

# B12

## Road Opening and Restoration



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## 12.1 INTRODUCTION

This Road Opening and Restoration specification sets out quality and intervention standards for restoring civil infrastructure assets.

It stipulates quality specifications, measurements and tolerances. If work does not conform to the quality specifications, we will deem it unsatisfactory and ask the service provider to rectify it.

If a quality specification for a particular type of work or material is not detailed in this document, then industry best practice applies.

You can amend a specification for a particular project only if you have agreement from us before work starts. City of Sydney may also amend a specification when assessing the quality of a particular project.

Please read this chapter alongside the other chapters in the City's Sydney Streets Technical Specifications and Standard Drawings.

We may review and update this document from time to time. If you are unsure about this document and its requirements, please contact City of Sydney.

## 12.2 STANDARDS AND GUIDELINES

Unless stated otherwise in this document, work must comply with current Australian Standards and Transport for NSW (TfNSW) TfNSW Standards.

If you find any variations or ambiguity between this document and these standards, please check with a City officer for approval before starting work.

The table below shows the main Australian Standards and TfNSW Standards that apply to this section.

TfNSW QA M208	Road Openings and Restoration (Low Risk)
TfNSW QA M209	Road Openings and Restoration
AUS-SPEC 1152	Road openings and restorations (Utilities)
AS 1742.3	Traffic control
AS 2150-2005	Asphalt Mix-Guide to best practice
TfNSW Specification M211	Crack sealing
TfNSW QA 3201	Concrete for Maintenance;
TfNSW QA 3204	Joint Fillers for Concrete Pavement and Structures;
Local Government Act 1993	Sections 101 ,142 and 146

## 12.3 RESTORATION SCOPE – SPECIAL REQUIREMENTS

### 12.3.1 HERITAGE SPECIFICATIONS

Each local government area has different requirements to protect and preserve heritage items. If your work site is near a heritage item, you must check the City of Sydney's requirements before work begins.

Heritage elements include:

- a) Footpaths with the names of streets or local features
- b) Footpaths and kerbs constructed from brick
- c) Kerb stones made of sandstone, trachyte or blue stone
- d) Kerb stones with street names
- e) Brick barrel pipe drains
- f) Sandstone retaining walls
- g) Brick retaining walls
- h) Plaques, memorials and public art
- i) Heritage and significant trees
- j) Timber pavements.

## 12.4 TEMPORARY RESTORATION

### 12.4.1 EXCAVATION OF ROAD OPENING

Before excavation, you must have:

- A road opening permit
- BYDA for locating of the underground service
- A traffic control plan
- A road occupancy permit from TfNSW if relevant.

You must send us photographic evidence of the state of the footway or road before work starts. This should be a minimum of:

- Three photos showing a close-up of the work area
- Two long shots from either end of the work.

Contractors must ensure the embankments of the excavation are safe and stable or provide an adequate shoring system to secure these.

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

The width of the trench will be agreed on site with the City's representative.

The excavated area must be appropriately and adequately secured to prevent unauthorised access while work is in progress.

You must remove all surplus excavated material from the site after works are complete.

Any assets such as permanent survey marks found in the footway or roadway during the work shall be

protected. Permanent survey marks are protected by legislation and if there is a possibility of interference with such marks, prior contact must be made with the relevant public authorities, e.g. land and property information NSW and or the Council.

Particular care must be taken to protect street trees and heritage items within the work area and to observe all environmental conditions under which the work has been authorized.

Where temporary steel plates are to be used, very particular attention is to be given to avoid trips or hazards for both pedestrians and cyclists. The surface of steel plates should be treated to ensure a level of roughness (friction) is maintained to minimise accidents for motorcycles and pedal cyclists.

If steel plates are to be used, or the trench depth is greater than 500mm, shoring may be required. In this instance, reference shall be made to TfNSW QA Specification M209 - Road Opening and Restoration, Clauses 2.4-2.6.

All requirements for traffic control must comply with AS 1742.3 and the TfNSW manual for traffic control at the workplace. This will include pedestrian and vehicular traffic.

A prominent sign shall be displayed identifying the contractor or body responsible for the work. A 24-hour contact phone number should be provided on the sign. Similarly, 24-hour contact phone numbers should be provided to and obtained from the Council.

### 12.4.2 BACKFILLING

Excavated material should not be used under any circumstances.

Placing of suitable material and compaction shall be carried out strictly in accordance with the B2: Earthworks Construction. Refer to City of Sydney standard drawings [9.1.1–9.1.4](#).

Sand filling around the services shall be compacted to the requirement of the Utility Authority.

Sand/cement filling above the service shall be thoroughly compacted in layers not exceeding 150mm in thickness, using appropriate equipment such as a vibrating plate or a roller where the width of trench permits.

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

Sand/cement mix plant mixed material up to the temporary wearing surface shall be placed and compacted using at least three passes with a vibrating plate compactor.

Sand/cement mix for road pavement and driveways is 8:1. The sand/cement mix for footpaths is 14:1.

Any natural seepage zones shall not be cut off by the impervious sand/cement material. Natural seepage shall be provided for by the provision of a pervious drainage layer or subsoil drainage.

### 12.4.3 FINAL LAYER

Place and compact minimum 50mm of asphalt (cold mix temporarily if unavailable) to match the existing surface. Any loose material must be swept away.



## 12.5 PERMANENT RESTORATION

### 12.5.1 ROAD PAVEMENT – FLEXIBLE

Prior to excavation, sawcut to the dimensions shown in the “Permanent Restoration Minimum Area Definition” in Annexure A.

Temporary cold mix/asphalt shall be removed to subgrade level and the surface levelled and compacted.

