
3.8	Certification, which demonstrates that the curing compound is suitable for the purpose, must be supplied by the curing compounds manufacturer.
4.9.1	Checklist that verifies that the work was completed in accordance with the Specification and Project Quality Plan.
5	Conformity records and Nonconformity reports as required by TfNSW Q.

ANNEXURE M258/D – PLANNING DOCUMENTS**D.1 TYPICAL CONSTRUCTION PROCESSES TO BE ADDRESSED IN THE PROJECT QUALITY PLAN**

Reference	Process	Details
2.3 Surface level and thickness	Measurement and material assessment	Method to determine: <ul style="list-style-type: none"> ■ The Finished BASE Levels (FBL). ■ The thickness of adjacent SLABS. ■ Pavement course position and assessment of material in each course.
3.1 BASE CONCRETE 3.2 Material below BASE 3.9 Asphalt wearing course	Supply and delivery	<ul style="list-style-type: none"> ■ Source of material supply (name, location, distance). ■ Delivery vehicles. ■ For sand cement or lean mix Concrete the delivery vehicles. ■ Conformity testing.
3.3 Steel reinforcement and dowels	Supply and delivery	<ul style="list-style-type: none"> ■ Source of material supply (name) and QA status ■ Method to provide steel free from surface contamination.
3.4 Adhesive 3.5 Joint sealant 3.6 Joint filler 3.7 Debonding materials 3.8 Curing compound	Supply and delivery	<ul style="list-style-type: none"> ■ Source of material supply (name) and QA status ■ Manufacturer's specification sheet and recommended method.
4. Construction Processes	Excavation	Method to prevent damage to adjoining FIXED SURFACES, utilities, drainage lines or underlying subbase course.
	Project constraints	Address project constraints and dealing with the weather constraints and protection of work.
	Temperature monitoring	<ul style="list-style-type: none"> ■ Method to determine: ■ Monitor fresh BASE CONCRETE temperature, ■ Monitor and record site temperatures, ■ Protect fresh BASE CONCRETE if the temperature falls below 5°C.
4. Construction Processes (continued)	Excavation	<ul style="list-style-type: none"> ■ Method for removing existing BASE. ■ Measures to prevent damage to the adjoining BASE and the underlying Subbase. ■ Sawcutting including alignment, longitudinal and transverse locations, and prevent damage to adjoining Slabs. ■ Method for treating unsuitable material underlying the BASE. Replace unsuitable material. ■ Replacement and compaction of pavement material(s).

Reference	Process	Details
	Notification and Verification	<ul style="list-style-type: none"> ■ Procedure to deal with unsuitable surface. ■ Procedure for verifying that the condition of the excavated surface is suitable prior to overlaying. The procedure is to record comments by You or the Principal regarding the condition of the underlying surface of the BASE.
	JOINTS and EDGES	<ul style="list-style-type: none"> ■ Preparation of JOINTS and EDGES. ■ Forming of JOINTS and temporary seal. ■ Permanent sealing of JOINTS.
	Placing steel	<ul style="list-style-type: none"> ■ proposed drill-tie installation method. ■ proposed dowel support system, drill-dowel installation and the method of debonding. ■ steel placement including securing steel, chair placement, splicing, LAPPING and welding.
	Paving BASE CONCRETE	<ul style="list-style-type: none"> ■ Type of plant, equipment and output capacity. ■ Details of the equipment to be used for placing, spreading and finishing the CONCRETE. ■ The size and number of vibrators and stand-by vibrators. ■ Forms. ■ Methods to place, spread vibrate and finish CONCRETE including. ■ Internal vibration pattern. ■ Screeding. ■ Final compaction and finishing.
	Texturing CONCRETE	<ul style="list-style-type: none"> ■ Process for transverse and longitudinal surface texturing. ■ Equipment to be used.
4. Construction Processes (continued)	Protection and curing	<ul style="list-style-type: none"> ■ Procedures and equipment proposed for the protection and covering of CONCRETE, including system to manage temperature. ■ Measures to be taken to restrict the evaporation of water from the CONCRETE surface and to prevent the incidence of plastic shrinkage cracking.
	Sealing JOINTS/EDGES	<ul style="list-style-type: none"> ■ Preliminary, temporary or permanent sealing.
	Preventing damage	<ul style="list-style-type: none"> ■ Strategy for protecting the BASE when delays are encountered.
	Disposal of material	<ul style="list-style-type: none"> ■ Disposal of excavated material. ■ Disposal of waste. ■ Disposal of excess fresh CONCRETE.
	Clean-up	<ul style="list-style-type: none"> ■ Washing down tools, plant and equipment.
	Opening to traffic	<ul style="list-style-type: none"> ■ Checklist to be completed.

