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<td>GM, IC</td>
<td>20.05.08</td>
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<td>All</td>
<td>General technical review, and revision of some technical requirements. Format revised.</td>
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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 RMS personnel on the application of the Specification. They do not form part of the Specification, Contract or Agreement.

USING RMS M209

RMS M209 has been developed mainly for use by third parties undertaking road opening work within an existing trafficked pavement on a State Road for the purpose of buried public utilities, services or drainage.

M209 may also be used for road opening work carried out by or for the RMS, with appropriate amendment to “third party” administrative provisions (e.g. “Proponent” becomes “RMS”).

M209 must not be used for any excavation or pavement restoration work other than for road openings (e.g. concrete slab replacement, heavy patching or pavement reconstruction).

This specification should be read in conjunction with the issued ROAD OPENING APPROVAL and ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES) for the road opening.

OUTLINE OF M209

Format and Appropriate Use of M209

M209 is designed to be a stand alone specification with minimal cross-referencing to other RMS specifications. It assumes little knowledge of RMS requirements and documentation.

There is some cross-referencing to RMS materials specifications in Clause 3, where suppliers need to be (and are likely to be) familiar with RMS requirements. Such cross-referencing is avoided for construction requirements in Clause 4 Execution, where the relevant requirements have been selectively imported from relevant RMS specifications. Pavement restoration requirements are based on M250 Heavy Patching (Flexible Pavement) and M258 Slab Replacement (Concrete Pavement), which are referenced only as guideline documents for “additional information”.

Owing to the relatively high level of risk with road opening work, M209 has a significant content of a prescriptive nature to address the key risks.

For emergency work or time-critical work, some requirements in M209 may need to be simplified by the RMS, based on a site-specific risk assessment and expert advice. Any changes to the Specification requirements must be agreed with the RMS at the INITIAL SITE MEETING and PRECONSTRUCTION SITE MEETING.

Assumed Scenario for Road Opening Work in M209

Road opening work is typically carried out on urban roads under highly contained conditions (e.g. residential areas, high traffic and pedestrian flows, very tight clearances to traffic, lane closures necessary, close to buildings). It is necessary to obtain a ROAD OPENING APPROVAL and a ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES) for such work. Lane closures may be difficult to obtain and may be of relatively short duration. Night work is often necessary.
Further difficulties arise from:

- the layout of existing utilities within the road may be parallel or skew or dog-legged, particularly in older urban areas. These layouts are far from optimal to carry out the work efficiently, creating additional difficulties such as multi-lane closures and extensive concrete pavement restoration.

- uncertainty of excavation and pavement subgrade conditions, which is usually not evident until the existing pavement is completely removed.

- Strict time restrictions often apply for completion of pavement restoration construction activities, including curing of concrete (described as ‘time-critical’ work in M209).

M209 is designed for the above conditions and addresses the unique risks of road opening work (e.g. road safety requirements, safe lateral clearances from traffic, excavation zone of influence, separation from pedestrians, use of road plates and time-critical concrete pavement restoration.

Permanent pavement restoration (normally carried out by the RMS – see below) is a major component of the work. The pavement restoration may extend well beyond the trench excavation. Restoration of other assets may be significant (e.g. kerbs, accesses, damage to property).

**Minimum Work Shift Duration for Concrete Pavement Restoration**

To reasonably and effectively carry out concrete pavement restoration work to the minimum acceptable standard of quality and strength, it is considered that a minimum work shift duration of 10 hours continuous lane closure is necessary (including at least 6 hours of concrete curing with use of calcium chloride set accelerating admixtures), before traffic is reinstated (e.g. 7.30 pm to 5.30 am).

Use of road plates (where permitted) to cover immature concrete or an incomplete road opening between work shifts can reduce the necessary shift duration. However, this is expensive and installation and removal of road plates significantly reduces the time available for “productive” work.

**Clause 1 General**

**M209 and M208**

RMS M209 is the main comprehensive RMS specification for road openings. However, for Low Risk road openings an abbreviated version RMS M208 can be used. M208 only contains the necessary technical requirements for excavation, backfill and temporary pavement restoration.

**Responsibilities of Proponent and RMS and Warranty Period**

Clause 1.7 of M209 specifies an apportionment of responsibilities for restoration and maintenance work between the Proponent and the RMS. These responsibilities will be agreed at the INITIAL SITE MEETING and specified in Annexure A. Normally, critical activities such as permanent concrete pavement restoration will be carried out by the RMS at cost to the Proponent.

Owing to the risk of settlement of poorly compacted or restored road openings, or damage to the buried utility, M209 requires maintenance of the road opening restoration (by RMS, at Proponent’s cost) during the Warranty Period (refer Clauses 1, 2, and 5).

The cost recovery arrangements for work by the RMS (by deduction from the PERFORMANCE BOND) are explained in Clauses 1.8 and 4.11.

To ensure an integrated approach and awareness of the true scope, costs and risks entailed in road opening work, M209 covers all requirements, even where they are executed by the RMS. M209 is written on the assumption that the entire work is the responsibility of the Proponent. Where instead part of the work is undertaken by the RMS, the relevant specification requirements are deemed to apply to the RMS.
CLAUSE 2 PLANNING

RMS Management of Road Opening Applications

RMS Regions need to have the necessary arrangements in place to handle road opening work.

The process described in Clause 2.1, Table 1 and the flowchart at Figure GN.1 below show the general process for obtaining Approvals and Licences and the main preconstruction activities prior to commencing work on site. As noted in Clause 2.1.6, this process does not provide the details of the Region-specific or utility-specific arrangements. In these situations the process and flowchart would need to be amended accordingly.

The Proponent should submit maps and drawings showing the location of the road opening.

Risk Category

M209 uses a risk-based approach to road openings, which affects the level of RMS management and the technical requirements. Low/Medium/High Risk categories are specified.

Use Table 2 as the guideline on how to assess the Risk Category. The key issue is the need for shoring. Use Table 5 to determine the need for shoring, together with a site-specific risk assessment for shoring requirements.

Pre-Construction Activities by Proponent, including Designs

Where design is the Proponent’s responsibility, the RMS will not carry out design reviews and will rely on the design certifications provided by the Proponent and the PERFORMANCE BOND to cover the RMS risk.

The onus is on the Proponent to:

(a) Ensure and certify that its works proposal and designs meet all relevant requirements. At the PRECONSTRUCTION SITE MEETING, the RMS will only clarify and confirm the design requirements, including the limits of concrete pavement restoration.

(b) Comply with all WHS, environmental and any other statutory requirements associated with the works, including necessary research and preparation of documentation. The RMS will not carry out reviews of the Proponent’s documentation in this regard. However, for “critical” construction activities (as specified in Annexure A.2), the Proponent should provide details of work methods at the PRECONSTRUCTION SITE MEETING.

INITIAL SITE MEETING

This is the only site meeting for Low Risk road openings. The issues, outcomes and requirements agreed at the meeting should be well documented by the RMS for future reference.

PRE-CONSTRUCTION SITE MEETING

A separate PRE-CONSTRUCTION SITE MEETING is only required for Medium or High Risk road openings, to confirm details after all designs, plans, and risk assessments have been completed.

Completing Annexure A

In its Approval and Licence Applications, the Proponent should propose particulars of the Work based on the requirements of M209.

After considering these Applications and after the INITIAL SITE MEETING, Annexure A should be completed by the RMS Regional Asset Management Section, based on the information provided by the Proponent and the details agreed and confirmed at the INITIAL SITE MEETING. This includes the confirmed Risk Category.
Table GN1 is provided for RMS personnel completing Annexure A.

### Table GN1 – Guidelines for completing Annexure A

<table>
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<tr>
<th>Clause reference(s)</th>
<th>Description</th>
<th>Requirements</th>
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<tr>
<td>1.7, 5.7 to 5.11</td>
<td>Warranty Period</td>
<td>Usually 6 months, or 12 months where permanent restoration is the Proponent’s responsibility.</td>
</tr>
<tr>
<td>2.2.5</td>
<td>Public Liability Insurance</td>
<td>Generally $20 million for any one occurrence. If another amount is chosen, then ensure that the Deed of Indemnity is consistent.</td>
</tr>
</tbody>
</table>
| 2.2.6 and Annexure L| Deed of Indemnity           | Always required, unless the Proponent holds:  
  - an existing Memorandum of Understanding (MOU) with RMS; or  
  - an existing Deed of Indemnity with the RMS for related development work that covers the road opening work. |
| 2.2.7, 5.9 to 5.11  | Performance Bond            | Always required, unless the Proponent holds:  
  - an existing Memorandum of Understanding [MOU] with RMS; or  
  - an existing Performance Bond with the RMS for related development work that covers the road opening work.  
  Amount: Generally, not less than the estimated value of permanent pavement restoration.  
  Where an RMS prequalified civil contractor is engaged, the value of the Performance Bond should be reduced by 50%. |
| 2.2.10              | Advance notice to surrounding premises | Required: Generally required for work adjacent to business premises, residential premises and for night work, or any work extending past 8.00 pm.  
  Details: Indicate form of notification (e.g. advertisement, letter box drops). Generally, the notice must be provided at least 5 Business Days prior to proposed commencement of Work. |
| 5.11                | Final inspection and return of Performance Bond | RMS contact person. This is usually the RMS Nominated Representative. Include contact details if someone else. |

### Road Safety and Stage Construction Requirements

Clause 2.4 integrates the traffic management considerations and worker safety requirements for the Work Area, to allow the road opening work to be staged in daily shifts and to reduce risks.

Road opening work is often critical, including emergency situations and restoring essential services. Such work cannot be avoided due to greater community risk. Furthermore, the older services that generate much road opening work are typically sub-optimally located under very busy roads.

The traffic and pedestrian control requirements in Table 3 are the minimum requirements that must apply to make such onerous work achievable with an adequate level of safety. These requirements are based on the RMS Traffic Control at Work Sites (TCWS) Manual, on the assumption of ‘Short Term’ work. To satisfy this ‘Short Term’ assumption the work must be completed in accordance with Clause 2.4.
**ROAD OPENING MANAGEMENT FLOWCHART**

<table>
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<tr>
<th>Who</th>
<th>When</th>
<th>What</th>
<th>Outcome</th>
<th>Doc. Ref.</th>
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<tr>
<td>Proponent</td>
<td></td>
<td>Identify road opening proposal</td>
<td>Proposed details, location and dimensions</td>
<td></td>
</tr>
<tr>
<td>Proponent</td>
<td></td>
<td>Prepare Applications for ROA and ROL</td>
<td></td>
<td>ROL Application Forms C &amp; D</td>
</tr>
<tr>
<td>Proponent</td>
<td></td>
<td>Submit Applications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAM/RPS</td>
<td>Within 10 business days of receipt of application</td>
<td>Initial Site Meeting with Proponent</td>
<td>Confirmed Risk Category and main requirements</td>
<td></td>
</tr>
<tr>
<td>RPS</td>
<td></td>
<td>Assess pavement restoration requirements and estimate Performance Bond amount</td>
<td></td>
<td>ILC-AM-TP3-102</td>
</tr>
<tr>
<td>RAM</td>
<td>Within 2 business days of advice from RPS</td>
<td>Determine RTA requirements for road opening and advise Proponent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proponent</td>
<td></td>
<td>Forward Public Liability Insurance &amp; Performance Bond to RAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAM/RPS</td>
<td></td>
<td>Preconstruction Site Meeting with Proponent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>Within 5 business days of receipt of Insurance &amp; Performance Bond</td>
<td>Issue ROA to Proponent with conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TMC</td>
<td></td>
<td>Issue ROL to Proponent with conditions</td>
<td></td>
<td>ILC-AM-TP1-161</td>
</tr>
<tr>
<td>RAM</td>
<td></td>
<td>Request RPS to arrange site surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RPS</td>
<td>During work on site</td>
<td>Monitor road opening works</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RPS</td>
<td>At completion of work</td>
<td>Advise RAM for release of Performance Bond subject to deductions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAM</td>
<td>At end of Warranty Period</td>
<td>Release balance of Performance Bond</td>
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**LEGENDS**

- RAM – Regional Asset Management
- RPS – Regional Project Services
- TMC – Transport Management Centre
- ROL – Road Occupancy Licence (Development Activities)
- ROA – Road Opening Approval

**Figure GN1 - Flowchart for RMS management of road openings by external organisations.**

**NOTE:** This process may vary for Region-specific arrangements, MOU work or development-related road openings.
Excavation, Shoring and Zone of Influence Issues

An explanation of the concept of zone of influence is provided in the definition in Annexure M.

Figure 1 and Figure 2 show diagrammatically the zones of influence and safe clearances for the unsupported and supported trench conditions. They take into account the “effective zone of influence allowing for pavement” that is incorporated into Table 5 (i.e. different pavement categories).

Temporary Pavement Restoration

The requirements for temporary pavement restoration (as defined in Annexure M) must be agreed with the RMS at the INITIAL SITE MEETING. Some of the temporary pavement restoration may form part of the permanent pavement restoration. Site-specific issues (e.g. compatibility with adjoining pavement) and the capabilities of the Proponent should be taken into account when specifying the temporary and permanent pavement restoration.

The use of freshly mixed sand cement material up to the level of the temporary wearing surface is mandated for Low Risk and time-critical road openings, due to its ease and reliability of compaction. This minimises the need for rework at the time of the permanent pavement restoration.

Design of Pavement Restoration

Where pavement restoration is the Proponent’s responsibility, the Proponent is responsible for the pavement restoration design. This design is to be based on the standard details provided in Figure E.1 Figure E.1 to Figure E.4 (in Annexure E), annotated to suit all site-specific needs and RMS requirements (e.g. tiebar spacing, slab layout to suit limits of restoration), as advised at the INITIAL SITE MEETING.

The concrete pavement concept designs shown in Figure E.2 to Figure E.4 are based on Plain Concrete Pavement (PCP). Figure E.5 shows the typical details for concrete pavement (e.g. joints).

Backfill Materials Used as a Protective Layer Around Utilities or Services (Clause 3.4.1)

This clause applies to special materials that are used as a protective layer around buried utilities or services which are specified by the utility or service owner. An example of such material is Thermally Stable Backfill (TSB) material that is used as a protective layer around electricity services. TSB is similar to a lean-mix concrete type of material comprising 10 mm coarse aggregate, fine aggregate, cement, and fly ash, with a slump of about 110 mm and 28 day compressive strength of about 4 MPa to 7 MPa.

The Proponent is required to provide details of any special protective layer material to RMS before it is used in the work.

Limits of Concrete Pavement Restoration

The RMS is responsible for determining the limits of the concrete pavement restoration to suit the proposed road opening. These limits must be confirmed at the PRECONSTRUCTION SITE MEETING, in conjunction with the location and layout of the road opening. Note that the limits of concrete pavement restoration are normally greater than the limits of the road opening excavation.

The limits of concrete pavement restoration should meet all of the following requirements (NOTE: These are general principles and the site-specific constraints may require modified requirements):

1. Located a minimum of 200 mm outside the limits of the road opening excavation.
2. Minimum slab replacement width of 1.0 m longitudinally (i.e. parallel to road centreline).
3. Perimeter comprised of straight line segments, that are either parallel to or at right angles to existing longitudinal joints.
.4 Longitudinally (i.e. parallel to road centreline), to coincide with the existing longitudinal joint on each side (i.e. restoration must extend the full width of each slab).

.5 Transversely (i.e. at right angles to road centreline), at new tied construction joints within existing slabs, located:
   - At right angles to existing longitudinal joints.
   - Not closer than 1.5 m to an existing transverse contraction joint.
   - Where the limits of the trench excavation are at any point closer than 1.5 m to an existing transverse contraction joint, within the adjoining slab at 1.5 m beyond the transverse joint. In this case, install a new contraction joint at the location of the existing transverse contraction joint (refer Figure E.3).

**ROAD PLATES**

M209 introduces new detailed RMS requirements for road plates. This includes increased plate thicknesses compared to the current industry practice, improved fixings and bearing support and many other requirements that will lift the current industry standards in terms of safety and reliability. In particular, increased plate thicknesses should reduce the problems experienced with road plates (e.g. excessive deflections, rebound, noise, differential deflections at joints and movement out of position).

Mandatory skid resistance requirements for the trafficked surface of the road plates are specified in Clause 3.3.3, being either a coating in accordance with the RMS 3368, or an alternative treatment that provides an equivalent skid resistance.

A key issue is the resistance of road plates to horizontal slip due to sudden braking forces from heavy vehicle wheel loads on the plate (e.g. at intersection). M209 specifies a combination of strategies to provide such resistance, including bituminous ramps, recessing, fixings to the pavement and frictional bedding material under the supported plate edges. Recessing of plates and bituminous ramps formed with compacted hot mix asphalt (that has good cohesion) are both considered effective to resist braking loads. Pavement fixings generally appear to have limited capacity to resist braking loads, however they are necessary to prevent plate uplifts and horizontal movements (due to rebound).

However, in short term installations with no plate recessing (the most common situation), the ramps are formed with cold mix material that cannot resist braking loads (due to its low cohesion). In these cases, it appears that resistance to braking loads depends on the friction between the plate and the underlying pavement. Limited shear box testing on premium grade pre-packaged proprietary bituminous cold mixes (that are specified in M209) indicates that these products are frictional materials (internal friction angle in order of 35 to 50 degrees). High internal friction angle has better frictional performance, and may correlate with lower compacted voids content. This limited testing is indicative only of the likely performance of the road plates under idealised and assumed conditions. It is recommended that RMS personnel monitor and provide feedback on the performance of road plates.

**CONCRETE PAVEMENT RESTORATION**

The requirements for concrete slab replacement in M209 have been developed specifically for limited slab replacements as part of road opening work (based on maintenance specifications RMS M250 and RMS 3201). They should not be used for general concrete pavement reconstruction or maintenance.

In M209, it is assumed that work will be conducted under a lane closure and must be reopened to traffic promptly, often within 12 hours. The limited time for work has been considered in developing the M209 requirements, based on a compromise between speed of operations and quality of work.

The requirements for concrete used in slab replacement in M209 are largely based on RMS 3201 Concrete Supply for Maintenance.
The concrete material requirements are specified in Clause 3.6. Concrete must be one of the mix designs specified in Annexure F, providing a minimum design compressive strength of 20 MPa (at 24 hours) and 40 MPa (at 28 days).

In addition, for time-critical work, M209 makes specific provision for use of a high early strength mix, using calcium chloride (CaCl₂) set accelerating admixtures, to achieve a design compressive strength of 5 MPa at 6 hours. Three mix designs are capable of this, either:

- the SP40H Special Class (pavement) mix as per RMS 3201 (up to 0.8% CaCl₂) or
- the SP40HC Special Class (pavement) mix as per RMS 3201 (up to 2.0% CaCl₂) or
- the Sydney Region 40 MPa (nightwork) mix based on the SP40HC mix in RMS 3201 (1.35 to 1.55% CaCl₂).

The assumed application for use of these high early strength mixes is lane closures not exceeding 12 hours (where the time to reopen is critical), hand placement of concrete, and provision of transverse and longitudinal contraction joints as per Figure E.2 to Figure E.4 of Annexure E.

Further guidance on the high early strength SP40H and SP40HC mixes and the use of calcium chloride set accelerating admixtures is provided in RMS 3201 Guide Notes.

CaCl₂ accelerates both the setting rate (aluminate reaction) and the strength gain (silicate reaction). It greatly accelerates the corrosion of steel tiebars, reinforcement and dowels. It is critical to correctly calculate the dosage rate. Guidelines on dosage are provided in RMS 3201 Guide Notes under the heading “Calculation of CaCl₂ dose rate”.

Mixes containing doses of CaCl₂ greater than 0.8% accelerate the corrosion of tiebars and reinforcement, and must not be used with steel fibres.

Clause 4.10 sets out the requirements for executing concrete pavement restoration work.
ROAD OPENINGS AND RESTORATION

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IC-QA-M209

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FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been revised from RMS M209 Edition 2 Revision 0.

All RMS 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:

(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.

CLAUSE REFERENCE FORMAT

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<td>■ Annexure B.3 (the third section within Annexure B)</td>
<td>■ M745 Annexure B.3 (ditto)</td>
</tr>
<tr>
<td>■ Table 1 (the first Table within Specification)</td>
<td>■ M745 Table 1 (ditto)</td>
</tr>
<tr>
<td>■ Figure 4 (the fourth Figure within Specification)</td>
<td>■ M745 Figure 4 (ditto)</td>
</tr>
<tr>
<td>■ Table E.1 (the first Table within Annexure E)</td>
<td>■ M745 Figure E.1 (ditto)</td>
</tr>
<tr>
<td>■ RMS M745 / RMS G10 (entire specification)</td>
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</tr>
</tbody>
</table>
QA SPECIFICATION RMS M209
ROAD OPENINGS AND RESTORATION

1 GENERAL

1.1 The Work to be executed under this Specification involves the excavation, backfill and restoration of road openings located within, or adjacent to, an existing trafficked pavement that are for the purpose of buried public utilities, services, or drainage.

Road opening work includes:

1 Maintenance of the excavation (including any shoring, road plates, barriers and signs) during the works.

2 Maintenance of the temporary pavement restoration (or permanent restoration if carried out by the Proponent) during the WARRANTY PERIOD.