- The type, thickness and required compaction of the reinstated subbase is specified in Drawing 9.1.3 of the City’s standards drawings.
- Backfill material must have adequate moisture to achieve the specified compaction. Moisture must be uniformly distributed within each layer at the time of compaction.
- The thickness of the asphalt wearing course is to be at least the same thickness wearing course of the existing pavement.
- The asphalt pavement material types are to match the existing pavement.
- All edges to the restoration are to be square or perpendicular to the path of travel and generally in accordance with Annexure A.
- Preparation of pavement must be completed prior to tack coating and placing asphalt and must include cleaning the surface so that it is free of loose stones, dirt or foreign material.
- Prior to laying asphalt, apply a tack coat to the vertical sides and bottom (i.e. over the restored road base or concrete base course) of the pavement restoration.
- The asphalt layer thicknesses, laying temperatures and compaction shall be completed to the requirements of AS 2150-2005 Hot mix asphalt – A guide to good practice.
- 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. No surface indentations are permitted after compaction.
- Joints and edges must be compacted to avoid reduced density along the edges of the pavement restoration.
- All cold joints shall be sealed with a 50mm wide bitumen joint seal in accordance with TfNSW specification M211.
- Any permanent restoration of flexible pavements shall be in accordance with City of Sydney standard drawing 9.1.3.
- Joints must be constructed by:
  - Removing uncompacted or cracked material along the edge of the adjoining existing pavement prior to placing asphalt adjacent to the edge.
  - Providing a positive bond by tack coating to the adjoining pavement material.

### 12.5.2 ROAD PAVEMENT – RIGID PAVEMENT

Prior to excavation, sawcut to the dimensions shown in the “Permanent Restoration Minimum Area Definition”. Additionally, temporary cold mix/asphalt shall be removed to subgrade level and the surface levelled and compacted. Note as follows:

- The type, thickness and required compaction of the reinstated subbase is specified in the City’s standards drawing 9.1.3.
- The thickness of the concrete pavement is to match the existing pavement thickness.
- Place reinforcement mesh using bar chairs to which it is tied and above tie bars and dowels.

- Provide at least 50mm top cover to the mesh.
- Horizontally termination is at 50mm from joints or slab edges.
- N12 tie bars shall be used at 600mm intervals (construction joints).
- N12 tie bars shall be installed with the debonded end on one side as per Council's technical specification (expansion joints).
- Place and spread concrete (minimum 40MPa) into its final position using shovels. Internal vibrator should not be used to spread concrete.
- The finished surface must match the surface of the adjoining concrete pavement slab. Neatly trim all joints with adjoining slabs.
- All expansion and control joints shall match existing joints.
- Immediately after finishing and texturing, apply a sprayed film of curing compound, so as to form a continuous uniform and unbroken film.
- Where possible, cover the concrete surface with plastic sheeting immediately after applying curing compound to minimise temperature losses and related cracking. Covers must be secured and weighed down to prevent trip hazards and air movement under the cover.
- Protect newly placed concrete from damage at all times until the road is reopened to traffic.
- The finish of the concrete pavement is to match the finish of the existing pavement for texture, pattern, colour and joint pattern. Wearing course on rigid road pavement should be minimum three times the size of the stone.
- Any permanent restoration of the rigid pavement shall be in accordance with City of Sydney standard drawing [9.1.3](#).

### 12.5.3 FOOTPATH

Prior to excavation, sawcut to the dimensions shown in the "Permanent Restoration Minimum Area Definition". Additionally, temporary cold mix/asphalt shall be removed to subgrade level and the surface levelled and compacted.

Note as follows:

- The thickness of the concrete pavement is to match the existing pavement thickness.
- The type, thickness and required compaction of the reinstated subbase is specified in City of Sydney standard drawing [9.1.2](#).
- Concrete strength, expansion joints and control joints should be in accordance with Council's Technical Specifications.
- Any permanent restoration of the footpaths shall be in accordance with City of Sydney standard drawing [9.1.2](#).

### 12.5.4 VEHICULAR CROSSINGS

- Subgrade and subgrade preparation are the same as for the footpath (see 12.5.3 above)
- For Single Residential, use 32MPa concrete and 150mm thick with SL82.
- For Multi Residential, use 32MPa concrete and 200mm thick with SL 82.
- For Commercial, use 32MPa concrete and 250mm thick with SL 82 (two layers)
- Refer to standard drawings [2.2.10](#), [2.3.9](#), [2.4.6-2.4.8](#), [2.5.5-2.5.7](#), [2.6.8](#) for more guidance.

### 12.5.5 KERB AND GUTTER

Refer to standard drawing [1.1.16](#) for more guidance.

### 12.5.6 VERGES AND LANDSCAPE AREAS

Backfill material must be material that can pass through a 75mm sieve and not contain any organic or deleterious material or reactive clay. In landscape areas, topsoil should be placed on the subgrade to the same thickness as the surrounding topsoil.

Backfilling, for a minimum 300mm thickness, around tree roots should be made of a topsoil mixture, placed and compacted in layers of 150mm depth to a dry density equal to that of the surrounding soil.

No backfill shall be placed above the natural ground surface around a tree trunk or over the root zone unless approved by the Council's officer.

#### Notes

- i) Any line marking and RPMs removed to conduct the utility work shall be reinstated.
- ii) Service manholes shall be replaced flush with final surface levels.
- iii) Reinstated pavers shall be set on the new base in the same pattern, level and finish to match existing pavers.
- iv) Where pavers were mortared to the base, they should be reinstated on a mortar bed.
- v) The thickness of the concrete pavement is to match the existing pavement thickness.
- vi) Where the existing footpath or cycleway is reinforced, reinstate the pavement using SL72 reinforcement. Where the existing pavement is fibre-reinforced concrete (FRC), reinstate the pavement with FRC.
- vii) The asphalt colour coating and pattern is to match the existing pavement.
- viii) Reinstated pavers are to match the existing paver colour and texture and be set on the new base in the same pattern, level and finish to match the existing surface pattern. If the paver cannot be matched, paver selection shall be in consultation with Council.
- ix) Where pavers were mortared to the base, they should be reinstated on a mortar bed.
- x) Tiles are to be reinstated on a rigid concrete base slab with sawcuts in the base slab to align precisely with tile joints. Tile joints in the base slab are to be filled using a flexible silicon joint sealer.
- xi) Any signs or street furniture removed to conduct the utility work should be reinstated.
- xii) The finish of the kerb, gutter and dish gutter concrete surface should be a steel trowel finish.
- xiii) The kerb ramp finish should match the existing pavement for texture, pattern, colour and joint pattern.
- xiv) Where concrete work abuts asphalt paving, an asphalt restoration 0.5m wide shall be undertaken along the concrete edge.
- xv) Where the existing vehicular crossing is reinforced, reinstate the pavement using one layer of SL72 reinforcement mesh for residential properties, a layer of SL82 reinforcement mesh for residential flat buildings and two layers of SL82 reinforcement mesh for commercial properties.