ANNEXURES M258/E TO M258/K – (NOT USED)

ANNEXURE M258/L – ADDITIONAL TEST METHODS

L.1 INSPECTION FOR CONCRETE CRACKING

- | | | |
|-------|--|------------------------------------|
| L.1.1 | Cracking is categorised into unplanned structural cracks, induced cracks, plastic shrinkage cracks and drying shrinkage cracks. | Cracking in base slabs |
| L.1.2 | Unplanned structural cracks are not induced cracks. They include drying shrinkage cracks in unreinforced SLABS (eg PCP). | Unplanned structural cracks |
| L.1.3 | Induced cracking is a normal result of SLAB or joint construction (eg sawcuts are used to induce cracks). | Induced cracking |
| L.1.4 | Plastic shrinkage cracks:

.1 Are discrete cracks of length less than 500 mm and of depth less than 50% of the BASE thickness.

.2 Form during the plastic stage of CONCRETE set.

.3 Do not intersect a longitudinal EDGE or a formed joint (ie they are not an induced joint). | Plastic shrinkage cracks |
| L.1.5 | Drying shrinkage cracks consist of:

.1 JRCP, PCP-R and SFCP-R: occur in the central part of the SLAB, extend full depth and are continuous between JOINTS and/or EDGES.

.2 CRCP: full depth discrete transverse cracks without branches or convergences over the full width between longitudinal JOINTS or EDGES. | Non-structural cracks |
| L.1.6 | Each new BASE SLAB must have cracking categorised and its extent estimated and results documented.

.1 Each PCP SLAB:

Cumulative length of plastic shrinkage cracks;
less than 1m and greater than or equal to 1m in any SLAB,

Occurrence of unplanned structural cracks (including and drying shrinkage cracks),

Mark non-conforming SLABS. | Document results |

.2 CRCP, JRCP, SFCP-R and PCP-R SLABS:

Cumulative length of plastic shrinkage cracks;
less than 1m and greater than or equal to 1m in any
SLAB,

Occurrence of unplanned structural cracks (note: exclude
drying shrinkage cracks),

Mark non-conforming SLABS.

ANNEXURE M258/M – REFERENCED DOCUMENTS AND DEFINITIONS

M.1 REFERENCED DOCUMENTS

M.1.1 Australian Standards

AS 1554.3	Structural steel welding - Welding of reinforcing steel
AS 2870	Residential slabs and footings
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

M.1.2 TfNSW Documents

TfNSW T862	Wax emulsion stability
TfNSW R82	Lean-mix 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 Q	Quality Management System
TfNSW 3201	Concrete for Maintenance
TfNSW 3204	Preformed Joint Fillers for Concrete Road Pavements and Structures
TfNSW 3254	Bitumen Emulsion
TfNSW 3263	Hot Poured Elastomeric Joint Sealant for Roads
TfNSW 3400	Manufacture and Delivery of Road Signs
TfNSW TS101	Traffic Control Signals – New Installation and Reconstruction