3 Repair and restore any assets, property or environmental features damaged or affected by the road opening work.

The RMS will undertake certain parts of the Work at cost to the Proponent such as maintenance (refer Clause 1.7).

This Specification does NOT include large area excavation within pavements for purposes such as concrete slab replacement, heavy patching or pavement reconstruction.

1.2 Details of the Work and any additional RMS requirements associated with the road opening are described in Annexure A.

The extent of the pavement restoration required will be determined by the RMS and may extend beyond the limits of the excavation.

1.3 Except as provided in Clause 1.7, all work including restoration will be at Your (i.e. the Proponent’s) cost and at no cost to the RMS.

1.4 This Specification must be read in conjunction with the following approvals issued for the Work:

1 ROAD OPENING APPROVAL.

2 ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES)

1.5 All work must be carried out in accordance with the:

1 Risk Category confirmed by the RMS (refer Clause 2.3).

2 Road safety and stage construction requirements for road openings (refer Clause 2.4).

3 Relevant layout and structural designs for the road opening (refer Clauses 2.5 and 2.6).
1.6 Where the Risk Category is confirmed as Low Risk (refer Clause 2.3), You may use Specification RMS M208 Road Openings and Restoration (Low Risk) as an alternative to this Specification. RMS M208 provides simplified requirements.

1.7 Responsibilities for restoration and maintenance work must be as agreed with the RMS at the INITIAL SITE MEETING.

Unless otherwise agreed and specified in Annexure A.2:

.1 Backfilling and temporary pavement restoration will be undertaken by the Proponent.

.2 Maintenance of the temporary pavement restoration up to time of permanent restoration will be undertaken by the RMS at the Proponent’s cost.

.3 Permanent pavement restoration will be undertaken by the RMS at the Proponent’s cost.

.4 Reinstatement of damaged or disturbed traffic signals, traffic facilities or pavement delineation will be undertaken by the RMS at the Proponent’s cost.

.5 Maintenance of the permanent pavement restoration during the WARRANTY PERIOD will be undertaken by the RMS at no cost to the Proponent, unless maintenance work results from defects in the Work carried out by the Proponent (e.g. settlement of backfill).

.6 Reinstatement and restoration of property or other public or private assets that are disturbed or damaged by the Work will be undertaken by the Proponent (refer Clause 4.11).

Where the permanent pavement restoration is undertaken by the Proponent, maintenance of the permanent pavement restoration during the WARRANTY PERIOD will be undertaken by the RMS at cost to the Proponent.

Where work is undertaken by the Proponent, the RMS will provide surveillance as it deems necessary at the Proponent’s cost.

1.8 Where work or surveillance is undertaken by the RMS at the Proponent’s cost, the amount due will be invoiced by the RMS and the RMS must receive full payment prior to authorising release of the PERFORMANCE BOND (refer Clause 5).

1.9 This Specification is written on the basis that the entire work is the responsibility of the Proponent, notwithstanding the responsibilities mentioned in Clause 1.7.

Where Clause 1.7 specifies part of the Work to be undertaken by the RMS (e.g. permanent pavement restoration), the relevant specification requirements are deemed to apply to the RMS.
1.10 Use the NSW SOC Guide to Codes and Practices for Streets Opening (SOC Guide) as a general reference for road opening work that involves buried utilities or services. Where there is an inconsistency (e.g. required cover depth), the requirements in this Specification take precedence.

1.11 All excavation and shoring work must comply with:

- WorkCover NSW Excavation Code of Practice.
- All other relevant statutory requirements.
- RMS Traffic Control at Worksites Manual.

1.12 Use the RMS Asset Maintenance Reference Number quoted on the issued ROAD OPENING APPROVAL in all relevant correspondence.

1.13 Provide the Identified Records (refer RMS Q) summarised in Annexure C.2.

1.14 The standards, specifications and test methods referred to by this Specification are referenced using an abbreviated form (e.g. AS 1478). The titles are given in Annexure M.

1.15 Some words and phrases have special meanings in this Specification. In some cases, the defined meaning is different from the meaning that the word or phrase might have in ordinary usage. In order to understand this Specification, You need to take these special meanings into account.

Defined terms have the special meanings set out in Annexure M. All defined terms are indicated by using small capitals (e.g. DEFINED TERM) unless they are one of the following basic terms, which appear too often for small capitals to be used:

- You
- Specification
- Proponent
- Work

1.16 Some technical words and abbreviations used in this Specification are also defined in Annexure M.

1.17 Unless otherwise specified, the issue of an Australian Standard or RMS Test Method to be used is the issue current on the date that the ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES) is issued. The RMS specification to be used is the issue contained in the project documentation.

1.18 You (the Proponent) are responsible for all activities, actions, works and supply of materials, unless Clause 1.7 specifies otherwise. Accordingly, this Specification does not generally use wording such as "You must …" because this is the underlying requirement. However, it is used where actions in a clause involve both the Proponent and the RMS and the roles need to be unambiguous.
2 PLANNING

2.1 APPLICATIONS FOR ROAD OPENING APPROVAL / ROAD OCCUPANCY LICENCE

2.1.1 Except in the case of a GENUINE EMERGENCY (as defined in Annexure M.3), You must obtain, fill out and submit the following information to the RMS Regional Asset Management Section at least 20 BUSINESS DAYS (or 10 BUSINESS DAYS for Low Risk road openings) prior to the intended date of commencement of site work:

1. Application for a ROAD OPENING APPROVAL:
   - Road Occupancy Licence Checklist - Form C.
   - Road Occupancy Licence Application (Development Activities) - Form D.
   - Both Forms C and D to be completed except for the RMS Asset Maintenance Reference Number.

2. Proposed details of road opening (refer Annexure A.1), including a sketch of the proposed layout, consistent with details provided in the completed Forms C and D.

3. Details of PUBLIC LIABILITY INSURANCE, PERFORMANCE BOND, DEED OF INDEMNITY (where specified in Annexure A.2), consistent with requirements of Clause 2.2:
   - The RMS will specify details in Annexure A.2 based on Items (1) and (2) of the Applications submitted above.

2.1.2 Except in the case of a GENUINE EMERGENCY (as defined in Annexure M.3), You must submit to the RMS Transport Management Centre an Application for ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES), being a copy of the completed Forms C and D (i.e. the same as submitted for the ROAD OPENING APPROVAL), at least 20 BUSINESS DAYS (or 10 BUSINESS DAYS for Low Risk road openings) prior to the intended date of commencement of site work.

This must include a TRAFFIC MANAGEMENT PLAN (TMP) that is submitted with the Application for ROAD OPENING APPROVAL.

2.1.3 Refer to Table 1 for details of where to obtain the Application Forms and where to submit each Application.

2.1.4 Each Application must provide all necessary details of the proposed work. Details include the proposed scope, location, layout, LATERAL CLEARANCES, trench dimensions, stage construction and timings for the road opening and any proposed use of road plates.

Details must be based on Your preliminary planning for the work, to the stage of a developed proposal (not detailed design). The level of detail must be appropriate for the proposed Risk Category.
2.1.5 For Medium and High Risk road openings, You must provide Your justification for the proposed road opening and demonstrate that:

.1 Suitable alternatives to an excavated road opening (e.g. using trenchless technology or existing ducts) have been investigated and found to be not feasible or cost-effective.

.2 Where an excavated road opening is necessary, its proposed length will be the minimum feasible and its proposed location and layout will minimise the work duration and the impact on road users and public and private assets.

Table 1 - RMS Contacts for Submission of Approval and Licence Applications

<table>
<thead>
<tr>
<th>Detail</th>
<th>ROAD OPENING APPROVAL</th>
<th>ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source</td>
<td>Submit the same completed Form C and Form D as submitted for the ROAD OCCUPANCY LICENCE</td>
<td><a href="http://www.rms.nsw.gov.au/publicationsstatisticsforms/downloads/forms_roadoccupancy_dl1.html">http://www.rms.nsw.gov.au/publicationsstatisticsforms/downloads/forms_roadoccupancy_dl1.html</a> [Form C]</td>
</tr>
</tbody>
</table>

Note: There are also Explanatory Notes available for each of these Forms.

<table>
<thead>
<tr>
<th>Detail</th>
<th>ROAD OPENING APPROVAL</th>
<th>ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Regions</td>
<td>Sales Region Asset Management Section</td>
<td>By facsimile to RMS Transport Management Centre (TMC)</td>
</tr>
<tr>
<td>Regional Region</td>
<td>By facsimile to RMS Regional Traffic Operations Unit</td>
<td></td>
</tr>
<tr>
<td>Sydney Region</td>
<td>Manager, Planned Incident Unit</td>
<td>Regional Traffic Operations Manager</td>
</tr>
<tr>
<td>Other RMS Regions</td>
<td>Regional Traffic Operations Unit</td>
<td></td>
</tr>
<tr>
<td>Submit to</td>
<td>Regional Asset Manager</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td>Local RMS Regional Office (refer following link and choose relevant Office): <a href="http://www.rms.nsw.gov.au/contactus/administration.html">http://www.rms.nsw.gov.au/contactus/administration.html</a></td>
<td>RMS Transport Management Centre (TMC)</td>
</tr>
<tr>
<td>Tel. No.</td>
<td>Local RMS Regional Office (refer above link)</td>
<td>02 8396 1512</td>
</tr>
<tr>
<td>Fax No.</td>
<td>Local RMS Regional Office (refer above link)</td>
<td>02 8396 1530</td>
</tr>
</tbody>
</table>

2.1.6 The procedures or contacts in Clause 2.1 and Table 1 may vary for:

.1 Region-specific arrangements (outside Sydney Region); or

.2 Road opening work by utility authorities that hold an existing Memorandum of Understanding (MOU) with the RMS; or

.3 Road opening work that is related to a development work covered by a separate agreement with the RMS.

2.1.7 The RMS will advise the name and telephone number of the RMS Nominated Representative upon receipt of the Applications.

The RMS Nominated Representative will organise and advise the time and place of the INITIAL SITE MEETING, to occur within 10 BUSINESS DAYS of receipt of the Applications (refer Clause 2.1.9).
2.1.8 The RMS will make every endeavour to issue the Approval and Licence within 20 BUSINESS DAYS (or 10 BUSINESS DAYS for Low Risk road openings) but does not guarantee their issue. Each will contain the RMS Asset Maintenance Reference Number for the Work.

The ROAD OPENING APPROVAL will not be issued until after the PRECONSTRUCTION SITE MEETING and will be in the form of a letter of approval (usually sent by facsimile).

The ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES) will not be issued (by TMC) until after issue of the ROAD OPENING APPROVAL and will be in the form of an approved Form C.

2.1.9 Processes Held: Detailed planning and design for road opening work. Commencement of work on site (Low Risk road openings).

Submission: After submitting the Approval and Licence Applications, You must attend an INITIAL SITE MEETING with the RMS Nominated Representative (time and place advised by RMS).

At this INITIAL SITE MEETING, after considering all site issues, the RMS will review and confirm:

.1 The submitted Applications (You must provide copies).
.2 The scope, location, trench dimensions and cover depth of the road opening.
.3 The Risk Category and permitted use of road plates.
.4 The responsibilities for restoration and maintenance.
.5 The extent and type of temporary pavement restoration.
.6 The main design requirements.
.7 Where the Risk Category is Low, all relevant construction requirements, including designated stockpile sites.

Release of Hold Point: The RMS will review the submission and may direct further work be done on the submission and/or the preparation for the work before releasing the Hold Point.

2.2 GENERAL PRECONSTRUCTION REQUIREMENTS

2.2.1 Immediately after the INITIAL SITE MEETING, submit a completed Form R “Speed Zone Authorisation Application” to the RMS Transport Management Centre for approval (refer Table 1).

2.2.2 Where specified in Annexure A.2, comply with any special requirements of the RMS for the Work.

2.2.3 Make due allowance in Your work planning (e.g. TRAFFIC CONTROL PLAN (TCP), stage construction) for development of sufficient strength in concrete pavement restoration for it to carry traffic (refer Clause 4.10).
2.2.4 You must warrant in writing to the RMS that You have the people, equipment and materials to properly and timely perform the Work. **Warranty on capacity**

2.2.5 You or Your agents must hold PUBLIC LIABILITY INSURANCE:

1. In the amount specified in Annexure A.2.
2. That provides coverage for road opening type of work.
3. Extended to cover the interests of the Roads and Maritime Services, or its agent, and the local Council.
4. That provides coverage until the expiration of the WARRANTY PERIOD specified in Annexure A.2.

You must provide evidence of insurances to the RMS prior to commencement of work and whenever requested to do so. **PUBLIC LIABILITY INSURANCE**

2.2.6 Where specified in Annexure A.2, You must provide a DEED OF INDEMNITY in the form of Annexure L to the RMS prior to commencement of work. **DEED OF INDEMNITY**

2.2.7 Where specified in Annexure A.2, You or Your agents must lodge a PERFORMANCE BOND with the RMS prior to commencing work:

1. In favour of the Roads and Maritime Services.
2. In the form of an original unconditional Bank Guarantee, with no end date.
3. In the amount advised by the RMS at the PRECONSTRUCTION SITE MEETING, once the details of work and risks are known.

The RMS will retain the PERFORMANCE BOND until the end of the WARRANTY PERIOD specified in Annexure A.2 (refer Clause 5). **PERFORMANCE BOND**

2.2.8 Prior to commencement of excavation works, You must:

1. Contact ‘Dial Before You Dig’ on telephone 1100 (free call) to ensure identification of all buried public utilities at the site. **Buried public utilities, drainage systems and traffic facilities loops**
2. Where buried public utilities are identified, liaise with the relevant public utility owners to identify the exact location of their buried services and to determine any potential effects of the Work on their assets.
3. Liaise with the RMS and the local Council regarding drainage systems or traffic facilities loops under the road and determine any potential effects of the Work on these assets.

You must accommodate and meet all reasonable requirements of the public utility owners, RMS and local Council. **Liaise with Council and other parties**

2.2.9 Consult and liaise with the local Council if the Work affects any Council asset, e.g. footpaths.

Consult other road users such as bus companies and taxi operators if the Work requires the temporary relocation of a bus or taxi stop.
2.2.10 Where specified in Annexure A.2, provide advance notification of the Work to adjacent premises.

Advance notice to adjacent premises

2.2.11 Where work at night or weekends is specified, obtain the separate approval of the NSW Department of Environment and Climate Change (DECC) and Council to work at night or weekends.

Night time and weekend work

2.2.12 Where specified in Annexure A.2, provide details of Your proposed work methods for critical construction activities. Work methods must comply with and take into account:

1. Relevant WorkCover NSW and other statutory requirements (refer Clause 1.11).
2. The RMS Traffic Control at Worksites Manual (TCWS).
3. The approved TRAFFIC CONTROL PLAN (TCP) for the work.

Critical work methods

2.2.13 Processes Held: Commencement of work on site (Medium and High Risk road openings).

Submission Details: At least 20 BUSINESS DAYS (or such longer period directed by the RMS) prior to the intended date of commencement, submit documentation to the RMS as follows:

1. All project documentation (including a copy of necessary checks and approvals) required under this Clause 2.2.
2. Certification that all necessary designs, drawings and procedures have been completed and are structurally adequate and comply with this Specification.
3. Certification that a site-specific risk assessment has been completed by a Competent Person for the proposed excavation and shoring work.
4. Stage construction sequence.
5. Details of critical work methods.

Release of Hold Point: The RMS will review the submission and may direct further work prior to organising a PRECONSTRUCTION SITE MEETING with You and Your designer(s).

At the PRECONSTRUCTION SITE MEETING, the RMS will:

1. Confirm the design requirements (including limits of trench excavation, limits of pavement restoration, tiebar spacing).
2. Confirm the detailed construction requirements (including any modified requirements for time-critical work).
3. Confirm the critical construction activities for provision of work methods and conformity testing (refer Clause 5).

and may direct further work prior to issuing the ROAD OPENING APPROVAL and the ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES) and authorising the release of the Hold Point.

HOLD POINT
PRECONSTRUCTION SITE MEETING
(for Medium and High Risk road openings)
2.2.14 Prior to commencement of work, You must prepare a site-specific TRAFFIC CONTROL PLAN (TCP) according to the TCWS that:

.1 Complies with the issued ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES) and the approved TMP.

.2 Complies with the road safety and stage construction requirements for road opening work (refer Clause 2.4).

.3 Includes all necessary signage.

2.3 RISK CATEGORY

2.3.1 The Risk Category for the road opening is:

.1 Selected by You according to Table 2 and Table 5, based on a site-specific risk assessment using the best available information and a developed work proposal.

.2 Reviewed and determined by the RMS at the INITIAL SITE MEETING (refer Clause 2.1) and documented in Annexure A.2.

The RMS reserves the right to review the Risk Category upon commencement of excavation or at any other time (e.g. where it is evident that unforeseen risk factors are present that affect the previously-determined Risk Category).

Where Table 5 indicates that shoring is not required, this is always subject to the WorkCover NSW requirement for a site-specific risk assessment at the time of actual excavation, which may determine that shoring is required because of actual excavation conditions.

2.3.2 A road opening is determined as Low Risk if:

.1 The warrants in Table 2 for Low Risk are met in regard to all criteria other than shoring.

.2 Shoring of the excavation is not required according to Table 5 and/or the site-specific risk assessment. This will depend upon the trench depth, proximity to traffic, pavement conditions and excavation conditions.

If shoring is required, the Risk Category is Medium or High.

2.3.3 Where the Risk Category is Low, a site-specific design is not required.

Where the Risk Category is Medium or High, You must provide site-specific structural designs for the road opening as follows:

.1 For excavation and shoring, according to Clause 2.6.2.

.2 For road plates, according to Clause 2.6.3.

2.3.4 You must meet the other requirements for the Risk Category according to Table 2.
<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Conditions</th>
<th>Requirements</th>
</tr>
</thead>
</table>
| 1. Low Risk  | Where no MAJOR RISK FACTORS (refer 3. High Risk) are present and ALL of the following conditions apply:  
  - Shoring of the excavation is not required (according to Table 5 and/or the site-specific risk assessment).  
  - Trench depth does not exceed 1.3 m.  
  - Trench width does not exceed 1.2 m.  
  - Area of excavation does not exceed 6 m² at one time, unless otherwise approved by RMS.  
  - No road plates are used.  
  Each stage of the road opening must be excavated and backfilled on the same working day.  
  The traffic LATERAL CLEARANCE must exceed that specified in Table 5 for the trench depth.  
  A site-specific structural design is not required.  
  NOTE: The Risk Category will become Medium where shoring of the excavation is required according to either Table 5 or the site-specific risk assessment, even if the trench depth does not exceed 1.3 m. This will depend on trench depth, proximity of traffic, and pavement and soil conditions. |
| 2. Medium Risk | Where no MAJOR RISK FACTORS (see 3. High Risk) are present and ONE OR MORE of the conditions for 1. Low Risk do not apply.  
  A site-specific design for the road opening must be provided according to Clause 2.6. The design must be certified by the Proponent’s Structural Engineer.  
  Shoring of the excavation must be provided, unless specifically certified by the Structural Engineer as safe for no shoring (refer Clause 2.6.2.5).  
  Regular inspection is required (refer Clauses 4.2.1, 4.3.3, and 4.4.2). |
| 3. High Risk  | Where MAJOR RISK FACTORS are present, such as:  
  - In a GENUINE EMERGENCY (see Annexure M.3).  
  - Very large trench width (i.e. exceeds 2.1 m), depth or length.  
  - Road openings parallel or at small skew to direction of traffic.  
  - High risk traffic situations.  
  - Hazardous excavation conditions (e.g. groundwater, excessive ground vibrations).  
  - Buried utilities which could cause a significant hazard, if disturbed (e.g. high voltage power).  
  - Adjacent buildings or structures within the zone of influence, especially those aligned parallel to the excavation.  
  - Long duration openings.  
  A site-specific design must be provided as for 2. Medium Risk. However, the design must also be independently verified (refer to Clause 2.6.1.2).  
  Shoring of the excavation must be provided as for 2. Medium Risk.  
  More intensive RMS requirements, review and surveillance will apply than for 2. Medium Risk.  
  Regular inspection is required as for 2. Medium Risk.  
  NOTE: In a GENUINE EMERGENCY, some requirements in RMS M209 may be simplified to expedite the work, based on an appropriate risk assessment and expert advice. Adoption of designs and requirements for a similar situation is acceptable for such emergencies. |
2.4 ROAD SAFETY AND STAGE CONSTRUCTION REQUIREMENTS

2.4.1 Clause 2.4 specifies the road safety and stage construction conditions that must apply to road opening work to ensure the safe execution of the work in proximity to traffic (e.g. in urban situations). This includes the safe lateral clearance to traffic, traffic and pedestrian control requirements and signposting, both during and after working hours. Clause 2.4 integrates traffic management considerations and worker safety requirements for the Work Area.

You must comply with these requirements in planning the layout, design, stage construction, TMP and TCP for the road opening.

2.4.2 In accordance with TCWS Section 3.6, road opening work is deemed to be Short Term work, with a Safe Clearance between Workers and Through Traffic less than 1.2 m (Option 4), provided that all the conditions in Clause 2.4 are complied with.

The Work Area is deemed to include both the open and road plated sections of an excavation.