## 12.5.7 ROAD PAVEMENTS WORK QUALITY SPECIFICATIONS

Table 1– Road Pavements – Flexible (Asphaltic Concrete)

	Quality Specifications	Tolerance
1	Restoration has clean unbroken edges along the trench or patch	<5% (not continuously) of the length of the trench has edge breaks
2	Reinstatement surface levels along the edge are flush with the adjacent pavement	No step greater than 5mm
3	The shape of the reinstatement surface matches the road cross section	*The restoration follows the existing road cross section profile to within $\pm 10\text{mm}$ *The work does not create vehicular scraping at vehicular crossings
4	No depression in the restoration surface	Departure of surface from a taut string line placed across the trench does not deviate by $\pm 10\text{mm}$
5	The restoration wearing course is free of rutting	<1% of restoration affected and not greater than an area exceeding $10\text{m}^2$
6	The restoration wearing course is free of ravelling	<1% of restoration affected and not greater than an area exceeding $10\text{m}^2$
7	The restoration wearing course is free of shoving	<1% of restoration affected and not greater than an area exceeding $10\text{m}^2$
8	The restoration wearing course is free of potholes	100% compliance
9	The restoration wearing course is free of cracks wider than 1mm	*No single crack longer than 0.5m *No block cracking or crocodile cracking
10	The restoration asphaltic concrete wearing course specification matches the existing wearing course surface	*Aggregate size matches adjacent pavement
11	No joint separation between the new and existing asphalt	Width of joint not to exceed 2mm
12	Pavement markings including RPMs are reinstated to the same standard and as per the removed pavement markings	100% compliance
13	Signal detectors are reinstated correctly including sealant	100% compliance
14	The service manholes are seated flush with the road surface	No step greater than 5mm on a constant grade
15	All sign posts removed during the work are reinstated	100% compliance

Table 2 - Road Pavements - Rigid

(Plain Concrete, Coloured Concrete, Patterned Concrete or Asphaltic Concrete Surface)

	Quality Specifications	Tolerance
1	Restoration has clean sawcut edges along the trench or patch	<5% (continuously) of the length of the trench has an edge break of greater than 30mm
2	Surface levels along the edge are flush with the adjacent pavement	No step greater than 5mm
3	The shape of the trench follows the road cross section	*The restoration follows the existing road cross section profile to within $\pm 10$ mm *The work does not create vehicular scraping at vehicular crossings
4	No depression in the restoration surface	When measured with a 3m straight edge across the trench, departures are less than $\pm 10$ mm
5	The restoration surface finish matches specifications and/or adjacent concrete surface finish	90% compliance
6	The restoration surface is free of cracking	<1% of restoration affected and crack length not to exceed a total length of 25m
7	Severity of cracks present is moderate	Width of cracks does not exceed 3mm
8	Concrete joints are present as per the existing surface specifications including placement of an elastic sealant	90% compliance and <1% of joint seal defective
9	Concrete surface is free of dusting	90% compliance
10	No spalling at joints and cracks	<5% of spalling of up to 30mm in size throughout restoration
11	Concrete strength specification is adequate	Certificates provided to confirm the use of 32MPa concrete as per TfNSW specifications
12	Pavement markings including RPMs are reinstated to the same standard and as per the removed pavement markings	100% compliance
13	Signal detectors are reinstated correctly including sealant	100% compliance
14	All sign posts removed during the work are reinstated	100% compliance

Table 3 - Road Pavements - Segmental Paving Surface

	Quality Specifications	Tolerance
1	Surface levels where restoration meets existing road surface are flush with adjacent road levels	No step greater than 5mm
2	The shape of the reinstatement surface follows the road cross section	*The restoration follows the existing road cross section profile to within $\pm 5\text{mm}$ *The work does not create vehicular scraping at vehicular crossings
3	No depression in the restoration surface	When measured with a 3m straight edge across the trench, departures are less than $\pm 5\text{mm}$
4	The reinstated paver matches the adjacent pavers	*90% compliance *100% where matching pavers available
5	Concrete base layer is reinstated	100% compliance
6	Pavers installed on a mortar bed are reinstated on a mortar bed	100% compliance
7	Joints are grouted as per the existing paving surface	<5% of joints have spalling mortar joints
8	No broken, cracked or painted pavers placed in the restored area	100% compliance
9	Any pre-existing joints including elastic sealant are reinstated	100% compliance
10	Paving adjacent to kerb and gutter is finished flush	No step greater than 5mm
11	Service manholes are installed flush with the surface	No step around the manhole greater than 5mm
12	Pavement markings including RPMs are reinstated to the same standard and as per the removed pavement markings	100% compliance
13	Signal detectors are reinstated correctly including sealant	100% compliance