Series MP Rigid Pavement Standard Details – Maintenance, Plain Concrete Pavement

M.2 ABBREVIATIONS AND DEFINED TERMS

CRCP	Continuously Reinforced CONCRETE Pavement (BASE).
FBL	Finished Base Level - refer to Clause 3.2.
JRCP	Jointed Reinforced CONCRETE Pavement (BASE) – dowelled.
LCS	Lean-mix CONCRETE Subbase.
PCP	Plain CONCRETE Pavement (BASE).
PQP	Project Quality Plan according to TfNSW Q and this Specification
SFCP	Steel Fibre Reinforced CONCRETE Pavement (BASE).
~ -R	The '-R' suffix indicates that discrete SLABS contain reinforcement in the BASE.
ANCHOR	A restraining beam cast in the ground, on which a BASE SLAB is later cast.
ANCHOR, TERMINAL	A SLAB ANCHOR where the overlying BASE SLAB is a terminal SLAB.
ANCHOR SLAB	The BASE SLAB which lies over an anchor.
APPROACH SLABS	Pavement which is located within 15 m of bridges (or other structures) where the CONCRETE BASE is discontinuous or within 15 m of contract limits.
BATCH	A quantity of CONCRETE containing a fixed amount of ingredients and produced in a discrete operation.
BASE	The upper (structural) layer of CONCRETE with varying insitu strengths, typically 25 to 50 MPa. The CONCRETE contains various forms of steel reinforcement, dowels and tiebars. In some instances the CONCRETE may contain steel-fibre reinforcement.
BATCHING	The process of combining the CONCRETE ingredients in fixed proportions by mass or by volume, including charging and mixing.
CONCRETE	A thoroughly mixed combination of cement, aggregates and water, with or without the addition of chemical admixtures or other materials, all of which separately and when combined comply with the requirements of this Specification.
COMPLETION OF BATCHING	For mobile mixers, it will be the time at which mixing and slump adjustment ceases at the BATCHING plant, or 10 minutes after the commencement of mixing, whichever occurs first.
DELIVERY TIME	The elapsed time measured from the completion of BATCHING to arrival on site within 100 m of the point of placement.
EDGE, FREE	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.
EDGE, OUTER (BASE)	An edge against which material other than BASE or kerb CONCRETE is to be placed (such as granular backfill or no-fines CONCRETE).
EDGE, RELIEF	An edge or joint, which relieves contraction stresses in JOINTS and/or sections and is aligned approximately parallel with that edge. A relief edge is provided by an untied joint, by a FREE EDGE or by an expansion or isolation joint.

FIXED SURFACES	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.
JOINT	A planned discontinuity in the CONCRETE, other than an edge.
JOINT, FORMED	All JOINTS except for induced JOINTS. This includes slipformed and fixed-formed JOINTS and edges.
JOINT, MISMATCHED	A joint which terminates on the edge of a SLAB. Only tied JOINTS are allowed to mismatch.
LAP (IN REINFORCEMENT)	A splice in which the bars are in contact over the full lapped length, with sufficient ties to ensure contact in the hardened CONCRETE.
LOAD	A single truckload of CONCRETE comprising one or more BATCHES.
LOT	As defined in TfNSW Q.
PAVEMENT COURSE POSITION	The pavement layers described in Figure 1.
NOMINATED CONSTRUCTION METHOD	The work procedure and method documented in the PROJECT QUALITY PLAN in accordance with Clause 2.
RETEMPERING	The addition of water to a BATCH after COMPLETION OF BATCHING.
SLAB	A portion of CONCRETE bounded by JOINTS and/or edges.
SLAB, ODD-SHAPED	Odd-shaped SLABS are defined as: <ol style="list-style-type: none">1. A SLAB containing a block out for a drainage structure, or2. A TRAFFICKED SLAB having a corner angle less than 84°, or the ratio of its longer to shorter dimension⁽ⁱ⁾ exceeding 1.25, or3. An un-TRAFFICKED SLAB having a corner angle less than 80°, or the ratio of its longer to shorter dimension⁽ⁱ⁾ exceeding 3.0.4. If dimensions measured normal and parallel to longitudinal JOINTS are variable within a SLAB, the greatest value of the ratio applies.
SLAB, MISMATCHED	A SLAB in which an edge is intersected by a JOINT which does not continue through the subject SLAB. Only tied joints are allowed to mismatch.
TRAFFICKED SLAB	A slab bounded by longitudinal JOINTS, which lies either totally or in part within the trafficked carriageway as defined by lane lines.
TRANSIT MIXER	An item of plant or equipment which maintains the plastic CONCRETE in the mixed state. Consistent with common usage, this term is also used (for convenience) in lieu of “mobile BATCH mixer”.
WATER/BINDER RATIO	The ratio of water to binder contained in the CONCRETE BATCH. Refer to TfNSW 3201.

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