2.4.3 Unless otherwise approved by the RMS, the stage construction of the road opening must ensure that:

.1 Each new section of excavation is opened up and completed (i.e. either backfilled or road plated) within 1 working day.
.2 Lane closures at any one time are minimised.
.3 Where shoring is required, the length of unsupported trench does not exceed 5 linear m at any one time and is shored immediately after each new stage of excavation (refer Clause 2.6.2).
.4 The equivalent length of excavated road opening (i.e. parallel to the direction of traffic) at any one time must not exceed:
   - 5 linear m (open excavation, not covered with road plates).
   - 15 linear m (road plated section).
   - 20 linear m (including open and road plated sections).
.5 Measures are taken to prevent surface runoff water from entering the excavation.
2.4.4 You must meet the following conditions for daily stage construction of the road opening excavation (refer Table 3):

.1 For Low Risk road openings, each stage is excavated and backfilled to be trafficable within 1 working day.

.2 For Medium and High Risk road openings, each stage is excavated and completed to either of the following conditions at the end of each working day:
   - The trench is fully backfilled to be trafficable; or
   - The trench is not fully backfilled and sections of open excavation within the trafficked pavement are covered with a road plate.

2.4.5 The minimum traffic LATERAL CLEARANCE from the edge of the road opening to the edge of the nearest trafficked lane must be:

.1 0.5 m, either during or after working hours, where shoring is in place and effective or where shoring is not required; or

.2 Where shoring is required but the trench is unsupported (i.e. newly excavated trench prior to shoring, or when shoring is removed):
   - The minimum LATERAL CLEARANCE specified in Table 5 for which shoring is not required; or
   - Where the trench depth exceeds 1.5 m, the clearance determined by Your Structural Engineer.

Where feasible, provide a larger clearance (e.g. at intersections, on curves or as advised by the RMS).

Where road plates are in use or the open excavation has been backfilled under the trafficked lanes, the LATERAL CLEARANCE is measured from the edge of the road plate or the edge of compacted backfill to the edge of the nearest trafficked lane.

2.4.6 You must implement the relevant traffic and pedestrian control requirements specified in Table 3 for the road opening, according to the TCWS and consistent with the issued ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES) and the approved TMP.

2.4.7 Road plates may only be used:

.1 For Medium or High Risk road openings (refer Table 2).

.2 Where permitted in Annexure A.2.

.3 When the road opening excavation cannot be properly backfilled within a working day and it is necessary to restore unobstructed traffic flow at the end of the working day.

Road plates must not be used on motorways, freeways or roads with a posted speed limit over 90 km/h under any circumstances. Use road plates only as a last resort on roads with a posted speed limit between 70 km/h and 90 km/h.
2.4.8 Unless otherwise approved by the RMS, road plates must not be used for a period longer than 1 month at any one location, after which the road opening must be backfilled. Periodic inspections at an appropriate frequency must be undertaken to ensure that the excavation conditions have not deteriorated and become unfavourable during this period.

Limited duration for use of road plates

2.4.9 Exceptional circumstances may include emergencies, unforeseen problems, excavations within a footpath, or where it is not practical to use road plates, and must meet all the following conditions:

.1 You must obtain the RMS approval or confirmation.
.2 The road opening must be Medium or High Risk.
.3 Work must occur within the road opening each working day.

When exceptional circumstances apply

<table>
<thead>
<tr>
<th>Control measure</th>
<th>During working hours</th>
<th>After working hours</th>
<th>Exceptional circumstances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition of road opening at end of each working day</td>
<td>Not applicable</td>
<td>Trench is fully backfilled and trafficable (i.e. after temporary pavement restoration)</td>
<td>Trench is not fully backfilled. All sections of open excavation within trafficked pavement must be covered with a road plate. Trench is not fully backfilled. Excavation within trafficked pavement may be left open and not covered by road plates (within lane closure).</td>
</tr>
<tr>
<td>Lane closures</td>
<td>As per approved TMP</td>
<td>Not required</td>
<td>Not required</td>
</tr>
<tr>
<td>Speed restriction for passing traffic</td>
<td>All of the following:  - Temporary road work speed zone (40 km/hr signposted limit)  - Provide a traffic controller at all times during active work on road opening (to control speed zone and stop traffic if necessary)  - Other appropriate traffic control devices (e.g. signs, flashing lights, tapers)</td>
<td>Not required</td>
<td>Where normal posted speed limit is between 70 km/h and 90 km/h:  - Temporary road work speed zone (60 km/h signposted limit) Both of the following:  - Temporary road work speed zone (60 km/h signposted limit)  - Other appropriate traffic control devices (e.g. signs, flashing lights, tapers)</td>
</tr>
<tr>
<td>Delineation between trafficked lane and excavated road opening</td>
<td>Cones or bollards. Do not use barriers or containment fences that impose loads on edge of trench, even if covered by</td>
<td>Not applicable</td>
<td>Not required</td>
</tr>
</tbody>
</table>

Table 3 - Traffic and Pedestrian Control Requirements for Road Opening Work
<table>
<thead>
<tr>
<th>Control measure</th>
<th>During working hours</th>
<th>After working hours</th>
<th>Exceptional circumstances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian safety</td>
<td>Enclose all sections of open excavation within footpath or road reserve. Use secure, lightweight pedestrian barricade.</td>
<td>Not required</td>
<td>Fully enclose all sections of open excavation within trafficked pavement, footpath and road reserve. Use secure, continuous lightweight pedestrian barricade.</td>
</tr>
<tr>
<td>Signage (additional to TCWS)</td>
<td>Exhibit a Rough Surface sign (T3-7) ahead of road plates, where used.</td>
<td>Nil</td>
<td>Nil</td>
</tr>
</tbody>
</table>

### 2.5 LOCATION AND LAYOUT DESIGN FOR ROAD OPENING

2.5.1 Determine the scope, location, layout, cross sectional dimensions and stage construction for the road opening, including the limits of the road opening excavation, consistent with:

.1 The proposed limits specified in Annexure A.1.

.2 The lateral clearance, limits on size of excavation, stage construction and other requirements of Clause 2.4.

.3 The design requirements of Clause 2.6.

.4 The limits for pavement restoration (refer Clause 2.7.2).

2.5.2 Minimise the number of separate road openings. Where feasible, use shared trench arrangements for multiple utilities or services.

2.5.3 Where feasible, and subject to agreement with the local Council, locate new utilities or services fully within the footpath and not within the trafficked pavement. Refer to the space allocations shown in Clause 6 of the SOC Guide.

2.5.4 The layout and alignment must be agreed with the RMS at the INITIAL SITE MEETING.

Unless otherwise approved by the RMS, the layout and alignment of the road opening must be at right angles (i.e. at 90 degrees) to the direction of traffic.

Where a road opening parallel to the direction of traffic is approved by the RMS, locate the road opening within the kerbside lane.
2.5.5 In order to prevent future damage from roadworks, the cover depth of new buried utilities or services within the trafficked pavement must be not less than that specified in Table 4, unless otherwise approved by the RMS. The cover depth and requirements for utility protection must be agreed with RMS at the INITIAL SITE MEETING.

The cover depth is measured from the top of the utility (including any protective sleeving, but disregarding concrete encasement) to the pavement Finished Surface Level (FSL). The minimum cover depth to the top of the concrete encasement is 0.5 m in all cases.

### Table 4 - Cover Depth of New Buried Utilities or Services

<table>
<thead>
<tr>
<th>Application</th>
<th>State Roads (RMS control)</th>
<th>Regional and Local roads (Council control)</th>
<th>Footpath</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New main (unprotected)</td>
<td>Depth of existing main; or 0.5 m top of encasement (whichever is greater)</td>
<td>As per SOC Guide</td>
</tr>
<tr>
<td>Minimum Cover Depth</td>
<td>1.2 m</td>
<td>1.0 m</td>
<td>As per SOC Guide</td>
</tr>
<tr>
<td>Protection Requirements</td>
<td>Nil</td>
<td>Sleeved within concrete encasement</td>
<td>As per SOC Guide</td>
</tr>
<tr>
<td></td>
<td>New main (protected)</td>
<td>Sleeved within concrete encasement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>New lateral to existing main</td>
<td>Sleeved within concrete encasement</td>
<td></td>
</tr>
</tbody>
</table>

2.5.6 Design, locate and install new buried utilities or services:

1. To minimise the risk of future collapse or damage (e.g. due to settlement, traffic, use of vibrating rollers in roadworks). Ensure durable construction, with adequate reserve strength.
2. To be maintenance-free (e.g. provide protective sleeving).
3. To minimise interference with other buried utilities/services.
4. To provide for future upgrades of the utility or service, with minimal disturbance to the trafficked pavement.
5. To be in previously undisturbed ground, where feasible.

2.5.7 Unless otherwise approved by the RMS, You must remove any buried utility or service that becomes obsolete as a result of Your work, including related restoration, according to this Specification.

2.5.8 Provide isolating valves at each end of crossings under a trafficked pavement, at locations within the footpath agreed with the RMS.

2.5.9 Manholes and pits must be finished flush with the pavement or footpath Finished Surface Level (FSL).
2.6 **STRUCTURAL DESIGNS FOR ROAD OPENINGS**

2.6.1 **General**

2.6.1.1 Provide a structural design for the road opening excavation that:

1. Is appropriate for the Risk Category determined by the RMS (refer Clause 2.3).
2. Meets the road safety and stage construction requirements for road openings (refer Clause 2.4).
3. Meets the location and layout requirements of Clause 2.5.
4. Meets the structural design requirements for:
   - Excavation and shoring (refer Clause 2.6).
   - Road plates, where permitted (refer Clause 2.6).

2.6.1.2 Each design must be:

1. Prepared and certified by Your Structural Engineer.
2. Where the Risk Category is High, verified by an independent Structural Engineer.

A copy of the design certification must be provided to the RMS.

2.6.1.3 The design Drawings must specify all:

1. Relevant loads, dimensions and design assumptions.
2. Site-specific requirements and stage construction sequence.

2.6.1.4 A copy of the design Drawings must:

1. Be kept on site at all times during the road opening work.
2. Be provided to the RMS if requested.

2.6.1.5 Where permanent restoration is Your responsibility, provide a pavement design for the backfill and permanent restoration of the road opening according to Clause 2.7.

2.6.2 **Design of Excavation and Shoring**

2.6.2.1 Determine the need for shoring based on a site-specific risk assessment completed by a Competent Person for the proposed excavation work.

Table 5 provides guidance for assessing the need for shoring.
2.6.2.2 The excavation and shoring design must be site-specific and:

.1 Meet the stage construction requirements of Clause 2.4.
.2 Meet the location and layout requirements of Clause 2.5.
.3 Facilitate staged excavation and ensure safe, stable conditions at each end of the excavation (i.e. backfilled and working face ends).
.4 Comply with relevant WorkCover NSW and other statutory requirements for excavation and shoring (refer Clause 1.11).
.5 Ensure the stability of, and prevent undermining of, the adjacent pavement.
.6 Take into account relevant geotechnical considerations according to Clause 2.6.2.5 and actual pavement conditions.
.7 Take into account the effects of vibration (e.g. from live loads or construction plant).

2.6.2.3 The excavation and shoring design must:

.1 Ensure that shoring can support surcharge from live loads in the trafficked lane adjacent to the excavation (assuming the vehicle tracks along the edge of the trafficked lane nearest to the excavation). Use the same live load as for road plate design (refer Clause 2.6.3).
.2 Where road plates are permitted, ensure that shoring can support all live and dead loads from the road plates that bear on the edge of the excavation according to Clause 2.6.3.
.3 Where necessary, support surcharge from, and ensure the stability of, adjacent buildings or structures (i.e. within their zone of influence) according to Clause 2.6.2.7.
.4 Support construction loadings (e.g. excavation plant, trucks and materials).

2.6.2.4 The trench width must provide sufficient clearance on each side of a buried utility or service that:

.1 Meets the utility owner’s requirements.
.2 Permits adequate compaction of backfill.

2.6.2.5 The excavation and shoring design must include an assessment of actual site, soil and groundwater conditions (based on soil sampling) by a qualified Geotechnical Engineer, unless worst case (i.e. conservative) soil conditions are assumed. Refer to Table 2.

Exemptions from shoring must be justified and certified on a similar basis. No exemptions are permitted if road plates are used.
2.6.2.6 Where shoring is required:

.1 The length of unsupported trench must ensure stability of the trench sides and must not exceed 5 linear m at any one time.

.2 Each new section of the trench must be shored immediately after excavation.

.3 While the trench is unsupported, the lateral clearance must be increased to the clearance specified in Clause 2.4.5.

2.6.2.7 Do not excavate within the zone of influence of any building or structure (refer Figure 1 and Figure 2), unless it is absolutely necessary.

Your structural design must ensure the stability of nearby buildings or structures, both for unshored and shored stages of excavation.

2.6.2.8 The shoring system may be permanent or removable and must:

.1 Provide effective ground support, with uniform bearing against trench sides and no excessive deflection under loads.

.2 Prevent loss of backfill material through gaps in shoring.

.3 Facilitate the filling of gaps and voids behind shoring or under the pavement according to Clause 4.3 (e.g. by using sacrificial formwork to allow re-use of shoring components).

For removable shoring, the design must allow for the sudden release of bracing forces and mobilisation of passive soil pressures when shoring bracing is removed. The design must ensure stability of the excavation is maintained during these conditions.

2.6.2.9 The shoring design Drawings must include:

.1 A description of the shoring system.

.2 Shoring materials and their properties.

.3 Sizes, dimensions and spacing of main components.

.4 Engineering product data (reference all specific items).

.5 The stage construction sequence.
Figure 1 - Unsupported zone of influence/clearances, where:
(a) shoring is not required (WorkCover NSW requirements or Table 5); or
(b) shoring is required, but not yet in place or effective

Figure 2 - Supported zone of influence/clearances, where shoring is in place and effective
### Table 5 - Guidelines for Assessing the Need for Shoring of Road Opening Excavations

**NOTE: THIS TABLE IS FOR GUIDANCE ONLY AND MUST ONLY BE USED IN CONJUNCTION WITH A SITE-SPECIFIC RISK ASSESSMENT OF ACTUAL TRENCH CONDITIONS AT TIME OF EXCAVATION**

<table>
<thead>
<tr>
<th>Trench Depth (mm)</th>
<th>Indicative Shoring Requirements (includes site-specific shoring design)</th>
<th>Flexible pavement or unsound concrete slab with favourable excavation conditions</th>
<th>Sound concrete slab pavement with favourable excavation conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 400</td>
<td>Not required if plate bearing width &gt; 0.6 m each side</td>
<td>Not required *</td>
<td>Not required *</td>
</tr>
<tr>
<td>400 – 500</td>
<td>Not required if plate bearing width &gt; 0.6 m each side</td>
<td>Required unless traffic lateral clearance &gt; 0.6 m *</td>
<td>Not required *</td>
</tr>
<tr>
<td>500 – 600</td>
<td>Always Required</td>
<td>Required unless traffic lateral clearance &gt; 0.8 m *</td>
<td>Not required *</td>
</tr>
<tr>
<td>600 – 700</td>
<td>Always Required</td>
<td>Required unless traffic lateral clearance &gt; 1.0 m *</td>
<td>Required unless traffic lateral clearance &gt; 0.8 m *</td>
</tr>
<tr>
<td>700 – 800</td>
<td>Always Required</td>
<td>Required unless traffic lateral clearance &gt; 1.2 m *</td>
<td>Required unless traffic lateral clearance &gt; 0.9 m *</td>
</tr>
<tr>
<td>800 – 900</td>
<td>Always Required</td>
<td>Required unless traffic lateral clearance &gt; 1.4 m *</td>
<td>Required unless traffic lateral clearance &gt; 0.7 m *</td>
</tr>
<tr>
<td>900 - 1000</td>
<td>Always Required</td>
<td>Required unless traffic lateral clearance &gt; 1.6 m *</td>
<td>Required unless traffic lateral clearance &gt; 1.0 m *</td>
</tr>
<tr>
<td>1000 – 1100</td>
<td>Always Required</td>
<td>Required unless traffic lateral clearance &gt; 1.8 m *</td>
<td>Required unless traffic lateral clearance &gt; 0.9 m *</td>
</tr>
<tr>
<td>1100 – 1200</td>
<td>Always Required</td>
<td>Required unless traffic lateral clearance &gt; 2.0 m *</td>
<td>Required unless traffic lateral clearance &gt; 1.5 m *</td>
</tr>
<tr>
<td>1200 - 1300</td>
<td>Always Required</td>
<td>Required unless traffic lateral clearance &gt; 2.2 m *</td>
<td>Required unless traffic lateral clearance &gt; 1.7 m *</td>
</tr>
<tr>
<td>1300 - 1400</td>
<td>Always Required</td>
<td>Required unless traffic lateral clearance &gt; 2.4 m *</td>
<td>Required unless traffic lateral clearance &gt; 1.2 m *</td>
</tr>
<tr>
<td>1400 – 1500</td>
<td>Always Required</td>
<td>Required unless traffic lateral clearance &gt; 2.6 m *</td>
<td>Required unless traffic lateral clearance &gt; 2.0 m *</td>
</tr>
<tr>
<td>More than 1500</td>
<td>Always required</td>
<td>Always required *</td>
<td>Always required *</td>
</tr>
</tbody>
</table>

**NOTES:**

* Minimum lateral clearance to traffic (measured from edge of excavation to edge of trafficked lane) for all cases is 0.5 m (refer Clause 2.4). Where shoring is required, maintain the traffic lateral clearance limit shown in Table 5 until the shoring is in place and effective. Where shoring is not required, maintain the traffic lateral clearance limit shown in Table 5 throughout the work.

1. Table 5 indicates the need for shoring in proximity to traffic to provide for traffic safety, allowing for load distribution through pavement. If in doubt, consult a Structural Engineer to confirm the shoring and traffic separation design requirements.

2. ‘Unfavourable excavation conditions’ means any of the following conditions (otherwise, favourable excavation conditions may be assumed):
   - Excavation in saturated clay or silt (i.e. one can indent one’s fingernail depth when applying maximum finger pressure) or any soil materials which are non cohesive (e.g. sandy type soils)
   - Any signs of erosion, instability, crumbling or loose materials in vertical faces of the excavation
   - Water seepage occurs from sides or base of the excavation

3. “Unsound concrete slab” includes concrete pavement with a parallel joint <1.0 m from edge of excavation.
2.6.3 Design of Road Plates

2.6.3.1 Where road plates are permitted (refer Clause 2.4.7 and Annexure A.2), either:

.1 Use Table 7 to determine the road plate thickness, provided that the trench width does not exceed 2.1 m and the other design requirements of Clause 2.6.3 are met; or

.2 Provide a site-specific structural design for the road plates according to this clause (e.g. trench widths exceeding 2.1 m).

2.6.3.2 Unless otherwise approved by the RMS:

.1 Each road plate must be rectangular in plan.

.2 Plates must be aligned parallel to the line of the trench.

.3 Locate plate joints to avoid the wheel paths, where feasible.

.4 The gap between adjoining plates must not exceed 5 mm.

2.6.3.3 The road plate design must specify the main parameters, including:

.1 Trench width, plate clear span and plate length (in the span direction, i.e. at right angles to line of trench).

.2 Plate width (at right angles to the span direction).

.3 Plate thickness and steel grade.

.4 Number, location and type of fixings per plate.

.5 Details of holes in plate for fixings, where permitted.

2.6.3.4 The road plate design must assume:

.1 Unstiffened steel plates are used according to Clause 3.3, unless otherwise approved by the RMS. In this case a site-specific design must be provided (refer Clause 2.6.3.1).

.2 Fully shored trench conditions for the road opening.

.3 A plate clear span equal to the trench width plus 400 mm to allow for bearing support on each side (refer Clause 2.6.3.9).

2.6.3.5 Design road plates according to AS 5100, using elastic analysis, a limit state stress of first yield and the following live load conditions:

.1 Live loading must be a series of moving 48 kN wheel loads spaced on a repeating 1.2 m square grid (to replicate T44 Truck rear axle group – single or adjacent trucks).

.2 Each wheel load must be distributed over a contact area of 400 mm x 200 mm, with the 200 mm dimension measured parallel to the direction of traffic.

.3 Wheel loads must be positioned in the most unfavourable loading position, i.e. along the unsupported edge of plate.

.4 The Live Load Factor (LLF) and Dynamic Load Allowance (DLA) must be as specified in Table 6.
2.6.3.6 The thickness of a road plate must be no less than 25 mm and must not exceed 60 mm.

The area of each road plate must be no less than 3.6 m².

The plate length (in the span direction – see diagram) must exceed the trench width by at least 800 mm (refer Clause 2.6.3.9).

The length to width ratio of each plate must not exceed 3:1.

Where the trench width exceeds 1.8 m, plate widths in between 1.2 m and 2.2 m are not permitted (to avoid critical load patterns).