## 12.5.8 FOOTPATHS WORK QUALITY SPECIFICATIONS

Table 4 - Footpaths and Cycleway - Concrete

	Quality Specifications	Tolerance
1	Full width slab is restored where existing footpath width is less than or equal to 1.5m, or remaining width is less than 1m	100% compliance
2	The footpath has a cross fall gradient of 2.5% towards road carriageway	Match existing
3	The footpath cross fall gradient does not exceed 5%	Match existing
4	Expansion joints are present at the extent of work and at 12m (max) spacing longitudinally	100% compliance
5	The reinstatement has clean sawcut edges	<2% of the length of the trench has an edge break of greater than 30mm
6	The surface levels where the reinstatement meets the existing footpath are flush with adjacent footpath	No step greater than 5mm
7	No water ponding on the footpath surface unless at a sag point	90% compliance
8	The surface finish is a broom finish or wooden float finish in direction of longest edge.	100% compliance
9	Transverse contraction joints (dummy joints) are installed at the lesser of 6m or 1.5 times the pavement width spacings	90% compliance
10	Concrete surface is free of dusting	90% compliance
11	No spalling at joints	<5% of spalling of up to 30mm in size throughout restoration
12	Concrete strength specification is adequate	Certificates provided to confirm the use of 32MPa concrete
13	The restoration surface is free of cracking	<1% of restoration affected
14	Severity of cracks present is moderate	Width of cracks does not exceed 2mm
15	The restoration work has not damaged adjacent property fencing, paving or tiled steps	100% compliance
16	Service manholes are installed flush with the surface	No step around the manhole greater than 5mm
17	The nature strip or boundary strip adjacent to a new concrete footpath or cycleway is backfilled and matches the top of the new concrete surface	No step greater than 10mm
18	The extent of disturbed nature strip or boundary strip is reinstated with turf rolls and the turf established.  Note: "When reinstating disturbed nature strips consideration should be given to an integrated water-sensitive urban design (WSUD). The design should include an integrated approach for stormwater, groundwater and wastewater management and water supply, to minimise environmental degradation and improve aesthetic and recreational appeal"	100% compliance

Table 5 - Footpaths and Cycleways - Segmental Pavers

	Quality Specifications	Tolerance
1	Surface levels where the reinstatement meets the existing footpath are flush with adjacent footpath	No step greater than 2mm
2	The footpath has a cross fall gradient of 2.5% towards road carriageway	Matching
3	Footpath cross fall gradient does not exceed 5%	Matching
4	Existence of expansion joints at extent of work and at 12m(max) spacing	100% compliance
5	Concrete base layer is reinstated	100% compliance
6	Pavers installed on a mortar bed are reinstated on a mortar bed	100% compliance
7	Joints are grouted as per the existing paving surface	<5% (not continuous) of joints have spalling mortar joints
8	No broken, cracked or painted pavers placed in the restored area	100% compliance
9	A sealant is applied if adjacent surface is sealed	100% compliance
10	No depression in the restoration surface	When measured with a 3m straight edge in both directions, departures are less than $\pm 5\text{mm}$
11	Any pre-existing joints including elastic sealant are replaced	100% compliance
12	Paving adjacent to kerb and gutter is finished flush	No Step greater than 2mm
13	Restoration work has not resulted in damage to adjacent private property assets	100% compliance
14	Service manholes are installed flush with the surface	No step around the manhole greater than 2mm
15	The nature strip or boundary strip adjacent to a new concrete footpath or cycleway is backfilled to match the top of the new concrete surface	No step greater than 10mm
16	The extent of disturbed nature strip or boundary strip is reinstated with turf rolls and the turf established	100% compliance
17	Asphalt around power poles is reinstated	100% compliance
18	Street furniture is reinstated	100% compliance
19	Sign posts are reinstated	100% compliance

Table 6 - Footpaths and Cycleways - Asphaltic Concrete

Quality Specifications	Tolerance
1 Full width footpath is restored where existing footpath width is less than or equal to 1.5m, or remaining width is less than 0.60m	100% compliance
2 The restoration has clean unbroken edges along the trench	<5%(continuous) of the length of the trench has edge breaks
3 Surface levels along the reinstated edge are flush with the adjacent pavement	No step greater than 2mm
4 The shape of the trench cross section follows the footpath cross section prior and following the work	*The restoration follows the existing footpath cross section profile to within $\pm 10\text{mm}$ *The work does not create vehicular scraping at vehicular crossings
5 No depression in the restoration surface	Departure of surface from a taut string line placed across the trench does not deviate by $\pm 10\text{mm}$
6 The restoration surface is free of rutting	<1% of restoration affected and not greater than an area exceeding $10\text{m}^2$
7 The restoration surface is free of raveling	<1% of restoration affected and not greater than an area exceeding $10\text{m}^2$
8 The restoration surface is free of shoving	<1% of restoration affected and not greater than an area exceeding $10\text{m}^2$
9 The restoration surface is free of potholes	100% compliance
10 The reinstated wearing course is free of cracks wider than 1mm	No single crack longer than 0.5m No block cracking or crocodile cracking
11 The restoration asphaltic concrete stone specification matches the existing surface	Aggregate size matches adjacent pavement
12 No joint separation between the new and existing asphalt	Width of joint does not exceed 2mm
13 Pre-existing line marking is reinstated using the same type of materials	100% compliance
14 Outdoor dining markers (other councils use brass plates) are reinstated	100% compliance
15 The nature strip or boundary strip adjacent to a new concrete footpath or cycleway is backfilled and matches the top of the new concrete surface	No step greater than 5 mm
16 The extent of disturbed nature strip or boundary strip is reinstated with turf rolls and the turf established	100% compliance
17 Service manholes are installed flush with the footpath surface	No step greater than 2mm
18 All sign posts removed during the work are reinstated and orientated correctly	100% compliance
19 Signs damaged during the work are replaced	100% compliance



Table 7 - Footpaths - Kerb Ramps

	Quality Specifications	Tolerance
1	Kerb ramp profile matches council specification, Australian standards and provisions of the Disability Discrimination Act 1992	100% compliance
2	Existing tactile paving is reinstated	100% compliance
3	The kerb ramp surface matches other kerb ramps in the footpath segment	100% compliance

Table 8 - Footpaths - Stairs

	Quality Specifications	Tolerance
1	Step treads and risers comply with the Australian Standards	100% compliance
2	The full flight of stairs is replaced	100% compliance
3	Concrete strength specification is adequate	Certificates provided to confirm the use of 32MPa concrete
4	The handrail is reinstated using the same material and complies with the Australian Standards for location and height	100% compliance

Table 9 - Footpaths - Unformed Grass Surface

	Quality Specifications	Tolerance
1	Surface levels where restoration meets existing unformed footway are flush	No step greater than 5mm
2	Surface is top dressed, turfed using turf rolls and established for the entire disturbed area	100% compliance
3	No depression in the restoration surface	The deviation from a 3m straight edge placed across the restoration in both directions does not vary by $\pm 20$ mm