### Table 6 - Live Load Design Requirements for Road Plates

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Location of Road Plate</th>
<th>Functional Road Class [AS 5100.7 App. A Table A1]</th>
<th>Live Load Factor (LLF)</th>
<th>Dynamic Load Allowance (DLA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Major arterial road, highway, port access, transport depot access or abnormal case</td>
<td>Urban: Class 6 and 9 Rural: Class 1, 2 and 5</td>
<td>1.8</td>
<td>0.6</td>
</tr>
<tr>
<td>B</td>
<td>Minor arterial road, state route, sub-arterial or local road (except port or transport depot access)</td>
<td>Urban: Class 7 and 8 Rural: Class 3 and 4</td>
<td>1.5</td>
<td>0.4</td>
</tr>
<tr>
<td>C</td>
<td>Light vehicle property access (&lt;10 tonnes gross)</td>
<td>Not applicable</td>
<td>1.0</td>
<td>0.2</td>
</tr>
<tr>
<td>D</td>
<td>Heavy vehicle property access (&gt;10 tonnes gross)</td>
<td>Not applicable</td>
<td>As per the adjoining road</td>
<td></td>
</tr>
</tbody>
</table>

### Table 7 - Design Sizes for Road Plates [trench width up to 2.1 m]

<table>
<thead>
<tr>
<th>Trench Width (mm)</th>
<th>Plate Clear Span [Trench Width plus 400] (mm)</th>
<th>Minimum Plate Length [Trench Width plus 800] (mm)</th>
<th>Minimum Plate Thickness ¹ (mm) [Grade 250 Plate]</th>
<th>Road Type for Plate Location (refer Table 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Type A</td>
<td>Type B</td>
</tr>
<tr>
<td>300 or less</td>
<td>700</td>
<td>1100</td>
<td>32</td>
<td>28</td>
</tr>
<tr>
<td>450</td>
<td>1150</td>
<td>1550</td>
<td>36</td>
<td>28</td>
</tr>
<tr>
<td>600</td>
<td>1000</td>
<td>1400</td>
<td>36</td>
<td>32</td>
</tr>
<tr>
<td>900</td>
<td>1300</td>
<td>1700</td>
<td>40</td>
<td>36</td>
</tr>
<tr>
<td>1200</td>
<td>1600</td>
<td>2000</td>
<td>45</td>
<td>40</td>
</tr>
<tr>
<td>1500</td>
<td>1900</td>
<td>2300</td>
<td>50</td>
<td>45</td>
</tr>
<tr>
<td>1800</td>
<td>2200</td>
<td>2600</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>2100</td>
<td>2500</td>
<td>2900</td>
<td>60 ²</td>
<td>60 ²</td>
</tr>
<tr>
<td>More than 2100</td>
<td></td>
<td></td>
<td></td>
<td>Site-specific structural design for road plate is mandatory</td>
</tr>
</tbody>
</table>

DESIGN ASSUMPTIONS:

1. Road plate design in accordance with Clause 2.6.3.
2. Where the trench width exceeds 1.8 m, plate widths in between 1.2 m and 2.2 m are not permitted (refer Clause 2.6.3.6 and its diagram).
2.6.3.7 Road plates must meet the following serviceability design requirements under live loads:

1. The live load deflection must not exceed 11 mm or Plate Clear Span/150, whichever is the lesser.
2. Plates must not lift off their bearing supports at any point.

2.6.3.8 For road openings parallel to the direction of traffic, road plates must extend past each end of the excavated trench:

1. By a dimension not less than the trench depth.
2. With same bearing support conditions as for trench (i.e. by extension of bedding strips - refer Clause 2.6.3.9).

2.6.3.9 To prevent edge loading of the trench, provide uniform bearing support conditions under road plates, along all supported sides, to meet the following requirements (refer Figure E.6 of Annexure E):

1. Plates must overlap the adjacent pavement by a minimum 400 mm from the edge of the (shored) trench on each side.
2. A 200 mm wide strip of bedding material conforming to Clause 3.3 must be provided under each supported side, with the edge of the strip at least 100 mm from the edge of the trench.
3. The bedding layer thickness must:
   - Be uniform, with an average thickness of not less than 5 mm and not more than 10 mm.
   - Ensure that no contact occurs between the plate and the pavement along each edge of the trench under live loads.

2.6.3.10 Installed road plates must meet the following Finished Surface Level (FSL) and recessing requirements (refer Figure E.6 of Annexure E):

1. The plate crossfall must match adjacent pavement crossfall.
2. Adjoining plates must have matching FSL.
3. Do not recess plates into concrete pavement.
4. For long term installations in flexible pavement or asphalt overlays, fully recess the plate to match the adjoining pavement FSL (where feasible).
5. Where it is not feasible to fully recess the plate, the plate FSL must be no higher than 70 mm above the adjoining pavement FSL (excluding bituminous ramps).
6. The edges of plate recesses must be straight, stepped vertical, and neatly trimmed.
2.6.3.11 Road plate pavement fixings must meet the following requirements:

.1 Provide at least 1 fixing every 2 m along each exposed edge of plate, with a minimum of 4 fixings per plate (one at each corner). However, for concrete pavement, provide 4 epoxied fixings per plate (one at each corner).

.2 Fixings must be dog spikes or alternative anchorages that can physically retain the edges or holes of the plate and resist both plate uplift due to dynamic rebound from live loads and horizontal plate movement due to vehicle braking forces.

.3 Fixings must have minimum 20 mm diameter and minimum embedment length 250 mm within the pavement.

.4 Fixings must not project more than 10 mm above the plate. Projections must be non-hazardous to traffic (smooth faces).

.5 At contact face between a dog spike fixing and top of plate, provide a thin compressed pad of shock-absorbing neoprene.

.6 Embedment of fixings in pavement must be as follows:
   • Driven or drilled (into flexible pavement).
   • Secured with rapid-setting epoxy in drilled holes, either directly or using ferrules (in concrete pavement). Use threaded bolts in epoxied threaded ferrules for repeated use at same location. Directly epoxied fixings must be cut off flush with pavement FSL when plate removed.

.7 Do not place fixings at critical locations (e.g. over traffic signal conduits).

2.6.3.12 Holes in road plates for fixings are only permitted:

.1 For concrete pavement; or

.2 For long-term installations; or

.3 Where the trench is parallel to the direction of traffic; or

.4 Where the plate thickness exceeds 40 mm.

Holes, where permitted, must be pre-drilled at locations approved by the plate owner (at least one at each corner), providing an edge distance of at least 100 mm and with a counter-bored recess in top of plate (up to 60% plate thickness) to allow use of threaded fixings with fully recessed head or nut.

2.6.3.13 Where it is not feasible to provide the specified fixings, You must provide an alternative means for fixing that both:

.1 Addresses the site-specific risks, based on a risk assessment.

.2 Is approved by the RMS.

2.6.3.14 Additional or more robust fixings may be necessary for long term installations, on steep grades or crossfalls, for high risk traffic situations, to reduce noise or to minimise the risk of dislodgement.
2.7 DESIGN FOR RESTORATION OF ROAD OPENING

2.7.1 General

2.7.1.1 The road opening restoration includes the backfill and the pavement restoration.

2.7.1.2 The concept design and requirements for the pavement restoration are specified in Annexure A.3, including the APPLICABLE DRAWINGS in Figure E.1 to Figure E.4 of Annexure E.

2.7.1.3 For Low Risk road openings:
   .1 Use the APPLICABLE DRAWINGS.
   .2 In addition, meet the other requirements of this clause (NOTE: Additional drawings are not required).

2.7.1.4 For Medium Risk or High Risk road openings:
   .1 Prepare design Drawings for the pavement restoration, based on the APPLICABLE DRAWINGS.
   .2 The Drawings must meet the requirements of this Clause.

2.7.2 Pavement Restoration Design

2.7.2.1 The limits of pavement restoration in Your pavement restoration design must be:
   .1 As agreed with the RMS at the PRECONSTRUCTION SITE MEETING, consistent with, but larger than, the agreed limits of the road opening excavation.
   .2 Determined by the RMS and confirmed at the PRECONSTRUCTION SITE MEETING (for concrete pavement).
   .3 Included in the location and layout design (refer Clause 2.5).

Note that the limits of concrete pavement restoration will normally be larger than the limits of the road opening trench excavation.

2.7.2.2 Use the concept design that is consistent with the adjoining pavement type (Figure E.1 for flexible pavement; Figure E.2 to Figure E.4 for concrete pavement – refer Annexure E).

Flexible pavements include all configurations where the base course does not consist of concrete.

Concrete pavements include all pavement configurations where the base course includes concrete, with or without asphalt surfacing.
2.7.3 Concrete Pavement Restoration Design

2.7.3.1 The minimum thickness of the replacement slab in Your design must be 250 mm. In the case where the thickness of adjoining slabs is greater than 250 mm, match the thickness of the adjoining slabs (refer Figure E.2 to Figure E.4 of Annexure E). Specialist design of the replacement slab is required in the case where the thickness of the replacement slab is greater than 250 mm.

2.7.3.2 Use the typical details provided in Annexure E and the materials requirements of Clause 3.6 as the basis for the detailing in Your design (e.g. joint details, bar sizes).

2.7.3.3 Joints in the replacement slab must meet the following requirements:

.1 The location and alignment of joints must be consistent with those in the adjoining existing base slabs.
.2 Install a new tied construction joint where the limits of the concrete pavement restoration are within an existing slab.
.3 Joints must be of the type and dimensions specified in the APPLICABLE DRAWINGS and Figure E.5 of Annexure E.
.4 Reinstate the existing joint details between kerb and gutter and adjoining new base slabs.
.5 Inlet pits and structures must be separated from adjoining new base slabs by an isolation joint using preformed joint filler (refer Figure E.5 of Annexure E).

2.7.3.4 Tiebars in tied construction joints must be:

.1 Placed in drilled holes in the adjoining slab face at mid-depth of the replacement slab or mid-depth of the adjoining slab (whichever is the thinner slab).
.2 Spaced at the dimension specified by the RMS at the PRECONSTRUCTION SITE MEETING.
.3 Located no closer than:
   • 300 mm to a transverse joint or existing crack in the adjoining slab (for longitudinal tied joints).
   • 150 mm to a longitudinal joint or slab corner (for transverse tied joints).

2.7.3.5 Dowels in transverse contraction joints must be:

.1 Prefabricated in self-supporting welded assemblies.
.2 Placed at mid-depth of the replacement slab or mid-depth of the adjoining slab (whichever is the thinner slab).
.3 Aligned parallel to the pavement surface.
.4 Spaced at 300 mm centres.
.5 Located no closer than 150 mm to a longitudinal joint or slab corner.
3 RESOURCES

3.1 PERSONNEL

3.1.1 Supervise the work on site at all times using a person who has extensive experience in road opening excavation and restoration.

3.1.2 The qualified Designer, Certifier and Independent Verifier must each be a Civil or Structural Engineer with the following qualifications and experience:

.1 Eligible for membership of the Institution of Engineers, Australia to the grade of Member.
.2 At least 5 years relevant experience in structural design and assessment of shored excavations and road plates.
.3 Understanding of geotechnical requirements for trenched excavations.
.4 For pavement restoration, relevant experience in pavement design.

3.1.3 Using Your leading Structural Engineer, engage and manage other appropriate experts and specialists for relevant parts of the design (e.g. a qualified Geotechnical Engineer).

3.1.4 The qualified Geotechnical Engineer, where required, must be an Engineer with the following qualifications and experience (refer WorkCover NSW Excavation Code of Practice):

.1 Eligible for membership of the Institution of Engineers, Australia to the grade of Member.
.2 At least 5 years relevant experience in stability design of geotechnical structures.

3.1.5 You must use a Competent Person for assessing and monitoring excavation, shoring and road plates (WorkCover NSW requirement).

3.2 MATERIALS FOR SHORING

3.2.1 Shoring and bracing components must meet the minimum requirements of the WorkCover NSW Excavation Code of Practice.

Steel shoring components must conform to AS 4744.1.

3.2.2 Weak lean mix concrete for filling voids behind shoring and under adjoining concrete pavement must comply with Table 8.
3.3 MATERIALS FOR ROAD PLATES

3.3.1 Road plates used for trench covers over road openings must be structural steel plate of minimum Grade 250 to AS 3678. Unless otherwise approved by the RMS, use unstiffened steel plates.

3.3.2 Road plates must be clearly identified by the following permanent marks on the uncoated underside or edge of the plate:

1. A serial number provided by the road plate owner, to identify the individual plate, the year and details of its manufacture, and its service history.
2. The steel grade.
3. The mass of the plate (in kg).

3.3.3 The trafficked surface of road plates must have either:

1. A skid resistant coating complying with Specification RMS 3368; or
2. An alternative treatment that is approved by the RMS and provides uniform long-life skid resistance equivalent to that specified in RMS 3368.

Plate surfaces must not be otherwise modified (e.g. by use of chequer plates or mesh tack welded to the plate surface).

3.3.4 Road plates must be flat and straight within a tolerance of +/- 5 mm at any point from the true, straight and level position.

3.3.5 Material for bedding of road plates, bituminous ramps or repair of road plate fixing holes must be a premium grade proprietary bituminous cold mix.

3.4 MATERIALS FOR BACKFILL

3.4.1 Backfill materials used below, around and immediately above a buried utility or service, including the protective layer, must comply with the requirements of the utility or service owner. Provide details of this protective layer material to RMS before it is used in the work.
3.4.2 Backfill material used above the protective layer of a buried utility or service must be free from organic, contaminated, corrosive or reactive content and must be one of the following:

.1 Freshly mixed subbase material conforming to Clause 3.5. Do not use a higher strength concrete in lieu of weak lean mix concrete.

.2 Select fill material with:
   - Particle size not exceeding 50 mm.
   - Plasticity Index between 2 and 12, tested to Test Method RMS T109.

However, for Low Risk road openings and time-critical work, only use freshly mixed sand cement mix conforming to Clause 3.5.

3.4.3 Drainage pipe for subsoil drains must:

.1 Be corrugated perforated plastic drainage pipe complying with AS 2439.1, with a diameter of 65 mm or 100 mm.

.2 Be inserted within a suitable seamless knitted tubular filter fabric complying with Specification RMS 3580.

Filter material (e.g. permeable sand or gravel) for the filter zone surrounding the subsoil drainage pipe must comply with RMS 3580.

3.5 MATERIALS FOR PAVEMENT RESTORATION (EXCEPT CONCRETE PAVEMENT)

3.5.1 Use the subbase type specified in Annexure A.3. The requirements for each subbase type are specified in Table 8.

Subbase materials must be freshly mixed at a batch plant and delivered to site by a transit mixer.

Obtain subbase from a supplier who has satisfactorily produced material to relevant RMS requirements within the last 12 months.

3.5.2 Use DGB20 dense graded granular material for roadbase as specified in Annexure A.3. Roadbase material must conform to Specification RMS 3051.

Obtain roadbase from a supplier who has satisfactorily produced material conforming to RMS 3051 within the last 12 months.

3.5.3 Bitumen emulsion used for curing and tackcoating must conform to Specification RMS 3254.
3.5.4 Asphalt used in the wearing course or for bituminous ramps for road plates must be the asphalt type specified in Annexure A.3 and must conform to Specification RMS R116.

Obtain asphalt from a supplier which:

1. Has satisfactorily produced material conforming to RMS R116 within the last 12 months.
2. Has a current RMS approved mix design for the asphalt type.

3.5.5 Repair road plate fixing holes using the following materials:

1. For flexible or asphalt pavement, a premium grade proprietary bituminous cold mix. Normal cold mix asphalt is not acceptable. Store and handle mix according to the manufacturer’s recommendations.
2. For concrete pavement, a low-shrinkage cementitious repair concrete of minimum 40 MPa compressive strength.

The maximum aggregate size must suit the hole diameter.

Table 8 – Requirements for Subbase Materials

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand cement mix</td>
<td>- Mix proportion of 8:1 sand to cement, with a moisture content of approximately 8%.</td>
</tr>
<tr>
<td></td>
<td>- Suitable for compaction.</td>
</tr>
<tr>
<td></td>
<td>- Freshly plant mixed and delivered to site in a transit mixer within 45 minutes after batching.</td>
</tr>
<tr>
<td>Weak lean mix concrete</td>
<td>- Compressive strength at 28 days: minimum 3 MPa and maximum 5 MPa.</td>
</tr>
<tr>
<td></td>
<td>- Freshly plant mixed.</td>
</tr>
<tr>
<td>Cement bound granular material</td>
<td>- Stabilised with 4% GP cement, with a moisture content of approximately 8%.</td>
</tr>
<tr>
<td></td>
<td>- Suitable for compaction.</td>
</tr>
<tr>
<td></td>
<td>- Freshly plant mixed.</td>
</tr>
</tbody>
</table>

3.6 MATERIALS FOR CONCRETE PAVEMENT RESTORATION

3.6.1 Concrete for slab replacement must conform to Specification RMS 3201 and one of the mix designs specified in Annexure F.

The minimum design compressive strength of the concrete must be:

1. 5 MPa at 6 hours (for time-critical work only, where calcium chloride set accelerating admixtures are approved for use).
2. 20 MPa at 24 hours.
3. 40 MPa at 28 days.
3.6.2 Obtain concrete, freshly mixed at a batch plant and delivered to site in a transit mixer not more than 45 minutes after batching, from a supplier which:

.1 Has satisfactorily produced concrete to RMS specification requirements (bridge or road) within the last 12 months.

.2 Has a current RMS-approved mix design for the relevant mix.

3.6.3 Admixtures for use in concrete must conform to, and be used according to, Specification RMS 3201.

3.6.4 Accelerating admixtures containing calcium chloride may be used to expedite the setting time of concrete, where approved by the RMS at the PRECONSTRUCTION SITE MEETING for time-critical work (e.g. overnight placement and reinstatement to traffic).

Where calcium chloride set accelerating admixture is used, it must:

.1 Be added to the concrete in solution after the transit mixer arrives on site and just before the concrete is to be placed.

.2 Be thoroughly mixed in the transit mixer according to the mixing time specified on the transit mixer's conformance plate.

3.6.5 Surface debonding materials for weak lean mix concrete subbase must comply with the requirements in Specification RMS M258 Table 2.

3.6.6 Steel dowels, tiebars and mesh reinforcement must:

.1 Conform to the details shown in the design Drawings and the additional requirements of Table 9.

.2 Be without any unwanted kinks or bends and not be bent or straightened in a manner that will damage the material.

.3 Have a surface free of contamination and surface condition that does not impair its bond to the concrete slab.

3.6.7 Chemical anchor adhesives used to anchor tiebars into drilled holes in concrete slabs must be a suitable medium-set two-component epoxy or polyester setting system that is thoroughly mixed within the injection delivery system. Do not use rapid setting adhesive.

Where chemical anchors are supplied as glass capsules, the supplied diameter must just fit the design diameter of the drilled holes.

3.6.8 Material in isolation joints must be as follows:

.1 Preformed joint filler must be bitumen impregnated fibreboard conforming to Specification RMS 3204.

.2 Joint sealant must be a highway grade silicone sealant detailed according to the manufacturer’s requirements.
### Table 9 - Requirements for Steel Dowels, Tiebars and Mesh Reinforcement

<table>
<thead>
<tr>
<th>Component</th>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dowels</strong></td>
<td>Plain round reinforcing steel bars Grade 250N to AS/NZS 4671 (or AS 3679.1).</td>
<td>Specification RMS M258</td>
</tr>
<tr>
<td></td>
<td>Straight, 450 mm long and of 32 mm diameter.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prefabricated in welded assemblies, using cross bars, to ensure bar alignment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Free of irregularities (e.g. crimped ends, burrs, protrusions) which could hinder their movement at movement joints. Guillotining to length is not acceptable.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hot dip galvanised according to AS/NZS 4680.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Debonded at one end by coating a length of 275 mm by two dips in bitumen emulsion, each being blinded with sand.</td>
<td></td>
</tr>
<tr>
<td><strong>Tiebars</strong></td>
<td>The reinforcement material supplier must be certified by the Australian Certification Authority for Reinforcing Steels (ACRS) for the supply of reinforcement material.</td>
<td>RMS M258</td>
</tr>
<tr>
<td></td>
<td>Deformed round reinforcing steel bars Grade 500N to AS/NZS 4671.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Straight, 750 mm long and of 16 mm diameter.</td>
<td></td>
</tr>
<tr>
<td><strong>Mesh reinforcement</strong></td>
<td>The reinforcement material supplier must be certified by the Australian Certification Authority for Reinforcing Steels (ACRS) for the supply of reinforcement material.</td>
<td>RMS M258</td>
</tr>
<tr>
<td></td>
<td>Plain round mesh reinforcement R500SL92 (or SL92 Grade 500L) to AS/NZS 4671.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Be cut to the sizes, dimensions and shapes shown in the Drawings or the typical details provided in Annexure E.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Where required, be bent to an internal bend radius at least twice the diameter of the bar.</td>
<td></td>
</tr>
</tbody>
</table>

3.6.9 Curing compounds must be one of the following:

1. Where the base slab will be surfaced with asphalt, a bitumen emulsion conforming to Clause 3.5, or
2. Where the base slab will be the wearing surface:
   - A water-borne hydrocarbon resin or styrene butadiene resin (SBR) compound conforming to AS 3799 Class Z; or
   - A C5 hydrocarbon resin compound conforming to AS 3799 Class B, with no added aromatic hydrocarbons.