## 12.5.9 KERB AND GUTTER

Table 10 – Kerb and Gutter – Integral Concrete

	Quality Specifications	Tolerance
1	The height and profile of the kerb and gutter is uniform and consistent with Council specifications	95% compliance
2	The height and profile of the layback is uniform and consistent with Council specifications	95% compliance
3	The surface finish is a steel float finish	100% compliance
4	All private roof water outlets are connected flush with the face of the kerb and the invert matches the gutter invert	100% compliance
5	The start and end of segments have been sawcut	100% compliance
6	Expansion joints are present at the start, end and at maximum spacing of 6m	100% compliance
7	Expansion material consists of bituminous filler 10mm thick	100% compliance
8	Any hard stand pavement at the rear of the kerb is separate from the new kerb, flush and includes an expansion joint	100% compliance
9	Contraction joints (dummy joints) are present at a maximum spacing of 3m	90% compliance
10	Water does not pool in the new gutter	100% compliance
11	The nature strip at the back of the kerb is backfilled and matches the top of the kerb level	No step greater than 5mm
12	The extent of disturbed nature strip is reinstated with turf rolls and the turf established	100% compliance
13	Nature strip batter at rear of the kerb is restored with a suitable transition that does not exceed 12% between new and existing grades.	90% compliance
14	The kerb and gutter are free of cracks outside the contraction joints	<3 cracks per 10m
15	The severity of cracks is moderate	Cracks no wider than 2mm
16	An asphalt restoration 0.6m wide (for minimum compaction plate) along the new gutter is present	100% compliance
17	Asphalt restoration is flush with the lip of gutter and to the quality standards outlined in 6.5.7 Road Pavements	No step greater than 5mm
18	The concrete road pavement has been restored flush with the lip of the gutter	No step greater than 5mm

Table 11 - Kerb and Gutter - Sandstone/Brick

Quality Specifications	Tolerance
1 The sandstone kerb stone or brick kerb is flush with the adjacent kerb	No step greater than 2mm
2 The sandstone gutter stones are flush with the adjacent gutter	No step greater than 2mm
3 No ponding is present along the restored gutter	100% compliance
4 The nature strip at the back of kerb is backfilled and matches the top of the kerb level	No step greater than 10mm
5 Nature strip batter at rear of the kerb is restored with a suitable transition that does not exceed 12% between new and existing grades	90% compliance
6 The extent of disturbed nature strip is turfed with turf rolls and the turf established	100% compliance
7 An asphalt restoration 0.5m wide (for suitable compaction plate) is done along the new gutter	100% compliance
8 Asphalt restoration is flush with the lip of gutter and to the quality standards outlined in road pavements	No step greater than 5mm
9 The concrete road pavement has been restored flush with the lip of gutter	No step greater than 5mm
10 All private roof water outlets are connected flush with the face of the kerb and the invert matches the gutter invert	100% compliance

## 12.5.10 VEHICULAR CROSSINGS

Table 12 – Vehicular Crossings – Concrete

	Quality Specifications	Tolerance
1	The restoration surface finish matches Council specifications and/or adjacent surface finish	95% compliance
3	Thickness of the concrete is as per Council's standard, corresponding to domestic, commercial or heavy duty specifications	100% compliance
4	Sawcutting is straight, clean and undertaken along an expansion or contraction joint	90% compliance
5	The restoration surface finish is a broom finish or wooden float finish	100% compliance
6	The height and profile of the layback is uniform and consistent with Council specifications	95% compliance
7	The surface finish of the layback is a steel float finish	100% compliance
8	The restoration surface levels match the adjacent/ existing surfaces	No step greater than 2mm
9	There are no depressions in the surface	Deviation from a straight edge placed across the restoration in both directions does not vary by $\pm 5\text{mm}$
10	The nature strip or boundary strip adjacent to new concrete footpath or cycleway is backfilled and matches the top of the new concrete surface	No step greater than 10mm
11	The extent of disturbed nature strip or boundary strip is reinstated with turf rolls and the turf established	100% compliance

Table 13 - Vehicular Crossings - Segmental Pavers

	Quality Specifications	Tolerance
1	The restoration surface levels match the adjacent/existing footpath	No step greater than 2mm
2	The footpath has a crossfall gradient of 2.5% towards road carriageway	Match existing
3	The footpath crossfall gradient does not exceed 5%	Match existing
4	Existence of expansion joints at extent of work and at the interface with the footpath	100% compliance
5	Concrete base layer is reinstated	100% compliance
6	Pavers previously installed on a mortar bed are reinstated on a mortar bed	100% compliance
7	Joints are grouted as per the existing paving surface	<5% of joints have spalling mortar joints
8	No broken, cracked or painted pavers placed in the restored area	100% compliance
9	A sealant is applied to the new pavers if the surface was previously sealed	100% compliance
10	No depression in the restoration surface	When measured with a 3m straight edge, departures are less than $\pm 5\text{mm}$
11	Any pre-existing joints including elastic sealant are replaced	100% compliance
12	Paving adjacent to the kerb and gutter matches the top of the kerb levels	No step greater than 2mm
13	Restoration does not damage adjacent property fencing or tiled steps	100% compliance
14	Service manholes are installed flush with the surface	No step around the manhole greater than 2mm
15	The nature strip or boundary strip adjacent to a new concrete footpath or cycleway is backfilled and matches the top of the new concrete surface	No step greater than 10mm
16	The extent of disturbed nature strip or boundary strip is turfed with turf rolls and the turf established	100% compliance
17	Asphalt around power poles is reinstated	100% compliance
18	Street furniture is reinstated	100% compliance
19	Sign posts are reinstated	100% compliance