3.6.10 Supply certification from the relevant manufacturers demonstrating that the chemical anchor adhesive system, curing compounds, and surface debonding compounds are suitable for the purpose.
3.7 **MATERIALS FOR RESTORATION OF OTHER ASSETS**

3.7.1 Concrete for structures other than pavement must conform to Specification RMS 3201 and the following:

1. Kerb/gutter alongside of or on top of flexible pavement or on top of concrete base: N40 (hand placed) or S25A10 (extruded or slipformed).
2. Kerb/gutter alongside and tied to concrete base: N40 (hand placed) or S32A20Q (slipformed).
3. Traffic islands, edge strips, medians, driveways: N32 (hand placed, reinforced, or unreinforced).

3.7.2 Materials for restoration of other assets must meet the requirements of the relevant Council, road authority, property or service owner.

3.8 **PLANT AND EQUIPMENT**

3.8.1 Sawcut existing asphalt and concrete pavements using a diamond or abrasive circular saw that is suitable for this use and fitted with a water coolant dust suppression and slurry recovery system.

3.8.2 Asphalt and granular materials must be compacted by self-propelled rollers equipped to deliver variable compactive effort. Where use of self-propelled rollers is impractical, vibrating plate compactors may be used.

3.8.3 Internal vibrators used for compacting concrete and weak lean mix concrete subbase must meet the following requirements:

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).

At least two vibrators must be available at the site (one as back up).
4 EXECUTION

4.1 GENERAL

4.1.1 Process Held: Commencement of road opening work on site.

**Submission Details:** At least 2 BUSINESS DAYS prior to starting work on site, notify the RMS Nominated Representative of the confirmed date and time for commencement of works and submit documentation that verifies that the RMS has issued all four of the following:

.1 ROAD OPENING APPROVAL.
.2 ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES).
.3 Speed Zone Authorisation.
.4 Approved TCP for the work.

The commencement date must comply with the approved ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES).

**Release of Hold Point:** The RMS will review the submission and may direct further work prior to authorising release of the Hold Point.

4.1.2 Comply at all times with every requirement of the issued ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES) and the approved Speed Zone Authorisation, for example:

- Specified conditions for lane closures.
- Any restricted hours of work or night work requirements.
- All relevant records (e.g. dates of speed zones).

4.1.3 Manage traffic in accordance with:

.1 The issued ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES).
.2 The approved TCP for the Work.

During night work, ensure adequate reflective signposting and lighting is provided in accordance with the TCP (refer Clause 2.2).

4.1.4 Ensure the safety of all members of the public who may be affected by the execution of the Work (e.g. road users, pedestrians, residents, local workers and businesses). Provide safe access, detour arrangements and ramps for pedestrians.

This includes, without limitation, providing all safety devices, traffic control, barricades, signs, warnings, and training of Your workers that are necessary for the protection of people and property.

Comply with relevant requirements of Clause 2.4 and the TCWS.
4.1.5 Stop work as necessary where risks to public health or safety exist. Take prompt corrective action to eliminate existing, identified and predictable hazards.

4.1.6 Carry out the Work in a timely and expeditious manner to minimise and, where possible, prevent nuisance or inconvenience to anyone who may be affected by the performance of the Work.

Where access to private property is affected, liaise with the owner or tenant and make every effort to maintain access at all times.

Where disturbance to existing property services is unavoidable, maintain temporary service arrangements at all times.

4.1.7 Prevent any loss or damage or disturbance to any property, assets, services and the environment, except for unavoidable impacts that:

.1 Are limited to the minimum extent necessary for the performance of the Work in accordance with good engineering practice.

.2 Are identified and agreed at the planning stage.

.3 Are approved by the RMS and affected property owners.

.4 Are planned for reinstatement according to Clause 4.11.

Ensure that Your compaction methods do not cause damage or disturb buried utilities or services.

Do not remove or disturb any permanent survey marks, boundary markers or milestones located within the road reserve.

4.1.8 Promptly make good any damage to property or the environment caused by performance of the Work. Repair and restore damaged assets in accordance with this Specification.

4.1.9 Additional information can be obtained from the following RMS Specifications regarding the pavement restoration requirements:

.1 Specification RMS M250 for an existing flexible pavement.

.2 Specification RMS M258 for an existing concrete pavement.

Some requirements may not be suitable for road opening work due to site-specific requirements, limited scale and time constraints.

4.1.10 Comply with all relevant environmental statutory requirements.

This includes, but is not limited to, erosion and sedimentation control measures, and noise and dust control measures.

4.1.11 Tie-ins of the restored surface with kerbs, gutters, structures or adjacent pavement must not pond water or create a potential hazard for vehicles or pedestrians.
4.1.12 Keep the trafficked pavement adjacent to the road opening clean and safe for traffic at all times, including sweeping if necessary. Your vehicles or plant leaving the Work Area must not spill material or track mud onto the public road, footpath, or road reserve.

4.1.13 You are responsible for the appropriate and legal disposal of all surplus spoil material, removed material and waste that result from the Work and related road cleaning activities. All such material will become Your property unless otherwise specified.

4.1.14 The RMS Nominated Representative may direct the Proponent to suspend the whole or part of the Work for any reason or to carry out certain related works as required.

4.2 EXCAVATION OF ROAD OPENING

4.2.1 General

| 4.2.1.1 | Under no circumstances is excavation to commence before You have completed the preconstruction check for buried utilities and services (refer Clause 2.2.8). | Restriction on commencement of excavation |
| 4.2.1.2 | Prior to any excavation below the pavement layer using mechanical equipment, You must physically check the precise location and depth of any buried utilities or services that are identified in the vicinity of the road opening, using: |
| .1 | Careful hand excavation or potholing techniques. |
| .2 | Accredited services locators or appropriately trained personnel, where feasible. | Physical check for identified buried utilities |
| 4.2.1.3 | Carry out excavation work according to the: | Key requirements |
| .1 | Risk management requirements for excavation and shoring (refer Clause 1.11). |
| .2 | Road safety and stage construction requirements (refer Clause 2.4). |
| .3 | Location and layout determined in Clause 2.5. |
| .4 | Excavation and shoring design provided in Clause 2.6.2. |
| 4.2.1.4 | Avoid excavation work during rain or when rain is imminent. | Rain |
4.2.1.5 Inspect excavation and shoring according to the following minimum frequency:

.1 Where road plates are in use – daily (refer Clause 4.4.2).
.2 Where road plates are not used and work is in progress – daily.
.3 Where road plates are not used and no work is in progress – at the frequency determined by the site-specific risk assessment.

4.2.2 Cut Out and Remove Existing Pavement Layer

4.2.2.1 Prior to excavation of the road opening, sawcut (where necessary), break out and remove the existing pavement layer(s), according to:

.1 The limits of the road opening trench excavation specified in the location and layout design (refer Clause 2.5).
.2 The minimum width necessary to excavate the trench.
.3 The sawcutting requirements set out below.

Mark out the limits of the trench excavation on site.

4.2.2.2 Saw cut and remove asphalt courses over flexible pavement:

.1 Initially, 150 mm outside the limits of the road opening trench excavation.
.2 To the full depth of the wearing surface or, in the case of deep lift asphalt, to a minimum depth of 75 mm.

4.2.2.3 Sawcut concrete pavement slabs (including asphalt overlays), before breaking out and removing the slab for excavation, as follows (refer Figure E.2 to Figure E.4 of Annexure E):

.1 Initially, 200 mm outside the limits of the proposed trench excavation (or 100 mm where road plates will be used).
.2 To the full depth of the existing concrete pavement base slab and subbase slab (where present).
.3 With sawcuts not extending horizontally beyond the section of slab to be replaced. However, when cutting along existing longitudinal or transverse joints, sawcuts may extend 250 mm beyond the limits of the slab replacement.

4.2.2.4 Do not break out concrete pavement slabs and asphalt courses in a manner that will cause damage to, displace or undermine adjacent concrete slabs or kerb and gutter.

4.2.3 Construction Requirements

4.2.3.1 Do not use blasting.
4.2.3.2 Where natural seepage zones or subsoil drains are intercepted and
the excavation makes water, maintain effective temporary drainage.
If necessary, the excavation must be kept pumped out.

Drainage of excavation during works

4.2.3.3 Use the designated stockpile sites agreed with the RMS at the
INITIAL SITE MEETING for stockpiling excavated material.

Stockpiling of excavated material

Do not stockpile excavated material within the zone of influence of
the excavation (refer Figure 1 and Figure 2).

4.2.3.4 At each stage of excavation:

1. The completed sides of the excavation must be straight,
vertical and neatly trimmed. Ends of trenched excavations
must be square to the line of trench.

2. All loose waste material must be removed.

Condition of completed excavation

4.2.4 Stability of Excavation

4.2.4.1 Where excavation within the zone of influence of any building or
structure (refer Figure 1 and Figure 2) is necessary:

1. Implement measures to ensure the stability of the building or
structure according to Your excavation and shoring design
(refer Clause 2.6.2).

2. Provide on site supervision of the excavation work using
Your Structural or Geotechnical Engineer.

3. Minimise ground disturbance and vibration and the impact
and severity of excavation.

Excavation within zone of influence of any structure

4.2.4.2 For traffic or construction plant, the zone of influence may be
assumed to be the minimum LATERAL CLEARANCE specified in
Table 5 for which shoring is not required (refer Clause 2.6.2).

Zone of influence for traffic or construction plant

4.2.4.3 Do not locate construction plant (e.g. excavators, trucks) within the
zone of influence of the excavation except where:

1. Shoring is in place and effective (refer Figure 2); or

2. Permitted according to Your excavation and shoring design.

No construction plant within zone of influence prior to shoring

4.2.4.4 Where shoring is required, it must be in place and effective before:

1. Workmen enter the trench; or

2. Traffic is permitted closer to the trench than the minimum
LATERAL CLEARANCE specified in Table 5 for which shoring
is not required (refer Clause 2.6.2).

Restrictions on workmen and traffic prior to shoring

4.2.4.5 Monitor long-term excavations to ensure that conditions have not
deteriorated and become unfavourable (refer Table 5). In this case:

1. Unshored excavations may require shoring; or

2. Existing shoring may need to be upgraded.

Long-term excavations
4.3 SHORING OF EXCAVATION

4.3.1 Shore and brace the excavation according to:

1. The shoring design requirements of Clause 2.6.2.
2. The risk management requirements for excavation and shoring (refer Clause 1.11).
3. The stage construction requirements of Clause 2.4.

Key requirements

4.3.2 Install and remove shoring according to Your shoring design.

Install shoring immediately after each new stage of excavation.

Immediately after removal of shoring, backfill the trench according to Clause 4.5.

Install and remove shoring according to design

4.3.3 Inspect and check shoring for adequacy and conformity with the shoring design using a Competent Person (or a Structural Engineer where the trench depth is 2 m or greater):

1. Immediately after initial installation of each stage of shoring.
2. During service, according to the minimum frequency specified in Clause 4.2.1.5.
3. Where, during trenching, any significant changes occur to the original design conditions or assumptions. In this case, the shoring design must be reviewed by Your Structural Engineer and may need to be upgraded.

Inspection and monitoring

4.3.4 Fill gaps and voids:

1. Behind shoring, to ensure that the shoring is stable and provides effective ground support.
2. Under adjoining concrete pavement, to promote effective bearing support and load distribution.

Fill voids

Use good quality, non-friable, non-erodible filling material that is able to be compacted to provide adequate bearing capacity (e.g. weak lean mix concrete or sand cement mix conforming to Table 8). Compact the filling material using a method suitable for the confined space.
4.4 ROAD PLATES

4.4.1 Process Held: First use of road plates by traffic.

Submission Details: At least 2 BUSINESS DAYS prior to first use of road plates by traffic, notify the RMS Nominated Representative of the intended date for use and submit documentation as follows:

.1 Design details and/or drawings for the road plates (refer Clause 2.6.3).
.2 Certification verifying that the installed shoring and road plates comply with the design and are safe for use by traffic.

Release of Hold Point: The RMS will review the submission and may direct further work prior to authorising release of Hold Point.

4.4.2 Inspect road plates daily to monitor their performance.

4.4.3 Install, provide uniform bearing support conditions under, and fix the road plate according to the design (refer Clause 2.6.3) so that:

.1 The road plate is stable and does not rock under loads.
.2 The road plate operates with minimum noise.

Before traffic uses the plate, confirm uniform bearing using a test vehicle and correct any uneven bearing.

4.4.4 Where road plates are not fully recessed into the existing pavement, provide bituminous ramps to provide a smooth transition between the road plate FSL and the pavement FSL along all exposed edges. The bituminous material must be thoroughly compacted.

Bituminous ramps must have a minimum taper length of 1500 mm for each 50 mm vertical height difference at the edge of the road plate or part thereof.

Unless otherwise approved, the bituminous material must be asphalt hot mix conforming to Clause 3.5, with an aggregate size of 7 mm or 10 mm, tack coated to the pavement using bitumen emulsion.

However, for short term installations not exceeding 7 days, the ramps may be formed with a premium grade proprietary bituminous cold mix, tack coated to the pavement where necessary.

4.4.5 Permanent deformation of each installed road plate must not exceed 10 mm from the true, straight and level position (using a straight edge placed parallel to either long or short axis of plate).

Immediately remove excessively deformed road plates from service and replace them. Do not heat or cold straighten or turn upside down excessively deformed road plates.
4.4.6 Maintain the skid resistance of the road plate surface to meet the requirements of Specification RMS 3368 at all times on at least:

1. 90% of the total surface area of the road plate.
2. 80% of the surface area of each clearly defined wheel path.

Otherwise, replace with a complying road plate.

4.4.7 Maintain road plates and bituminous ramps to ensure the stability and serviceability of the plates and the line and level of the ramps while they are under traffic.

4.4.8 After removal of road plates from a trafficked pavement:

1. Remove asphalt ramps, bedding materials, and plate fixings.
2. Clean the pavement surface.
3. Repair redundant fixings in the pavement.

4.4.9 Repair redundant road plate fixings holes as follows:

1. For asphalt pavement, fill the hole with a premium grade proprietary bituminous cold mix according to the manufacturer’s recommendations.
2. For concrete pavement, fill the hole with cementitious repair concrete. Ensure the hole is clean prior to filling.
3. Compact the repair material to slightly overfill the hole and roll the surface smooth.

4.5 BACKFILLING OF EXCAVATION

4.5.1 For shored excavations, each section of trench must be backfilled immediately after removal of shoring in that section. Backfilling of each section must be completed within 1 working day.

4.5.2 Where natural seepage zones or subsoil drains are affected by the excavation or the proposed use of impermeable backfill (e.g. weak lean mix concrete or sand cement mix), their continuity must be restored by replacing damaged subsoil drains and by including a 100 mm thick layer of permeable sand or gravel to surround the subsoil drains before backfilling.

Where excavation occurs in impermeable material (e.g. clay), ensure that a moisture trap is not created that could weaken the road pavement. Install effective subsoil drainage (including a suitable outlet) as necessary.
4.5.3 Before commencement of backfilling:

1. Install new buried utilities and services to the requirements of the utility or service owner(s), including protective sleeving.

2. Restore all existing stormwater pipes, subsoil drainage pipes, and other utilities and services to the requirements of the relevant utility or service owner(s).

3. Where concrete bedding or concrete encasement of a buried utility or service is required, ensure that the concrete has achieved its required early design strength.

4.5.4 For bottom backfill layers around a buried utility or service or drainage pipe, including the protective layer and replacement of any unsuitable material at the excavation base, backfilling must comply with the requirements of the utility or service or pipe owner.

4.5.5 For backfill above the protective layer of a buried utility or service or pipe, place and compact the backfill material as follows:

1. In layers not exceeding 150 mm compacted thickness.

2. Where subbase material is used (i.e. sand cement mix, weak lean mix concrete, or cement bound granular material), according to the requirements of Table 10.

3. Where select fill material is used, to achieve a minimum 98% standard relative compaction according to Test Method RMS T166.

4.5.6 Backfill material must have adequate moisture content to achieve the specified compaction. Adjust and control the moisture content as necessary. Prevent over-wetting or excessive drying of material that would cause loss of material density and strength. Moisture must be uniformly distributed within each layer at the time of compaction.

4.6 **TEMPORARY PAVEMENT RESTORATION**

4.6.1 To enable prompt reopening of the Work Area to traffic after completion of backfilling, provide a temporary restoration of the road pavement that includes the following courses:

1. Subbase Course (refer Clause 4.7).

2. Asphalt Course (refer Clause 4.9), if required under Clause 4.6.2.

The temporary pavement restoration may be partly or fully replaced during the permanent pavement restoration. In some cases, a temporary pavement restoration may not be required.
4.6.2 The requirements for temporary pavement restoration (e.g. course thickness and type) must be agreed with the RMS at the INITIAL SITE MEETING.

The course thicknesses need not match the corresponding course thicknesses of the adjoining pavement or the permanent restoration.

Where there is no existing asphalt course on the adjoining pavement or an asphalt course is not required, apply a sprayed bituminous seal in lieu of the asphalt course.

4.6.3 For Low Risk road openings and time-critical work, You must only use freshly mixed sand cement mix subbase material.

4.6.4 Do not reopen the temporary pavement restoration work to traffic unless:

.1 The restoration matches the adjoining pavement FSL.
.2 The surface is safe for use by traffic.
.3 When measured by a 1.5 metre straight edge laid in any direction achieves a gap below the straight edge no greater than 5 mm.

4.6.5 The condition of the temporary pavement restoration must satisfy the conditions in Clause 4.6.4 until the permanent pavement restoration is completed. Maintenance of the temporary pavement restoration will be undertaken in accordance with Clause 1.7.

4.7 PAVEMENT RESTORATION – SUBBASE COURSE

4.7.1 The type and thickness of the reinstated subbase course is specified in Annexure A.3 and Your approved pavement restoration design.

4.7.2 Subbase material must have adequate moisture to achieve the specified compaction according to Table 8. Moisture must be uniformly distributed within each layer at the time of compaction.

4.7.3 Each layer of subbase material must be placed and uniformly compacted according to the requirements of Table 10 before the next layer is commenced. The full depth of the material must be compacted over the entire area of placement.

**Table 10 – Requirements for reinstating subbase**

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak lean mix concrete</td>
<td>Place, spread and compact concrete mix using internal vibrators according to Clause 4.10.</td>
</tr>
<tr>
<td>Sand cement mix</td>
<td>Compact plant mixed material using at least 3 passes with a vibrating plate compactor. Compacted thickness of each layer must not exceed 100 mm.</td>
</tr>
<tr>
<td>Cement bound granular material</td>
<td>Compact plant mixed material using at least 3 passes with a vibrating plate compactor. Compacted thickness of each layer must not exceed 100 mm.</td>
</tr>
</tbody>
</table>
4.8 PAVEMENT RESTORATION – ROADBASE COURSE

4.8.1 The type and thickness of the reinstated roadbase course is specified in Annexure A.3 and Your approved pavement restoration design.

4.8.2 Roadbase material must have adequate moisture to achieve the specified compaction and to ensure that the road can be trafficked without shoving, ravelling or rutting after compaction. Moisture must be uniformly distributed within each layer when compacted.

4.8.3 Each layer of roadbase material must be placed and uniformly compacted before the next layer is commenced as follows:

.1 In layers not exceeding 100 mm compacted thickness.

.2 Compaction must be a continuous operation commencing as soon as practicable after spreading each new layer of material. The full depth of the material must be compacted over the entire area of placement.

.3 The compaction effort is either:
   • At least 4 passes with a vibrating plate compactor; or
   • At least 6 passes with a self-propelled vibrating smooth drum roller that fits within the trench width.

4.8.4 Trim the top of the roadbase course to produce an even surface parallel to the pavement Finished Surface Level (FSL).

4.9 PAVEMENT RESTORATION – ASPHALT COURSE

4.9.1 The type and thickness of the reinstated asphalt course is specified in Annexure A.3 and Your approved pavement restoration design.

4.9.2 Prior to pavement restoration, remove the existing asphalt course or asphalt overlay as follows:

.1 150 mm outside the limits of pavement restoration specified in the pavement restoration design with a minimum asphalt cut out width of 1800 mm (refer Clause 2.7.2 and Figure E.1 of Annexure E). Joints must not be located in wheel paths.

.2 To provide a milled or jackhammered face along the edges of the asphalt pavement restoration, after asphalt removal. Edges must be straight, near-vertical and neatly trimmed. Saw cut edges are not acceptable.

All loose waste material must be removed.

4.9.3 Do not place asphalt if the underlying pavement is wet or rain is imminent.

Asphalt layers of 50 mm thickness and less must not be placed unless the pavement temperature is at least 8°C for dense graded asphalt and 13°C for open graded asphalt, and rising in each case.
4.9.4 Preparation of the pavement must be completed prior to tackcoating and placing asphalt and must include cleaning the surface so that it is free of loose stones, dirt or foreign materials.

4.9.5 Prior to laying asphalt, apply a tackcoat to the vertical sides and bottom (i.e. over the restored roadbase or concrete base course) of the pavement restoration. Avoid overspray where the bitumen can be picked up by traffic or construction equipment.

The residual bitumen from the tack coat must be evenly spread over the surface at an application rate nominated by You, which must be between 0.15 and 0.30 litres per square metre (doubled for vertical surfaces and contact surfaces of kerbs and gutters).

4.9.6 The as-constructed thickness of each compacted layer of asphalt must be within the limits of 3.0 to 5.0 times the nominal mix size.