Table 14 - Vehicular Crossings - Asphaltic Concrete

	Quality Specifications (per vehicular crossing)	Tolerance
1	Restoration has clean unbroken edges along the trench/cut	<5% of the length of the trench has edgebreaks
2	Surface levels along the edge match the adjacent pavement	No step greater than 2mm
3	The shape of the reinstated surface cross section follows the footpath cross section prior and following the work	*The restoration follows the existing footpath and vehicular crossing cross section profile to within $\pm 10\text{mm}$ *The work does not create any vehicular scraping
4	No depression in the restoration surface	Departure of surface from a taut string line perpendicular to the direction of vehicular travel does not deviate by $\pm 10\text{mm}$
5	The restoration surface is free of rutting	<1% of restoration affected and not greater than an area exceeding $1\text{m}^2$
6	The restoration surface is free of raveling	<1% of restoration affected and not greater than an area exceeding $1\text{m}^2$
7	The restoration surface is free of shoving	<1% of restoration affected and not greater than an area exceeding $1\text{m}^2$
8	The restoration surface is free of potholes	100% compliance
9	The restoration wearing course is free of cracks wider than 1mm	*No single crack longer than 0.5m *No block cracking or crocodile cracking
10	The restoration asphaltic concrete stone specification matches the existing surface	Aggregate size matches adjacent pavement
11	No joint separation between the new and existing asphalt	Width of joint does not exceed 2mm
12	Pre-existing line-marking is reinstated using the same type of materials	100% compliance
13	Outdoor dining markers (some councils use brass plates) are reinstated	100% compliance
14	The nature strip or boundary strip adjacent to a new concrete footpath or cycleway is backfilled and matches the top of the new concrete surface	No step greater than 2mm
15	The extent of disturbed nature strip or boundary strip is reinstated with turf rolls and the turf established	100% compliance
16	Service manholes are installed flush with the surface	No step greater than 2 mm
17	All sign posts and/or signs removed during the work are reinstated and orientated correctly	100% compliance
18	Signs and/or sign posts damaged during the work are replaced	100% compliance



Table 15 - Vehicular Crossings - Unformed Grass Surface

	Quality Specifications	Tolerance
1	Surface levels where the restoration meets the existing unformed footway match existing levels	No step greater than 10mm
2	Surface is top dressed, turfed using turf rolls and established for the entire disturbed area	100% compliance
3	No depression in the restoration surface	When measured with a 3m straight edge across the surface, departures are less than $\pm 10\text{mm}$

## 12.5.11 TRAFFIC FACILITIES

Table 16– All Traffic Facilities

	Quality Specifications	Tolerance
1	The height and profile of median kerbs and barrier kerbs gutter is uniform and consistent with TfNSW and Council specifications	95% compliance
2	The surface of the kerb is painted with white reflective thermoplastic paint to match the existing	100% compliance
3	The start and end of segments of the kerb have been sawcut	100% compliance
4	Expansion joints are present at the start and end of the reinstated kerb segment	100% compliance
5	Expansion material consists of bituminous filler 10mm thick	100% compliance
6	The reinstated kerb is doweled or keyed into the road pavement	95% compliance
7	The kerb is free of cracks outside the contraction joints	95% compliance
8	The reinstated island infill surface finish matches specifications and/or adjacent concrete surface finish	95% compliance
9	The island infill at the rear of kerb is separate from the new kerb, flush and includes an expansion joint	100% compliance
10	The restoration surface finish is a broom finish or wooden float finish	100% compliance
11	The restoration surface levels match the adjacent kerb and existing surfaces	No step greater than 2mm
12	The reinstated apron of the roundabout centre island has a matching lip and profile consistent with the existing island	95% compliance
13	There are no depressions in the surface	Deviation from a straight edge placed across the restoration in both directions does not vary by $\pm 5\text{mm}$
14	The reinstated surface is free of cracking	<1% of restoration affected
15	Severity of cracks present is moderate	Width of cracks does not exceed 3mm
16	Concrete joints are present as per the existing surface specifications	90% compliance
17	Concrete surface is free of dusting	90% compliance
18	No spalling at joints	<2% of spalling of up to 30mm in size throughout restoration
19	Concrete strength specification is adequate	Certificates provided to confirm the use of 32MPa concrete

	Quality Specifications	Tolerance
20	Concrete strength specification is adequate	Certificates provided to confirm the use of 32MPa concrete
21	Pavement markings including RPMs are reinstated to the same standard as per the removed pavement markings	100% compliance
22	All sign posts and signs removed during the work are reinstated	100% compliance
23	Landscaped islands – the reinstated soil level matches the top of the kerb	No step greater than 20mm noting the need for rainfall to be retained within the island so it does not spill to adjacent paved areas.
24	Landscaped islands – the number and type of plant species is the same as prior to disturbance	100% compliance
25	Landscaped islands – the restoration area is mulched	100% compliance
26	Landscaped islands – the planting is established	100% compliance

### 12.5.12 OPEN SPACE ASSETS

Table 17 - Open Space Assets – Unformed Grass Surface

	Quality Specifications	Tolerance
1	Restoration surface levels match existing surface levels	No step greater than 5mm
2	Surface is top dressed and turfed with turf rolls for the entire disturbed area	100% compliance
3	The turf is established	100% compliance
4	No depression in the restoration surface	When measured with a 1m straightedge across the top of any part of the restoration, departures are less than $\pm 15\text{mm}$

Table 18- Open Space Assets - Landscaping

	Quality Specifications	Tolerance
1	The reinstated soil is at the level of the landscaping prior to disturbance	No step greater than 20mm
2	The restoration area is mulched	100% compliance
3	The number and type of plant species is the same as prior to disturbance	100% compliance
4	The planting is established	100% compliance

Table 19- Open Space Assets - Street Furniture

	Quality Specifications	Tolerance
1	Street furniture is replaced and is secured properly	100% compliance

Table 20- Open Space Assets - Handstand Areas

	Quality Specifications	Tolerance
1	The quality meets standards set out for footpaths	100% compliance

## 12.6 CONFORMITY

- The contractor shall provide photographic evidence of the work in progress, such as placing material, layer thickness and compaction.
- Freshly mixed sand/cement mix must be from a commercially approved batch plant and hand mixing is not permitted for more than one square meter area. A certificate/docket from the supplier to certify that the mix complies with this specification should be submitted. Material found to be unsuitable must not be used.
- The City reserves the right to undertake any audit inspection and testing deemed necessary to confirm the conformity of the work. The contractor is to pay the cost of all testing if the test fails.