4.9.7 Unless otherwise specified by the RMS, place asphalt using a mechanised process such as an asphalt paving machine that minimises handling and the segregation of uncompacted asphalt.

Hand placement of asphalt is only permitted for minor correction of the existing surface and in areas where placement by mechanical means is impracticable.

4.9.8 Place and compact asphalt within the range of temperatures specified in the asphalt supplier’s written recommendations. Measure asphalt temperature prior to placing according to Table 12.

Asphalt that exhibits a temperature variation must not be incorporated in the Works unless it has been remixed to a consistent and adequate temperature for compaction.

4.9.9 Compaction must be a continuous operation and must commence as soon as practicable after spreading the new material. The full depth of the material must be compacted over the entire area of placement. Uniformly compact each layer before the next layer is commenced.

All activities associated with compaction and primary trimming must be completed within the allowable working time of the asphalt. No surface indentations are permitted after compaction.
4.9.10 The asphalt course must be finished with a flat planar surface, and when measured by a 3 metre straight edge laid in any direction, achieves a gap below the straight edge no greater than 5 mm. Joints and edges must be compacted to avoid reduced density along edges of the pavement restoration.

Joints must be constructed by:

.1 Removing uncompacted or cracked material along the edge of the adjoining existing pavement prior to placing asphalt adjacent to the edge.

.2 Providing a positive bond by tackcoating to the adjoining pavement material.

4.9.11 Do not reopen newly placed asphalt pavement work to traffic until the dry pavement surface temperature is less than 60°C.

4.10 PAVEMENT RESTORATION – CONCRETE PAVEMENT COURSE

4.10.1 Process to be Witnessed: Placement of concrete pavement restoration and reopening the work to traffic (for each stage).

Submission Details: At least 3 BUSINESS DAYS prior to placement of each stage of concrete pavement, notify the RMS Nominated Representative of the date and time for placement of that stage.

4.10.2 The type and thickness of the reinstated concrete course is specified in Annexure A.3 and Your approved pavement restoration design.

4.10.3 Prior to concrete pavement restoration, sawcut, break out and remove the existing concrete pavement slabs according to:

.1 The limits of concrete pavement restoration determined by the RMS (refer Clause 2.7.2). The RMS will mark out these limits on site, using pavement markings.

.2 The requirements for sawcutting of concrete pavement slabs set out in Clause 4.2.2.3 (except limits).

Remove the existing subbase underlying removed base slabs down to the level specified in the concrete pavement restoration design.

4.10.4 Comply with the requirements of Clauses 4.2.2.4 and 4.2.3 for precautions during concrete slab removal work, stockpiling of removed material, and condition of the completed opening for the concrete pavement restoration.

4.10.5 Where unsuitable subbase material is uncovered after removal of existing concrete slabs (i.e. deemed unsuitable by the RMS), remove the unsuitable material and replace it with subbase material according to Clause 4.7. This work is at no cost to the Proponent.
4.10.6 The surface under the concrete course must be free of any loose debris, unevenness or irregularity that would restrain the overlying base concrete from horizontal movement. Bumps, defects or protrusions must be removed.

4.10.7 Where weak lean mix concrete is the subbase, apply a membrane of surface debonding material of adequate thickness to the top of the subbase course to ensure that complete debonding is achieved.

4.10.8 Do not place concrete during rain or when rain is imminent.

4.10.9 Prior to placing concrete:

1. At tied construction joints, with the exception of the top and bottom 45 mm of the joint face, lightly scabble the vertical joint faces of the adjoining slab. Avoid damage to tiebars.

2. Ensure that the sawcut opening for the concrete pavement restoration, including all vertical joint faces and projecting tiebars, is clean and free of loose material or excess water.

4.10.10 Install dowels for transverse contraction joints, in prefabricated assemblies, at the locations specified in the design Drawings.

Dowels must be:

1. Installed with the debonded end located on one side of the contraction joint.

2. Supported so that no part of the assembly except the dowel crosses the joint.

4.10.11 Drill holes for tiebars (for tied construction joints) in the adjoining slab face according to the tiebar locations and details specified in the design Drawings.

The diameter and length of the drill hole must suit the size of the tiebar and the type of chemical anchor adhesive system used. Unless otherwise specified, the drill hole diameter must not be more than 4 mm greater than the diameter of the tiebar.

Drilling must not cause damage to the slab (e.g. broken edges). Repair any damage and fill any holes that are drilled but not used.
4.10.12 Tiebars must be securely fixed in pre-drilled holes using a chemical anchor adhesive system installed according to the adhesive manufacturer's recommendations.

Prior to insertion of adhesive, the drilled holes must be thoroughly cleaned to remove drilling dust and debris, using an industrial vacuum cleaner or oil-free compressed air. Ensure complete removal of dust from the end of the hole.

Insert a sufficient volume of adhesive into the cleaned hole such that the adhesive will just fill the hole once the tiebar is inserted.

Immediately after insertion of adhesive, insert the tiebar, rotating the tiebar into the hole in order to maximise bond between the adhesive and both the tiebar and the concrete. Confirm complete filling of the hole by observing excess adhesive squeeze from the hole.

4.10.13 Mesh reinforcement must be placed:

.1 Above the tiebars and dowels.
.2 To provide at least 65 mm top cover to the mesh.
.3 Horizontally, terminating at 50 mm from joints or slab edges.

The mesh must be supported in place on bar chairs to which it is tied. Use sufficient chairs to prevent deflections or displacement of the mesh during placing and compaction of the concrete.

4.10.14 Install isolation joints at pits and structures using preformed joint filler according to the design Drawings.

4.10.15 Place and spread concrete into its final position using shovels. Internal vibrators must not be used to spread concrete.

Vibrate the placed concrete in two passes (with a maximum speed of advance of 1.5 m/min) using either:

.1 A vibrating screed supported off adjacent concrete slabs; or
.2 A vibrating bull float.

4.10.16 You must compact concrete using:

.1 Internal vibrators complying with Clause 3.8.
.2 A pattern of regular and systematic insertions using one of the methods shown in Table 11.

Vibration near unsupported edges of concrete or when the concrete is moving is not included as part of the compaction time or effort.
### Table 11 – Internal Vibration Methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Diagram</th>
<th>Guideline Parameters (i)</th>
</tr>
</thead>
</table>
| 1. Dip method                               | ![Plan view of method](image1) | - Insertions using one of the patterns in the diagram below, where the spacings \( D_1 \) and \( D_2 \) must be 300 mm maximum, and  
  - Insertion durations of 10 secs minimum, and  
  - Withdrawal speed not exceeding 1.5 m/min. |
| 2. Drag method                              | ![Plan view of method](image2) | - Vibrator paths at spacings of 350 mm maximum, and  
  - Travel speed of 1.5 m/min maximum.                                                               |
| 3. Modified Drag method (for reinforced pavement) | ![Section view of method](image3) | - Vibrator paths at spacings of 350 mm maximum, and  
  - Insertion spacings of 350 mm maximum, and  
  - Nett horizontal travel speed of 1.5 m/min maximum, and  
  - Withdrawal speed not exceeding 1.5 m/min.                                                       |

**NOTES:**

(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.


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**Guideline Parameters (i)**

1. **Plan view of method**
   - Insertions using one of the patterns in the diagram below, where the spacings \( D_1 \) and \( D_2 \) must be 300 mm maximum, and
   - Insertion durations of 10 secs minimum, and
   - Withdrawal speed not exceeding 1.5 m/min.

2. **Plan view of method**
   - Vibrator paths at spacings of 350 mm maximum, and
   - Travel speed of 1.5 m/min maximum.

3. **Section view of method**
   - Vibrator paths at spacings of 350 mm maximum, and
   - Insertion spacings of 350 mm maximum, and
   - Nett horizontal travel speed of 1.5 m/min maximum, and
   - Withdrawal speed not exceeding 1.5 m/min.
4.10.17 The concrete course must be finished with a flat planar surface, matching the surface of the adjoining concrete pavement slabs. Neatly trim all joins with adjoining slabs (not using edging tools).

Provide a transversely textured finish to the surface as follows:

1. Where an asphalt wearing surface will cover the concrete, to achieve a lightly broomed texture finish.
2. Where there is no asphalt wearing surface, to match the surface texture in adjoining slabs.

4.10.18 Immediately after finishing and texturing, apply a sprayed film of curing compound to the concrete surface, so as to form a continuous uniform and unbroken film.

Where hydrocarbon resin curing compound is used, it must be applied at an application rate of at least 0.40 L/m².

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

4.10.19 Where feasible, cover the concrete surface with waterproof plastic sheeting immediately after applying curing compound, so as to minimise temperature losses and related cracking. Covers must be secured and weighed down to prevent air movement under the cover. Do not remove covers during very cold conditions.

4.10.20 Protect newly placed concrete from damage (e.g. from finishing and covering operations, rain, or construction vehicles) at all times until the newly placed concrete is reopened to traffic.

4.10.21 Do not reopen newly placed concrete pavement work to traffic until it has developed a nominal compressive strength of at least:

1. 5 MPa (for time-critical work); or
2. 20 MPa (where set-accelerating admixtures are not used).

so that it can carry traffic without damaging the Work.

NOTE: Use of a mix design in Annexure M209/F containing calcium chloride is deemed to meet requirement (1) at 6 hours after placing.
4.11 RESTORATION OF OTHER ASSETS

4.11.1 Unless otherwise specified on the Drawings, You must replace, repair, reinstate or otherwise restore as near as practicable to their pre-existing condition all road assets, other RMS assets, buried public utilities, surfaces, services and other public or private assets that are disturbed, destroyed, or damaged during the work.

“Other public or private assets” is deemed to include but not be limited to: existing shrubs, gardens, retaining walls, fences, signs, shelters and all other structures. Take photographs to record the condition of such assets before and after the Works.

4.11.2 All such restoration work must be at Your cost and at no cost to the RMS (refer Clause 1.3).

4.11.3 The extent and details of restoration of road assets and other RMS assets will be determined by the RMS and confirmed at the PRECONSTRUCTION SITE MEETING.

Where there is damage to the surrounding road pavement resulting from Your work, the RMS reserves the right to extend the extent of the necessary restoration.

4.11.4 Where the road opening extends beyond the trafficked pavement, backfill the trench with the previously excavated material.

Backfill material must not be placed above the original ground surface level (after making reasonable allowance for settlement). Place topsoil in the top layer of the backfilled trench at the same thickness as in adjacent areas.

4.11.5 Where loops for traffic signals or traffic facilities, or pavement delineation (e.g. line marking, pavement markers), are disturbed or damaged during the Work, You must:

.1 Immediately notify the RMS Transport Management Centre (TMC) when loops for traffic signals or traffic facilities have been disturbed or damaged.

.2 Provide alternative signposting and/or temporary measures for pavement delineation as necessary.

You must liaise with the RMS regarding the permanent reinstatement of loops for traffic signals or traffic facilities and pavement delineation. Permanent reinstatement will be carried out by the RMS at Your cost according to Clause 1.7.

4.11.6 Reinstate all traffic control devices (e.g. speed limit signs, other regulatory or warning road signs) that are affected by the Work to their previous location and condition.

4.11.7 Reinstate pavement markings to match existing pavement markings.

4.11.8 During backfill, restore all existing buried utilities to the requirements of the utility/service owner (refer Clause 4.5).
4.11.9 Restore kerbs and gutters according to their original design and configuration, with profile matching that of adjacent sections.

Where a section of kerb and gutter has been removed, neatly cut each end of the section using a concrete saw prior to restoration.

Kerb and gutter must be tied to concrete pavement using tiebars placed at mid-depth of the cross section and spaced at 300 mm centres.

4.11.10 Restore, to the requirements of the RMS and Council, any footpaths and landscaping damaged or affected by the Work.

4.11.11 Restore, to the requirements of the RMS and Council and property owners, any fencing and other public or private assets damaged or affected by the Work.

4.11.12 Reinstate accesses using materials and standards of construction of equal or better quality to the original construction.

4.11.13 Restoration work is an integral part of the Work.

Failure to restore any asset to the joint requirements of the RMS, Council and respective utility owner or property owner will be deemed to be incomplete work and may affect release of the PERFORMANCE BOND (refer Clause 5).

In this case, the RMS reserves the right to undertake the necessary restoration work at Your cost (refer Clause 1.7).

5 CONFORMITY

5.1 A certificate from the supplier must accompany supply of all materials to certify that their quality complies with this Specification. The RMS may request such documentation for audit. The minimum period for retention of the certificates is until the end of the WARRANTY PERIOD for the Work.

Supplied materials found to be unsuitable must not be used in the Work.

5.2 The as-constructed Work must comply with the process controls and conformity criteria listed in Table 12.
5.3 For Low Risk road openings, You are not required to provide test results to verify construction conformity of the Work.

For Medium or High Risk road openings, You must provide test results to verify construction conformity of the Work, according to the relevant testing requirements and conformity criteria set out in Table 12, for the following construction activities:

1. Concrete pavement restoration.
2. Any other construction activities deemed to be critical by the RMS at the PRECONSTRUCTION SITE MEETING.

The RMS reserves the right to carry out any audit, inspection, and testing deemed necessary to audit conformity of the Work.

You are responsible for meeting the cost of all testing (including the necessary audit testing by the RMS).

5.4 For concrete pavement, unless otherwise specified by the RMS, You must provide:

1. Testing documentation verifying that, when the new concrete is reopened to traffic, the restored pavement would have developed the compressive strength required in Clause 3.6.
2. A completed concrete pavement check list (Annexure D), including details of the mix design.

5.5 Provide photographs of the work in progress that show each stage of excavation prior to backfilling of that stage.

5.6 Progressively annotate any changes to the Drawings on a separate set of WORK-AS-EXECUTED DRAWINGS.

The WORK-AS-EXECUTED DRAWINGS must:

1. Provide work-as-constructed details of the buried utility or service, including the cover depth below the pavement FSL.
2. Represent the final position, layout, and dimensions of the backfilled road opening.
3. Provide details of the permanent restoration (where carried out by the Proponent).

Within 20 BUSINESS DAYS after completing the Work submit a copy of the WORK-AS-EXECUTED DRAWINGS:

1. To the utility owner.
2. To the RMS (for Medium and High Risk road openings only).

5.7 The DATE OF COMPLETION for commencement of the WARRANTY PERIOD is as defined in Annexure M.3.
5.8 You must warrant that the Work as completed will be free from defects in workmanship and materials during the Warranty Period.

5.9 Where defects in the Work carried out by You (e.g. buried utility or service, backfill and temporary restoration) become evident during the Warranty Period:

1. You must re-excavate the defective section of road opening, repair the defects, and again backfill and carry out a temporary restoration of the defective section, at Your cost.

2. The RMS will undertake the permanent pavement restoration of the defective section of road opening at Your cost by deduction from the Performance Bond.

Alternatively, the RMS reserves the right to undertake all necessary rectification work at Your cost by deduction from the Performance Bond.

5.10 If the Work is commenced and for any reason is not able to be completed within a reasonable time or is unfinished, the Performance Bond may be called upon.

The Performance Bond will be used to either complete the Work, or if the amount of funds does not permit completion, take the Work to a stage where it is rendered safe for the public and traffic.

5.11 At the end of the Warranty Period, You must contact the RMS to organise a joint Final Inspection at the site.

The RMS will, on Your written request, return the Performance Bond, or balance thereof, subject to any deductions which have occurred during the Work:

1. To rectify Your nonconforming or incomplete work, or

2. For any other work carried out by the RMS at Your cost and invoiced, but unpaid by You (refer Clause 1.8).

Table 12 – Process controls and conformity criteria

<table>
<thead>
<tr>
<th>Item</th>
<th>Clause Reference</th>
<th>Property</th>
<th>Test Method</th>
<th>Criteria</th>
<th>Minimum Testing Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation</td>
<td>2.2.8 and 4.2.1</td>
<td>Identification of existing buried utilities</td>
<td>Dial Before You Dig check</td>
<td>Certified check</td>
<td>Before excavation</td>
</tr>
<tr>
<td></td>
<td>4.2.1</td>
<td>Location/depth of existing buried utilities</td>
<td>Physical check</td>
<td>± 20 mm</td>
<td>Before excavation</td>
</tr>
<tr>
<td></td>
<td>2.5 and 4.2.2</td>
<td>Limits of excavation and sawcutting</td>
<td>Measure</td>
<td>± 50 mm parallel &amp; square to trench</td>
<td>Each edge</td>
</tr>
<tr>
<td></td>
<td>4.2, 4.3 and Tables 2 &amp; 4</td>
<td>Trench depth and width Trench sides and ends</td>
<td>Measure Inspect</td>
<td>± 50 mm</td>
<td>At 1 m intervals along trench</td>
</tr>
<tr>
<td>Item</td>
<td>Clause Reference</td>
<td>Property</td>
<td>Test Method</td>
<td>Criteria</td>
<td>Minimum Testing Frequency</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
<td>----------</td>
<td>-------------</td>
<td>----------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Shoring of Excavation</td>
<td>2.6.2, 3.2 and 4.3</td>
<td>Shoring and bracing (Medium or High Risk road openings)</td>
<td>Inspect using Competent Person</td>
<td>Safe, complies with design and Clause 3.2 (for components)</td>
<td>As per Clause 4.2.1</td>
</tr>
<tr>
<td>Road Plates</td>
<td>2.6.3</td>
<td>Plate thickness</td>
<td>Physical check</td>
<td>Table 7 or per design</td>
<td>Before use</td>
</tr>
<tr>
<td></td>
<td>3.3</td>
<td>Plate material grade</td>
<td>Check plate ID</td>
<td>250 MPa or greater</td>
<td>Before use</td>
</tr>
<tr>
<td></td>
<td>2.6.3 and 4.4</td>
<td>Plate correctly installed:</td>
<td>Inspect</td>
<td>Clause 2.6.3:</td>
<td>Every day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Plate FSL</td>
<td></td>
<td>- FSL ± 5 mm</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>- Recessing</td>
<td></td>
<td>- Complies</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>- Alignment/gaps</td>
<td></td>
<td>- Complies</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Bearing support</td>
<td></td>
<td>- Plate stable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Noise level</td>
<td></td>
<td>- Minimal noise</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.6.3.11</td>
<td>Road plate fixings</td>
<td>Inspect</td>
<td>Not loose and comply with Clause 2.6.3.11</td>
<td>Every day</td>
</tr>
<tr>
<td></td>
<td>4.4.4</td>
<td>Bituminous ramps</td>
<td>Inspect</td>
<td>Clause 4.4.4</td>
<td>Every day</td>
</tr>
<tr>
<td>Road Plates (cont’d)</td>
<td>3.3.4 and 4.4.5</td>
<td></td>
<td></td>
<td>Before use</td>
<td>Every day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.3 and 4.4.6</td>
<td>Skid resistant top surface</td>
<td>Visual inspection</td>
<td>&gt; 90% intact (overall)</td>
<td>Before use and Every day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; 80% intact (wheel path)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BPN ≥ 55</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RMS 3368 Clause 3</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Backfilling</td>
<td>3.4</td>
<td>Backfill material</td>
<td>Check</td>
<td>Clause 3.4</td>
<td>Each load</td>
</tr>
<tr>
<td></td>
<td>4.5.4 Bottom layers incl. utility protective layer</td>
<td>Inspect</td>
<td>Utility owner’s requirements</td>
<td>Each stage of backfill</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.5.5</td>
<td>Thickness of each layer</td>
<td>Measure</td>
<td>≤ 150 mm</td>
<td>During placing</td>
</tr>
<tr>
<td></td>
<td>4.5.6</td>
<td>Moisture content</td>
<td>Inspect</td>
<td>Clause 4.5.6</td>
<td>During placing</td>
</tr>
<tr>
<td></td>
<td>4.5.5 Compaction:</td>
<td></td>
<td></td>
<td>Table 10</td>
<td>During placing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Subbase material</td>
<td>Inspect</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Select fill material</td>
<td>RMS T166</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temporary Pavement Restoration</td>
<td>2.7.2 Limits of pavement restoration</td>
<td>Measure</td>
<td>± 100 mm parallel &amp; square to trench</td>
<td>Each edge of restoration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.6 Subbase, Roadbase and Asphalt courses as for Subbase, Roadbase and Asphalt below</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.6.3 Temporary restoration FSL</td>
<td>Measure</td>
<td>- 0 / + 5 mm adjoining pavement FSL</td>
<td>After compaction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.6.4 Restoration Shape</td>
<td>1.5 m Straight Edge</td>
<td>5 mm in any direction</td>
<td>After compaction</td>
<td></td>
</tr>
<tr>
<td>Subbase</td>
<td>3.5.1 &amp; 5.1 Subbase material</td>
<td>Supplier certificate</td>
<td>Table 8</td>
<td>Each load</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.7.2 Moisture content</td>
<td>Inspect</td>
<td>Table 8</td>
<td>During placing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.7.3 Thickness of each layer</td>
<td>Measure</td>
<td>≤ 100 mm</td>
<td>During placing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.7.3 Compaction</td>
<td>Inspect</td>
<td>Table 10</td>
<td>During placing</td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Clause Reference</td>
<td>Property</td>
<td>Test Method</td>
<td>Criteria</td>
<td>Minimum Testing Frequency</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------</td>
<td>-----------------------------------</td>
<td>-------------</td>
<td>-----------------------------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td><strong>Roadbase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.5.2 &amp; 5.1</td>
<td>Roadbase material</td>
<td>Supplier certificate</td>
<td>RMS 3061</td>
<td>Each load</td>
</tr>
<tr>
<td></td>
<td>4.8.2</td>
<td>Moisture content</td>
<td>Inspect</td>
<td>Clause 4.8.2</td>
<td>During placing</td>
</tr>
<tr>
<td></td>
<td>4.8.3</td>
<td>Thickness of each layer</td>
<td>Measure</td>
<td>≤ 100 mm</td>
<td>During placing</td>
</tr>
<tr>
<td></td>
<td>4.8.3</td>
<td>Compaction</td>
<td>Inspect</td>
<td>Clause 4.8.3</td>
<td>During placing</td>
</tr>
<tr>
<td></td>
<td>4.8.4</td>
<td>Finished surface - levels</td>
<td>Measure</td>
<td>-0 / +10 mm design RL</td>
<td>After compaction</td>
</tr>
<tr>
<td><strong>Asphalt</strong></td>
<td>3.5.4 &amp; 5.1</td>
<td>Asphalt material</td>
<td>Supplier certificate</td>
<td>RMS R116</td>
<td>Each load</td>
</tr>
<tr>
<td></td>
<td>4.9.3</td>
<td>Temperature of pavement</td>
<td>Measure</td>
<td>Clause 4.9.3</td>
<td>Before placing</td>
</tr>
<tr>
<td></td>
<td>4.9.4</td>
<td>Pavement surface preparation</td>
<td>Inspect</td>
<td>Clause 4.9.4</td>
<td>Before placing</td>
</tr>
<tr>
<td></td>
<td>4.9.6</td>
<td>Thickness of each layer</td>
<td>Measure</td>
<td>3.0 to 5.0 times the nominal mix size</td>
<td>During placing</td>
</tr>
<tr>
<td></td>
<td>4.9.5</td>
<td>Tackcoating</td>
<td>Inspect</td>
<td>Clause 4.9.5</td>
<td>Before placing</td>
</tr>
<tr>
<td></td>
<td>4.9.8</td>
<td>Temperature of asphalt</td>
<td>See Note 1</td>
<td>Supplier's written recommendations</td>
<td>Before placing</td>
</tr>
<tr>
<td><strong>Asphalt</strong></td>
<td>4.9.9</td>
<td>Compaction</td>
<td>Inspect</td>
<td>Clause 4.9.9</td>
<td>During placing</td>
</tr>
<tr>
<td>(cont'd)</td>
<td>4.9.10</td>
<td>Asphalt joints - FSL</td>
<td>Measure</td>
<td>-0 / +2 mm adjoining pavement FSL</td>
<td>After compaction</td>
</tr>
<tr>
<td></td>
<td>4.9.10</td>
<td>Shape</td>
<td>3 m straight edge</td>
<td>5 mm in any direction</td>
<td>After compaction</td>
</tr>
<tr>
<td><strong>Concrete</strong></td>
<td>2.7.2 and 4.10.3</td>
<td>Limits of concrete pavement</td>
<td>Measure</td>
<td>±50 mm parallel &amp; square to existing</td>
<td>Each edge of restoration</td>
</tr>
<tr>
<td></td>
<td>4.10.6 and 4.10.9</td>
<td>preparation of base and sides of</td>
<td>Inspect</td>
<td>Clean, even and defect-free surfaces.</td>
<td>Before placing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>saw-cut opening for concrete</td>
<td></td>
<td>Scabbled at tied joints</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.6 &amp; 5.1</td>
<td>Concrete materials</td>
<td>Supplier certificate</td>
<td>Clause 3.6 and RMS 3201</td>
<td>Before placing</td>
</tr>
<tr>
<td></td>
<td>3.6.1</td>
<td>Design compressive strength of</td>
<td>Supplier certificate</td>
<td>Clause 3.6.1 and Annexure F</td>
<td>Before placing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>concrete</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.10.2</td>
<td>Thickness of concrete slab</td>
<td>Measure</td>
<td>-0 / +10 mm design thickness</td>
<td>Before placing</td>
</tr>
<tr>
<td></td>
<td>4.10.10</td>
<td>Dowels at contraction joint:</td>
<td>Inspect and Measure</td>
<td>Clause 4.10.10</td>
<td>Each dowel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Location (x and y axes)</td>
<td></td>
<td>±10 mm design</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alignment in assembly</td>
<td></td>
<td>Horizontal ±2 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Debonded ends</td>
<td></td>
<td>All on same side</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.10.11</td>
<td>Tiebars: Drill hole details and</td>
<td>Inspect</td>
<td>Clause 4.10.11</td>
<td>Each tiebar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>installation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.10.13</td>
<td>Mesh reinforcement :</td>
<td>Inspect</td>
<td>Clause 4.10.13</td>
<td>Before placing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Layout, cover, laps, location</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.10.16</td>
<td>Compaction</td>
<td>Inspect</td>
<td>Table 11</td>
<td>During placing</td>
</tr>
<tr>
<td></td>
<td>4.10.18-20</td>
<td>Curing and protection</td>
<td>Inspect</td>
<td>Clauses 4.10.18 to 20</td>
<td>After placing</td>
</tr>
<tr>
<td>Item</td>
<td>Clause Reference</td>
<td>Property</td>
<td>Test Method</td>
<td>Criteria</td>
<td>Minimum Testing Frequency</td>
</tr>
<tr>
<td>------</td>
<td>-----------------</td>
<td>----------</td>
<td>-------------</td>
<td>----------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>4.10.17</td>
<td>Concrete joints - FSL</td>
<td>Measure</td>
<td>- 0 / + 2 mm adjoining pavement FSL</td>
<td>At 1 m intervals along joints</td>
<td></td>
</tr>
<tr>
<td>4.10.17</td>
<td>Finished surface – levels</td>
<td>2 m straight edge</td>
<td>± 5 mm design FSL</td>
<td>After placing</td>
<td></td>
</tr>
<tr>
<td>4.10.17</td>
<td>Finished surface - texture</td>
<td>Inspect</td>
<td>Clause 4.10.17</td>
<td>After placing</td>
<td></td>
</tr>
<tr>
<td>4.10.21</td>
<td>Compressive strength of concrete prior to reopening to traffic</td>
<td>Nominal strength based on certificate for trial mix</td>
<td>5 MPa (time-critical work) • 20 MPa (other)</td>
<td>Based on curing time upon reopening to traffic</td>
<td></td>
</tr>
<tr>
<td>Restoration of other assets</td>
<td>4.11</td>
<td>Compare before and after condition</td>
<td>Compare before and after photos</td>
<td>As near as practicable to pre-existing condition \ After restoration</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

1. The temperature of asphalt must be measured immediately prior to placing. Measure and monitor paving and compaction temperatures with a hand held or machine mounted infrared thermometer readable and accurate to within ± 2°C at the discharge point from a tipper truck or at the distribution auger on the paver.
## ANNEXURE A – DETAILS OF WORK

### A.1 APPLICATIONS FOR LICENCES AND PROPOSED DETAILS

<table>
<thead>
<tr>
<th>ROAD OPENING APPROVAL</th>
<th>Application Submitted?: Yes / No *</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES)</td>
<td>Application Submitted?: Yes / No *</td>
</tr>
<tr>
<td>Name of Proponent (e.g. contractor for utility owner or developer) (as per Form D)</td>
<td></td>
</tr>
<tr>
<td>Owner of utility or developer for purpose of road opening</td>
<td></td>
</tr>
<tr>
<td>Proposed Location (as per Form D)</td>
<td></td>
</tr>
<tr>
<td>Proposed Scope and Layout of Road Opening</td>
<td></td>
</tr>
<tr>
<td>Proposed Overall Length</td>
<td></td>
</tr>
<tr>
<td>Proposed trench dimensions (Depth / Width)</td>
<td></td>
</tr>
<tr>
<td>Details of proposed buried utility (Type / Diameter)</td>
<td></td>
</tr>
<tr>
<td>Proposed minimum Cover Depth to proposed buried utility (related to pavement FSL)</td>
<td></td>
</tr>
<tr>
<td>Proposed Use of Road Plates</td>
<td></td>
</tr>
<tr>
<td><strong>Notes:</strong> (*) Strike out options that do not apply</td>
<td></td>
</tr>
</tbody>
</table>

### A.2 SCHEDULE OF PRESCRIBED REQUIREMENTS

<table>
<thead>
<tr>
<th>Clause reference(s)</th>
<th>Description</th>
<th>Requirements</th>
</tr>
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<tbody>
<tr>
<td><strong>1. Technical Requirements</strong></td>
<td></td>
<td></td>
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<tr>
<td>2.3.1 and 2.1.9</td>
<td>Confirmed Risk Category</td>
<td></td>
</tr>
<tr>
<td>2.4.7 and 2.1.9</td>
<td>Use of Road Plates Permitted? Yes / No *</td>
<td></td>
</tr>
<tr>
<td>1.7 and 2.1.9</td>
<td>Permanent pavement restoration by: Proponent / RMS *</td>
<td></td>
</tr>
<tr>
<td>2.5.1 and 2.1.9</td>
<td>Confirmed Location and Layout of Road Opening</td>
<td></td>
</tr>
<tr>
<td>2.5.1 and 2.1.9</td>
<td>Confirmed Overall Length</td>
<td></td>
</tr>
<tr>
<td>2.5.5 and 2.1.9</td>
<td>Confirmed Cover Depth of buried utility</td>
<td></td>
</tr>
<tr>
<td>2.5.5</td>
<td>Confirmed utility protection requirements</td>
<td></td>
</tr>
<tr>
<td>2.5.1 and 2.1.9</td>
<td>Confirmed trench dimensions (Depth / Width)</td>
<td></td>
</tr>
<tr>
<td>2.2.12 and 2.2.13</td>
<td>Details of proposed work method(s) for critical activities Required: Yes / No *</td>
<td></td>
</tr>
<tr>
<td>2.2.2</td>
<td>RMS special requirements (in addition to those provided in the Licences) Required: Yes / No * Details:</td>
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</tr>
<tr>
<td><strong>2. Contractual/ Administrative Requirements (advised by RMS)</strong></td>
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<td></td>
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<tr>
<td>1.12 and 2.1.8</td>
<td>RMS Asset Maintenance Reference No.</td>
<td></td>
</tr>
<tr>
<td>2.1.7</td>
<td>RMS Nominated Representative</td>
<td></td>
</tr>
<tr>
<td>1.1, 1.7, 5.8 and 5.11</td>
<td>WARRANTY PERIOD</td>
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<tr>
<td>2.2.5</td>
<td>PUBLIC LIABILITY INSURANCE Amount: $</td>
<td></td>
</tr>
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</table>
2.2.7, 5.9 to 5.11 PERFORMANCE BOND | Required: Yes / No * | Amount: $  
2.2.6 and Annexure L | DEED OF INDEMNITY | Required: Yes / No *  
2.2.10 | Advance notice to adjacent premises | Required: Yes / No * | Details:  
5.11 | FINAL INSPECTION and return of PERFORMANCE BOND | RMS Contact person:  
Notes: (*) Strike out options that do not apply

A.3 PAVEMENT RESTORATION DESIGN REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirements for pavement restoration of road opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Flexible pavement restoration</td>
</tr>
<tr>
<td>APPLICABLE DRAWINGS (refer Annexure E):</td>
</tr>
<tr>
<td>• Figure E.1</td>
</tr>
<tr>
<td>Asphalt course:</td>
</tr>
<tr>
<td>Type: ____________________________</td>
</tr>
<tr>
<td>Thickness: To match existing adjacent asphalt</td>
</tr>
<tr>
<td>Plan dimensions: _____ mm x _____ mm</td>
</tr>
<tr>
<td>Roadbase course:</td>
</tr>
<tr>
<td>Type: DGB20 dense graded granular material.</td>
</tr>
<tr>
<td>Thickness: _____ mm</td>
</tr>
<tr>
<td>Plan dimensions: _____ mm x _____ mm</td>
</tr>
<tr>
<td>Subbase course:</td>
</tr>
<tr>
<td>Type: ____________________________</td>
</tr>
<tr>
<td>Thickness: _____ mm</td>
</tr>
<tr>
<td>Plan dimensions: _____ mm x _____ mm</td>
</tr>
<tr>
<td>2. Concrete pavement restoration</td>
</tr>
<tr>
<td>APPLICABLE DRAWINGS (in Annexure E):</td>
</tr>
<tr>
<td>• Figure E.2 where distance* exceeds 1500 mm</td>
</tr>
<tr>
<td>• Figure E.3 where distance* is less than 1500 mm (transverse joint)</td>
</tr>
<tr>
<td>• Figure E.4 where distance* is less than 1000 mm (longitudinal joint)</td>
</tr>
<tr>
<td>• Figure E.5 (typical restoration details - for all cases)</td>
</tr>
<tr>
<td>Asphalt course:</td>
</tr>
<tr>
<td>Type: ____________________________</td>
</tr>
<tr>
<td>Thickness: To match existing adjacent asphalt</td>
</tr>
<tr>
<td>Plan dimensions: _____ mm x _____ mm</td>
</tr>
<tr>
<td>Concrete course:</td>
</tr>
<tr>
<td>Type: ____________________________</td>
</tr>
<tr>
<td>Minimum thickness: 250 mm. Match existing slab thickness if existing slab is thicker than 250 mm. Specialist design of the replacement slab is required in the case where the thickness of the replacement slab is greater than 250 mm.</td>
</tr>
<tr>
<td>Plan dimensions: _____ mm x _____ mm</td>
</tr>
<tr>
<td>Subbase course:</td>
</tr>
<tr>
<td>Type: ____________________________</td>
</tr>
<tr>
<td>Thickness: 150 mm</td>
</tr>
<tr>
<td>Plan dimensions: As for concrete course</td>
</tr>
</tbody>
</table>
ANNEXURE B – MEASUREMENT AND PAYMENT – (NOT USED)
### ANNEXURE C – SCHEDULE OF HOLD AND WITNESS POINTS AND IDENTIFIED RECORDS

#### C.1 SCHEDULE OF HOLD AND WITNESS POINTS

<table>
<thead>
<tr>
<th>Reference</th>
<th>Type</th>
<th>Process(es) Held or Witnessed</th>
<th>Submission Details</th>
</tr>
</thead>
</table>
| Clause 2.1.9 | HOLD POINT    | Detailed planning and design for road opening work                                               | At INITIAL SITE MEETING provide copies of Applications for:  
  - ROAD OPENING APPROVAL.  
  - ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES).                                                                                                                                                                  |
| Clause 2.2.13 | HOLD POINT   | Commencement of work on site (Low Risk road openings).                                          | At least 20 BUSINESS DAYS (or such longer period directed by the RMS) prior to the intended date of commencement:  
  - All project documentation (including copies of approvals) required under Clause 2.2.  
  - Certification that all necessary designs, Drawings and procedures have been completed, and are structurally adequate and comply with RMS M209.  
  - Certification that a site-specific risk assessment has been completed by a Competent Person for proposed excavation and shoring work.  
  - Stage construction sequence.  
  - Details of critical work methods.                                                                                                                                                                                  |
| Clause 4.1.1 | HOLD POINT    | Commencement of road opening work on site                                                      | At least 2 BUSINESS DAYS prior to starting work on site, notify the RMS Nominated Representative of the confirmed date and time for commencement and submit documentation that verifies that the RMS has issued all four of the:  
  - ROAD OPENING APPROVAL.  
  - ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES).  
  - Speed Zone Authorisation.  
  - Approved TCP for the work.                                                                                                                                                                                        |
| Clause 4.4.1 | HOLD POINT    | First use of road plates by traffic                                                           | At least 2 BUSINESS DAYS prior to first use of road plates by traffic, notify the RMS Nominated Representative of the intended date for use and submit documentation as follows:  
  - Design details and/or drawings for the road plates.  
  - Certification verifying that the road opening excavation, shoring and road plates have been installed in accordance with the design Drawings and are safe for use by traffic.                                                                 |
| Clause 4.10.1 | WITNESS POINT | Placement of concrete pavement restoration and reopening to traffic (for each stage)          | At least 3 BUSINESS DAYS prior to the intended date for placement of each stage of concrete pavement restoration:  
  - Notification of the time and date for commencing that stage of work.                                                                                                                                               |
## C.2 SCHEDULE OF IDENTIFIED RECORDS

<table>
<thead>
<tr>
<th>Clause Reference</th>
<th>Description of Identified Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2.8 and 4.2.1</td>
<td>Certified “Dial before You Dig” check for buried utilities and services</td>
</tr>
<tr>
<td>2.5.1</td>
<td>Location and layout design for road opening</td>
</tr>
<tr>
<td>2.2.13 and 2.6.1</td>
<td>Certified structural designs and Drawings for road opening **</td>
</tr>
<tr>
<td>2.2.13 and 2.6.2.1</td>
<td>Certified site-specific risk assessment for proposed excavation and shoring work **</td>
</tr>
<tr>
<td>2.2.13 and 2.2.12</td>
<td>Details of critical work method(s)</td>
</tr>
<tr>
<td>2.7.2</td>
<td>Design drawings for pavement restoration, including limits of restoration **</td>
</tr>
<tr>
<td>3.3</td>
<td>Road plate serial number(s) **</td>
</tr>
<tr>
<td>3.6.10</td>
<td>Manufacturer’s certification that materials are suitable for purpose (chemical anchor adhesive, curing compounds, surface debonding compounds) **</td>
</tr>
</tbody>
</table>
| 4.1              | RMS approvals for the road opening work:  
|                  | - ROAD OPENING APPROVAL  
|                  | - ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES)  
|                  | - Speed Zone Authorisation  
|                  | - Approved TRAFFIC CONTROL PLAN (TCP) |
| 4.4.1            | Certification that installed shoring and road plates comply with design and are safe for use by traffic (where road plates used) ** |
| 4.11.1           | Before and after photographs of “other public or private assets” affected by the Work |
| 5.1              | Supplier’s certificate of compliance for materials used |
| 5.3              | Test results ** to verify construction compliance for:  
|                  | - Concrete pavement restoration  
|                  | - Other construction activities deemed critical by RMS |
| 5.4              | Completed concrete pavement checklist (refer Annexure D), including details of mix design ** |
| 5.5              | Photographs showing each stage of excavation, prior to backfilling that stage |
| 5.6              | WORK-AS-EXECUTED DRAWINGS showing location, dimensions and details of road opening, including cover depth of buried utility or service. |

Notes:  
(**) For Medium and High Risk road openings only
# Annexure D – Checklist for Concrete Pavement Restoration

<table>
<thead>
<tr>
<th>Clause Reference</th>
<th>Process</th>
<th>Details</th>
</tr>
</thead>
</table>
| 3.6              | Supply and delivery of concrete | - Material supply sources (name and location of batch plant or quarry).  
                   - Details of the concrete mix design (including strength).  
                   - Supplier’s conformity testing. |
| 3.6              | Supply of steel tiebars, dowels and mesh reinforcement | - Source of material supply (name and location of mill).  
                   - Supplier’s QA status.  
                   - Manufacturer’s certification verifying steel grade and compliance with materials requirements. |
| 3.6              | Supply of chemical anchor adhesive, joint sealant, joint filler, debonding compound, curing compound | - Manufacturer’s name.  
                   - Manufacturer’s specification data sheet and SDS for product.  
                   - Manufacturer’s recommendations for use and installation. |
| 2.2.12 and 4.1.7 | Project constraints | - Methods to address project constraints, including dealing with time, weather and temperature constraints and protection of work. |
| 4.2 and 4.10     | Removal of existing concrete | - Method to remove existing concrete pavement base slabs, including measures to prevent damage to adjoining slabs, kerbs or gutters.  
                   - Method to prevent horizontal sawcuts into adjoining slabs.  
                   - Assessment of subbase material under removed concrete slabs. |
| 4.10             | Placing steel tiebars, dowels and mesh reinforcement | - Method for drilling holes for tiebars and installation of tiebars.  
                   - Method for installation of prefabricated dowel assemblies. |
| 4.10             | Placing, compacting and finishing concrete | - Details of equipment and methods for placing, spreading, vibrating, finishing and surface texturing concrete. |
| 4.10             | Protection and curing | - Procedures for protection, covering and curing concrete. |
ANNEXURE E – ROAD OPENINGS – TYPICAL DETAILS

Note: The Restoration requirements shown are guidelines only. The extent of the restoration required will be determined by RMS and may extend beyond the limits of excavation.