## 12.7 REVISION REGISTER

Revision	Clause	Description of Revision	Authorised By	Date
Rev. 6	Overall	References to "Roads and Maritime Services" or "RMS" changed to "Transport for NSW" or "TfNSW" respectively. References to "Dial Before you Dig" or "DBYD" changed to "Before you Dig Australia" or "BYDA" respectively.	SA	Aug-23

## ANNEXURE A - RESTORATION

### A1 TEMPORARY RESTORATION REQUIREMENTS

Refer to B12: Road Opening and Restoration for full details. Note the works shall be undertaken to the following key requirements:

- The excavation shall be backfilled with approved material and compacted to the required standard according to City of Sydney standard drawing 9.1.1.
- The surface level of the entire temporary restoration will match the surrounding levels. This surface level must be maintained until at least (a) three months, or (b) when the permanent restoration occurs. The restoration surface material shall either be hot mix or cold mix asphalt, of at least 50mm in depth. Note the preference for approved cool/cold mix as it is an offsite energy/GHG initiative – see below the specification for cold mix asphalt.

### COLD MIX ASPHALT

#### Joints in General

- Joints are the weakest part of the pavement. Cold joints should be minimised by planning of works to achieve a minimum number of construction joints and, where practicable, maximum use of hot or warm joints.

#### Cold Joints

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

#### Mix temperatures

- Mix Temperatures apply to hot mix Classes 170, 320 and AR450 bitumen binder. Use of Class 600, Multigrade, or PMBs may require minimum temperatures 5°C to 10°C higher than those shown.
- Warm mix shall be supplied with a minimum temperature of at least 20°C below the temperatures nominated above.

#### Warm mix asphalt additive

If required, include warm mix asphalt additive to asphalt to reduce the asphalt manufacturing temperature and/or to improve workability during the paving and compaction operations.

## A2 PERMANENT RESTORATION MINIMUM AREA DEFINITION

Refer to B12 Road Openings and Restorations for full details.

Note: The permanent restoration area will include any assets affected by the works beyond the minimum area nominated above. This includes damage caused by equipment used for the works. The City requires that a pre- works dilapidation record is made to demonstrate any asset damage which existed prior to the works.

Asset	Restoration Area Condition
All surfaces (note some exceptional/ additional requirements below may also apply)	<p>The minimum area shall:</p> <ul style="list-style-type: none"> <li>Extend 0.2m horizontally beyond the edge of the excavated works in all directions</li> <li>Have edges that are parallel or perpendicular to the road's alignment</li> <li>Be a minimum of 0.6m in all directions</li> </ul> <p>Based on the above, if the edge of the restoration is within 0.6 m of a joint or any existing crack control, it shall extend to this location.</p> <p>For stamped pattern surfaces, it shall be further extended to the nearest line in the stamp pattern where relevant.</p> <p>For specially coloured or polished concretes, architectural finishes and art, it shall fully replace the nearest joint or expansion control joint.</p>
Concrete roads, driveways, roundabout infills/apron and traffic island infills	<p>As per all surface's requirements, except these shall:</p> <ul style="list-style-type: none"> <li>Be a minimum of 1m in all directions</li> <li>Be perpendicular to the path of travel for edges crossing a vehicle lane</li> <li>Be full lane width for roundabout traffic lanes</li> </ul> <p>Based on the above, if the edge of the restoration will be within 1m of a joint or any existing crack control then it shall extend to this location.</p> <p>Where line marking exists, and the restoration is located in a vehicle travel lane, then the longitudinal joint shall be further extended to be located either at the centre or edge of a travel lane.</p>
Asphalt roads	<p>As per all surface's requirements, except these shall:</p> <ul style="list-style-type: none"> <li>Be perpendicular to the path of travel for edges crossing a vehicle lane</li> <li>Be full lane width for roundabout traffic lanes</li> </ul> <p>Where line marking exists, and the restoration is located in a vehicle travel lane, then the longitudinal joint shall be further extended to be located either at the centre or edge of a travel lane.</p>
Cycle ways	<p>As per all surface's requirements, except any longitudinal edge shall be extended to the edge of a cycle lane.</p>
Concrete pedestrian ramps	<p>The minimum area shall be to the nearest expansion joint or crack control line.</p>

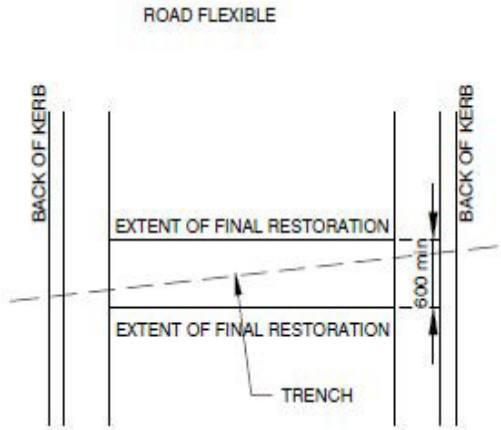


Asset	Restoration Area Condition
Segmental paving/tiles (footways, roads, kerb ramps, etc.)	<p>The minimum area shall:</p> <ul style="list-style-type: none"> <li>• Extend 0.2m horizontally beyond the edge of the excavated works in all directions</li> <li>• Be a minimum of 0.6m in all directions</li> </ul> <p>Based on the above area, any affected pavers are to be full pavers.</p>
Stone kerb and/or gutter	Full stone element
Concrete kerbs, gutters, medians, laybacks, dish drains	<p>The minimum area shall be:</p> <ul style="list-style-type: none"> <li>• The width of the whole element</li> <li>• Extend 0.2m horizontally beyond the edge of the excavated works in all directions</li> <li>• Have edges that are parallel or perpendicular to the road's alignment</li> <li>• Be a minimum length of 1.8m, with one end located on an existing expansion joint or crack control line</li> </ul> <p>Based on the above, if the length of the restoration will be within 1.8m of a joint or any existing crack control then it shall extend to this location.</p>

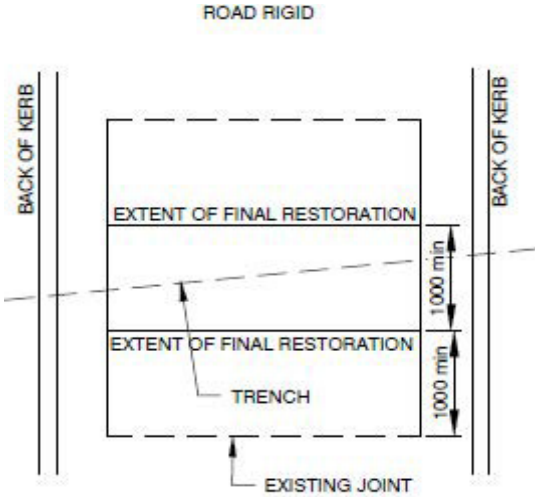
A3 PERMANENT RESTORATIONS AREA DEFINITION – EXAMPLE APPLICATIONS

ROAD PAVEMENT

Example 1 – Trench diagonally across flexible road travel lane

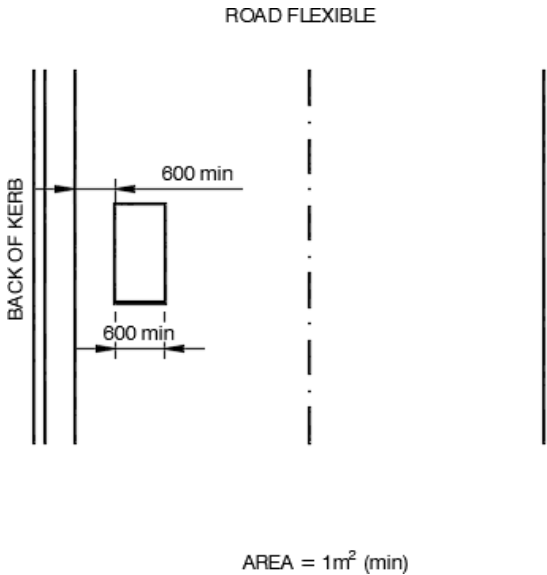


Example 2 – Trench diagonally across rigid road travel lane

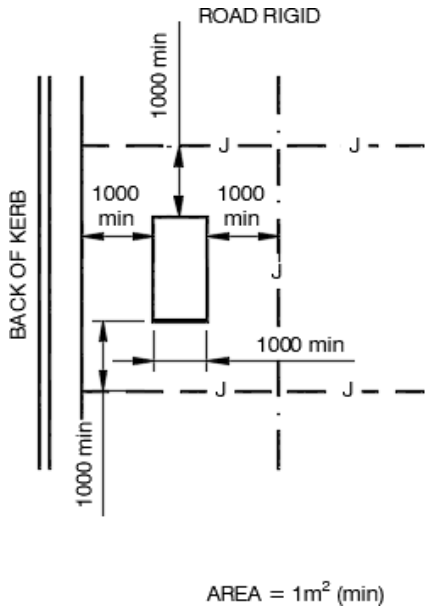


A3 PERMANENT RESTORATIONS AREA DEFINITION – EXAMPLE APPLICATIONS

Example 3 – Trench part way into flexible road travel lane

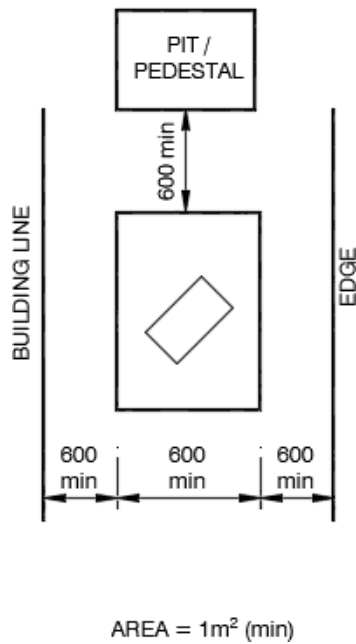


Example 4 – Trench part way into rigid road travel lane

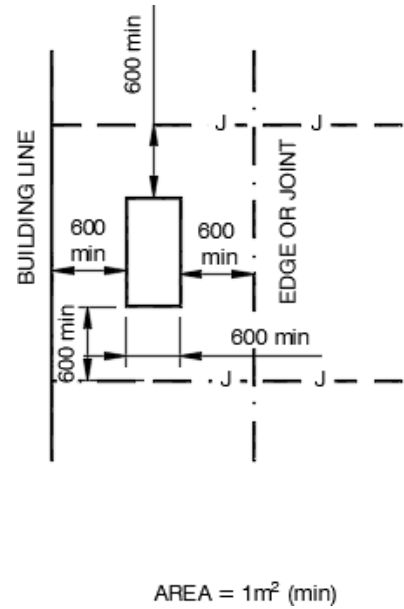


FOOTWAY

Example 5 – Trench in an asphalt footway



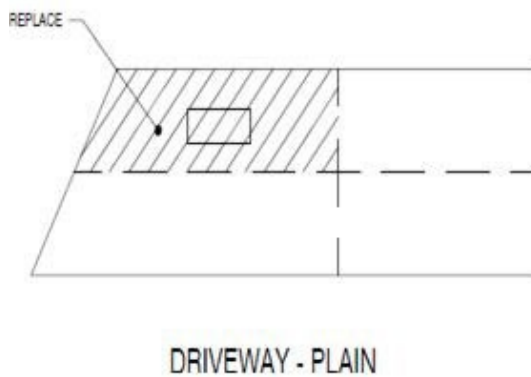
Example 6- Trench in concrete footway



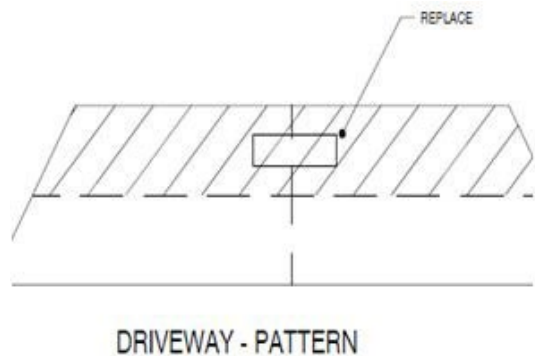
A3 PERMANENT RESTORATIONS AREA DEFINITION – EXAMPLE APPLICATIONS

DRIVEWAY

Example 7 – Driveway-Plain



Example-8-Driveway-Pattern



## ROUNDABOUT

## Example-9- Trench across roundabout