Figure E.1 – Restoration in flexible pavement (typical cross-section)
Figure E.2 Restoration in concrete pavement (typical cross-section)

Case 1 – Road opening at right angles to direction of traffic, where edge of minimum concrete cut-out is greater than 1500 mm from an existing transverse contraction joint
Figure E.3 Restoration in concrete pavement (typical cross-section)

Case 2 – Road opening at right angles to direction of traffic, where edge of minimum concrete cut-out is less than 1500 mm to an existing transverse contraction joint
Figure E.4  Restoration in concrete pavement (typical cross-section)

Case 3 – Road opening parallel to direction of traffic, where edge of minimum concrete cut-out is less than 1000 mm to an existing longitudinal joint
TIED CONSTRUCTION JOINT
- LONGITUDINAL OR TRANSVERSE
(BETWEEN SLAB REPLACEMENT AND EXISTING SLAB)

LOCATION OF EXISTING TRANSVERSE CONTRACTION JOINT
DEBONDING ON ONE SIDE OF DOWEL MIN 275

CRACK INDUCER (0.6 THICK ALUMINIUM STRIP) INSERTED
IN NEW Poured CONCRETE ABOVE PREFABRICATED
DOWEL ASSEMBLY

N32 DOWELS 450 LONG
AT 300 C/C WELDED IN
PREFABRICATED ASSEMBLY

INDUCED CRACK
REPLACEMENT SLAB
(ON BOTH SIDES OF JOINT)
SUPPORT CHAIRS FOR PREFABRICATED
DOWEL ASSEMBLY (TYP)

TRANSVERSE CONTRACTION JOINT
(REINSTALLMENT OF EXISTING CONTRACTION JOINT)

* Specialist design is required for slab thickness greater than 250mm (refer Clause 2.7.3.1)
Not to scale
Dimensions in millimetres

Figure E.5 – Restoration in concrete pavement (typical joint details)
Figure E.6 – Road Plate (typical details)

Not to scale
Dimensions in millimetres

Note: Refer to clauses 2.6.3 and 4.4 for further details.
# ANNEXURE F – CONCRETE PAVEMENT RESTORATION – MIX DESIGN DETAILS

<table>
<thead>
<tr>
<th>Property</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SP40 Special-Class (Pavement) Mix</strong></td>
<td>SP40H Special-Class (Pavement) Mix</td>
</tr>
<tr>
<td><strong>[RMS 3201]</strong></td>
<td><strong>[RMS 3201]</strong></td>
</tr>
<tr>
<td>Application</td>
<td>No time constraint on placement</td>
</tr>
<tr>
<td>Compressive Strength (MPa)</td>
<td>≥ 40 at 28 days</td>
</tr>
<tr>
<td>Early age compressive strength (MPa)</td>
<td>≥ 5 at 6 hrs</td>
</tr>
<tr>
<td>Portland cement (kg/m³)</td>
<td>≥ 320</td>
</tr>
<tr>
<td>W/C</td>
<td>≤ 0.5</td>
</tr>
<tr>
<td>Fly Ash (kg/m³)</td>
<td>≤ 70</td>
</tr>
<tr>
<td>Slump (mm)</td>
<td>55 to 75</td>
</tr>
<tr>
<td>Max Nom Aggregate Size (mm)</td>
<td>(iii)</td>
</tr>
<tr>
<td>Placement method</td>
<td>Hand</td>
</tr>
<tr>
<td>Admixture</td>
<td>No CaCl₂</td>
</tr>
<tr>
<td>PROJECT ASSESSMENT required (iv)</td>
<td>Yes</td>
</tr>
<tr>
<td>Other</td>
<td>Type SL or GB Cement</td>
</tr>
</tbody>
</table>

| **SP40HC Special-Class (Pavement) Mix** | **Sydney Region 40 MPa (Nightwork) Mix** [based on SP40HC] |
| [RMS 3201]                             |                                                  |
| Application                           | Critical time to reopen                          |
| Compressive Strength (MPa)            | ≥ 40 at 28 days                                   |
| Early age compressive strength (MPa)  | ≥ 5 at 6 hrs                                      |
| Portland cement (kg/m³)               | ≥ 430                                            |
| W/C                                   | ≤ 0.45                                           |
| Fly Ash (kg/m³)                       | ≤ 70                                             |
| Slump (mm)                            | 55 to 75                                         |
| Max Nom Aggregate Size (mm)           | (iii)                                            |
| Placement method                      | Hand                                             |
| Admixture                             | ≤ 0.8% CaCl₂                                    |
| PROJECT ASSESSMENT required (iv)      | Yes                                             |
| Other                                 | Type SL, GB or HES Cement                        |

|                             |                                                  |
| Notes                      | Where no value is specified in the table, You must select an appropriate value. |
| (i) High early strength (HES) and strength requirements must both be met. |
| (ii) Adjustment by on-site addition of HWR may not be as precise as with water. Slumps in the higher range will increase the risk of downhill flow on grades. Slumps in the lower range are acceptable as long as the vibration (both internal and surface) produces thorough compaction. |
| (iii) Aggregate must meet the additional requirements in Specification RMS 3201 Clause 3.4. |
| (iv) According to AS 1379 Clause 6.5 |
ANNEXURE G TO K – (NOT USED)

[This Page Left Intentionally Blank]
ANNEXURE L – DEED OF INDEMNITY

THIS DEED made the ........ day of ..........................................

BETWEEN: .................. ACN ......................
of........................................
in the state of ............ (hereinafter called “the PROPONENT”)

AND: ROADS AND MARITIME SERVICES OF NEW SOUTH WALES…
(hereninfter called “the RMS”)

WHEREAS:

A. The PROPONENT proposes to undertake … on the land known as …
hereinafter called “the WORKS”

NOW THIS DEED WITNESSETH:

1. The PROPONENT hereby indemnifies the RMS and its officers, employees, contractors and agents from and against all actions, claims, costs, expenses and damages (the “Claims”) in respect of loss or damage to property or personal injury to any person resulting from the WORKS whether arising out of or by reason of anything done or omitted intentionally or negligently by the PROPONENT or by any agent to the PROPONENT.

2. The PROPONENT’S liability to indemnify the RMS and its officers, employees, contractors and agents under clause 1. will be reduced proportionally to the extent that a negligent or wilful act or omission of the RMS or its officers, employees, contractors and agents has contributed to the Claims.

3. The PROPONENT must take out or ensure to be taken out public liability insurance for an amount of twenty million dollars ($20,000,000) for any one occurrence which names the RMS, the PROPONENT and any contractor or subcontractor of the RMS or the PROPONENT in respect of the WORKS.

4. The PROPONENT undertakes to complete all works in accordance with RMS conditions of approval including approved drawings and specifications.

5. The PROPONENT undertakes to rectify all defects (excluding fair wear and tear) arising during the WARRANTY PERIOD at no cost to the RMS.

6. The provisions of this deed apply from the commencement of the WORKS until the end of the WARRANTY PERIOD which is 6 months / 12 months from the DATE OF COMPLETION as determined by the RMS.

[Strike out option that does not apply]

IN WITNESS THEREOF the parties hereunto set their hands and seals on the day and year first hereinbefore written.

THE COMMON SEAL of

) )
) ) .................................

In the presence of:

........................................

EXECUTED BY ROADS AND MARITIME SERVICES OF NEW SOUTH WALES .................................
ANNEXURE M – REFERENCED DOCUMENTS AND DEFINITIONS

M.1 REFERENCED DOCUMENTS

M1.1 Australian and International Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS 1379</td>
<td>Specification and supply of concrete</td>
</tr>
<tr>
<td>AS 1742.3</td>
<td>Manual of uniform traffic control devices - Traffic control devices for works on roads</td>
</tr>
<tr>
<td>AS 2439.1</td>
<td>Perforated plastics drainage and effluent pipe and fittings – Perforated drainage pipe and associated fittings</td>
</tr>
<tr>
<td>AS/NZS 3678</td>
<td>Structural steel - Hot-rolled plates, floorplates and slabs</td>
</tr>
<tr>
<td>AS/NZS 3679.1</td>
<td>Structural steel - Hot-rolled bars and sections</td>
</tr>
<tr>
<td>AS 3799</td>
<td>Liquid membrane-forming curing compounds for concrete</td>
</tr>
<tr>
<td>AS/NZS 4360</td>
<td>Risk Management</td>
</tr>
<tr>
<td>AS/NZS 4671</td>
<td>Steel reinforcing materials</td>
</tr>
<tr>
<td>AS/NZS 4680</td>
<td>Hot-dip galvanized (zinc) coatings on fabricated ferrous articles</td>
</tr>
<tr>
<td>AS 4744.1</td>
<td>Steel shoring and trench lining equipment</td>
</tr>
<tr>
<td>AS 5100</td>
<td>Bridge design</td>
</tr>
</tbody>
</table>

M1.2 WorkCover NSW Document

- Excavation Code of Practice

M1.3 Other Documents


M1.4 RMS Test Methods

- RMS T109 | Plastic limit and plasticity index of road materials |
- RMS T166 | Determination of relative compaction

M1.5 RMS Specifications

- RMS Q | Quality Management System |
- RMS R116 | Heavy Duty Dense Graded Asphalt |
- RMS 3051 | Granular Base and Subbase Materials for Surfaced Road Pavements |
- RMS 3201 | Concrete Supply for Maintenance |
- RMS 3204 | Preformed Joint Fillers for Concrete Road Pavements and Structures |
- RMS 3254 | Bitumen Emulsion |
M1.6 RMS References

TCWS RMS Traffic Control at Worksites Manual

M.2 Abbreviations

ACRS Australian Certification Authority for Reinforcing Steel
DTR Direction to Restrict (Speed) Application (refer Clause 2.2.1)
FSL Finished Surface Level of a road pavement
HWR High range water-reducing (for an admixture)
MOU Memorandum of Understanding between the Proponent and the RMS (e.g. for a public utility).
SDS Safety Data Sheet
SOC NSW Streets Opening Conference
TCP TRAFFIC CONTROL PLAN
TMC RMS Transport Management Centre
TMP TRAFFIC MANAGEMENT PLAN

M.3 Defined Terms

Applicable Drawings The concept Drawings provided by the RMS to represent the permanent restoration of the road opening, showing all relevant details and requirements (see Annexure E Figures E.1 to E.5).
Business Day Any day other than a Saturday, Sunday or public holiday or 27, 28, 29, 30 or 31 December.
Competent Person A person who has acquired through training, qualification or experience, or a combination of them, the knowledge and skills to carry out a particular task (refer Occupational Health and Safety Regulation 2001).
Date of Completion The date when:

- All excavation, backfill and temporary restoration of the road opening is completed and safe for use by traffic; or
- Where permanent restoration is carried out by the Proponent, the permanent restoration is completed.

Deed of Indemnity Means the completed form included in Annexure L.
Drawings
The detailed drawings prepared by the Proponent for structural designs (excavation and shoring, road plates) and road opening restoration. The Drawings for road opening restoration must be based on the APPLICABLE DRAWINGS.

FINAL INSPECTION
Joint inspection mandated at end of the WARRANTY PERIOD (refer Clause 5.11).

Finished Surface Level
The surveyed design or existing level of the finished surface of the road pavement.

GENUINE EMERGENCY
Urgent work where time does not permit the following:
- The application for, or issue of, the ROAD OPENING APPROVAL and ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES).
- Detailed planning and preparation of site-specific designs for the road opening.
Adoption of a design for a similar situation, or of the prescriptive design requirements of Table 5 and Table 7 is acceptable for such emergencies.
Such work is deemed to be High Risk.
The following types of works are examples of genuine emergency works:
- Sewer, water or gas main burst
- A major electrical failure
- Road subsidence

HOLD POINT
A point beyond which a work process must not proceed without the RMS express written authorisation (refer RMS Q).

INITIAL SITE MEETING
The joint meeting on site between the Proponent and the RMS Nominated Representative immediately after the Proponent has submitted the Applications for the ROAD OPENING APPROVAL and the ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES).

LATERAL CLEARANCE
The safe clearance, measured at right angles to the direction of traffic, from the edge of an open excavation for a road opening to the nearest delineated edge of the trafficked lane.
Where road plates are in use bridging over an open excavation, or the open excavation has been backfilled under the trafficked lanes, the LATERAL CLEARANCE is measured from the edge of the road plate or the edge of compacted backfill to the nearest delineated edge of the nearest trafficked lane.

MAJOR RISK FACTOR
A risk factor, additional to excavation and shoring risks, that contributes to elevate the overall risk level of the road opening to High Risk. Typical major risk factors are listed in Table 2.

PERFORMANCE BOND
As defined in Clause 2.2.7. The amount of PERFORMANCE BOND required is set out in Annexure A.2. The Proponent may nominate an agent to lodge on their behalf. This PERFORMANCE BOND must be unconditional and not have an end date.

PRE-CONSTRUCTION SITE MEETING
For Medium and High Risk road openings only, the joint meeting on site between the Proponent and the RMS Nominated Representative to consider all detailed issues. It occurs before commencement of work on site, after completion of design and other preconstruction activities.

Proponent
The party undertaking the road opening work, including its agents (i.e. employees, contractors, subcontractors and professional consultants). This is not necessarily the utility or asset owner.

PUBLIC LIABILITY INSURANCE
The insurance must name the RMS, the Proponent and any contractor, or subcontractor of the RMS or the Proponent as per the DEED OF INDEMNITY. This risk should be insured from the date of physical commencement of the Work and remain in force until the expiration of the WARRANTY PERIOD. The amount of the insurance required is set out in Annexure A.2.

Risk Category
The evaluated risk for the road opening work according to Table 2. The Risk Category reflects the complexity, hazards and associated risk factors for the road opening work. The specified measures or criteria for executing the works will depend on the Risk Category (e.g. level of structural design and inspection). Refer to AS/NZS 4360 for guidance on risk evaluation.
Road Type
A grouping, unique to RMS M209, based on the traffic and live loading situation for the road opening. This is generally related to the functional road classes under AS 5100.

ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES)
A licence issued by the RMS (Transport Management Centre) for the road occupancy aspects of the road opening.
Specifies occupancy of road space and lane closures, including the operational dates and times. Approved dates and timings in the Licence are not necessarily the same as those originally requested.

ROAD OPENING APPROVAL
A Licence issued by the RMS (Asset Maintenance) for the technical aspects of the road opening.
The issued Approval specifies details of excavation, layout, staged construction, use of road plates, WARRANTY PERIOD etc. and any associated RMS conditions for the road opening. Details specified in the Approval are not necessarily the same as those originally requested.

RMS Asset Maintenance Reference Number
An identification number issued by the RMS for the particular road opening work as part of the issued ROAD OPENING APPROVAL. The reference number is provided in Annexure A.2 and should be used for all correspondence with the RMS.

RMS Nominated Representative
The person nominated in Annexure A.2 as the RMS representative for the purpose of ensuring the Proponent’s compliance with this Specification. Normally from the RMS Regional Asset Management Section. Unless otherwise specified, the first point of contact with the RMS is the RMS Nominated Representative.

Specification
Means RMS M209.

TRAFFIC CONTROL PLAN
The TCP is a detailed plan, in accordance with AS 1742.3 and the RMS Traffic Control at Work Sites Manual, which recognises safety for the general public as well as employees on the worksite. This plan must also recognise the designated traffic speed for the road and physical constraints such as road curvature, visibility and structures.
The TCP must include but is not limited to:

1. Location and layout of traffic control devices (e.g. cones, signs, barrier boards, bollards)
2. Lane widths and LATERAL CLEARANCE from traffic to Work Area
3. Site access provisions and pedestrian access

TRAFFIC MANAGEMENT PLAN
The TMP is a plan for integrating the Work into the operation of the road network. The TMP is to be submitted, together with the Application for a ROAD OCCUPANCY LICENCE (DEVELOPMENT ACTIVITIES), for approval.
The TMP assesses the impact of the proposed work on traffic flow, local residents, businesses, schools, hospitals and public transport. The TMP incorporates method as well as providing the physical arrangements for traffic control (i.e. TCP) that are needed to provide safe handling of vehicular and pedestrian traffic through the worksite. The TMP also identifies the factors governing implementation of traffic control (e.g. clearway restrictions, transit lane provisions, staging of works, night time or day time workings and location of site entry and exit points for construction traffic). The TMP may require a temporary speed reduction through the Work Area.
The times for commencement of work and finishing work must be specified as part of the TMP. In certain circumstances, the TMP might need to take account of EPA noise requirements that could dictate the most suitable times for working.

WARRANTY PERIOD
The period set out in Annexure A.2 starting from the DATE OF COMPLETION.

WITNESS POINT
A point in a work process where the Proponent must give prior notice to the RMS and the option of attendance may be exercised by the RMS (refer RMS Q).

Work Area
The specific area on the road or within the road reserve where the road opening work is being carried out. The Work Area includes areas where trucks and machines engaged in the work assemble and manoeuvre (refer TCWS).
Work

The physical work involving carriageway modification such as excavation performed by the Proponent within the State Road reserve and all incidental on-site acts in any way related to such activities. The Work generally results from the need to install a buried utility or service such as a water pipe or a large diameter gas main or underground electric cable.

**WORK-AS-EXECUTED DRAWINGS**

Drawings recording details of the road opening and any buried services following completion of the Work.

**You**

Means the Proponent, including subcontractors, employees and agents of the Proponent. However, where a part of the work that is normally the Proponent’s responsibility is undertaken by the RMS (e.g. permanent pavement restoration), the relevant clauses apply to the RMS.

### M.4 DEFINITIONS

<table>
<thead>
<tr>
<th>Term</th>
<th>Alternative Term</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backfill</td>
<td></td>
<td>Temporary or permanent filling of a road opening excavation, to make it suitable for use by traffic. In the case of temporary backfill, filling of the road opening excavation until the permanent restoration is required.</td>
</tr>
<tr>
<td>Contaminated Material</td>
<td></td>
<td>Foul or polluted material that represents a risk of harm to human health or to the environment.</td>
</tr>
<tr>
<td>Cover depth</td>
<td></td>
<td>The vertical distance between the top surface of a utility or service (that is buried or will be buried), including any protective sleeving ducts, and the Finished Surface Level of the road pavement or footpath, measured on the lower side of the trench. Within a trafficked pavement, the cover depth of new utilities must not exceed the depth specified in Table 4, unless otherwise approved by the RMS.</td>
</tr>
<tr>
<td>Depth</td>
<td></td>
<td>The vertical distance between the base of the trench and the Finished Surface Level of the road pavement or footpath, measured on the higher side of the trench.</td>
</tr>
<tr>
<td>Longitudinal</td>
<td></td>
<td>Parallel to the direction of traffic or road centreline.</td>
</tr>
<tr>
<td>Open Excavitation</td>
<td></td>
<td>For the purpose of this Specification, a road opening excavation that has not been backfilled.</td>
</tr>
<tr>
<td>Plate Clear Span</td>
<td></td>
<td>The clear span of a road plate between its supports (i.e. measured at right angles to the line of trench, between the centroids of bearing support material on each side). [This is equal to the trench width plus 400 mm].</td>
</tr>
<tr>
<td>Road Opening</td>
<td>Trench</td>
<td>A trench, shallow excavation or hole dug within an existing trafficked pavement or within the zone of influence of an existing trafficked pavement for the purpose of buried public utilities, services or drainage. The road opening must be at least 100 mm deeper than the existing pavement. The road opening is deemed to exist from the time of first excavation until the permanent restoration is complete, notwithstanding that it may be backfilled and temporarily restored.</td>
</tr>
<tr>
<td>Road Plate</td>
<td>Steel plate Trench cover</td>
<td>A structural steel plate used to temporarily cover and bridge across an open excavation for the purpose of carrying traffic or pedestrians after the end of a working day. The plate can be removed each working day or left in place.</td>
</tr>
<tr>
<td>Shoring</td>
<td></td>
<td>The use of timber, steel or other structural material for the purpose of providing effective and adequate temporary support to maintain the stability of the walls of an excavation (refer WorkCover NSW Excavation Code of Practice).</td>
</tr>
</tbody>
</table>
Span
Clear Span
The distance between the road plate supports on either side of the trench. This is measured to the centrelines of each 200 mm wide bedding strip, i.e. equal to the trench width plus 400 mm (refer Figure E.6 of Annexure E).

Temporary pavement restoration
The extent of pavement restoration necessary to promptly restore each section of backfilled road opening to traffic. For the permanent pavement restoration, the temporary pavement restoration may be partly or fully re-excavated and replaced with the final pavement courses. The extent of such rework will depend on site-specific issues (e.g. compatibility with adjoining pavement) and will be confirmed by the RMS at the INITIAL SITE MEETING.

Transverse Normal
At right angles to the direction of traffic or road centreline.

Trench
An excavation having a depth that exceeds its width, measured at the bottom (refer WorkCover NSW Excavation Code of Practice).

Unsuitable Material
Excavated material from the road opening which the RMS deems to be unsuitable for backfilling or pavement support.

Zone of Influence
The volume of soil around the excavation affected by any external load (e.g. vehicles, plant, excavated material). It is the area around the excavation that is susceptible to slippage or collapse (refer to diagrams in Figures 1 and 2).

NOTE: This volume is generally assumed to be that formed by planes extending from the load to a maximum angle to the horizontal of 30 degrees in the case of sand and 45 degrees for clay (refer to WorkCover NSW Excavation Code of Practice).

For road opening work within a trafficked pavement, the effective zone of influence and the required LATERAL CLEARANCE for traffic and construction plant is indicated in Table 5, Figure 1 and Figure 2. Good pavement conditions (e.g. sound concrete slab) will promote load distribution beyond the zone of influence, so a lesser LATERAL CLEARANCE for traffic is usually tolerable for this type of work. The effective zone of influence for this situation is therefore narrower than for non-pavement situations.

Table 5 was developed rationally but conservatively, based on nominal soil failure planes at angles of 45 degrees (favourable excavation conditions) or 23 degrees (unfavourable excavation conditions) and for the different pavement cases. Note that 23 degrees is quite conservative.