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1.0 Technical specifications

The specifications must be read in conjunction with the Crossover Guidelines.

1.1 General information

1.1.1 Brick Paving Unit

A manufactured unit with plain or dentate sides and parallel top and bottom faces preferably with chamfers, for use in roadways, parking areas, industrial hard standings, and areas subject to pedestrian movement and/or vehicular traffic.

1.1.2 Concrete Interlocking Brick Paving Units

Concrete brick paving units supplied shall comply with the Concrete Masonry Association of Australia MA20-1986 'Specification for Concrete Segmental Paving Units'.

1.1.3 Clay Brick Paving Units

Clay bricks paving units supplied must conform to AS/NZS 4455– 1997AS/NZS 4456. The bricks must be Heavy Duty bricks suitable for Commercial Traffic.

1.1.4 Dimensional Tolerance

Brick on flat shall have ± 1 mm tolerance on all dimensions, providing the brick complies with the length to width relationship as determined by AS1255, clay building bricks.

The right angle face will be determined by diagonal measurements on all faces of the brick. These dimensions shall not vary by more than 1 mm.

1.1.5 Compressive Strength of Paving Units

The minimum compressive strength for paving bricks shall be in accordance with AS/NZS 4456-5.

1.1.6 Manufacturer's Guarantees

Brick paving units used in brick paved crossovers shall be covered by a manufacturer's guarantee for structural adequacy, soundness and satisfactory performance for a minimum period of 10 years from the date of laying the brick paving.

1.2 Excavation and preparation of sub-grade

1.2.1 The existing ground and topsoil will need to be excavated to allow for the required finished levels which include a 100 mm thick base course layer.

1.2.2 The property owner is responsible for the disposal of all spoil material offsite.

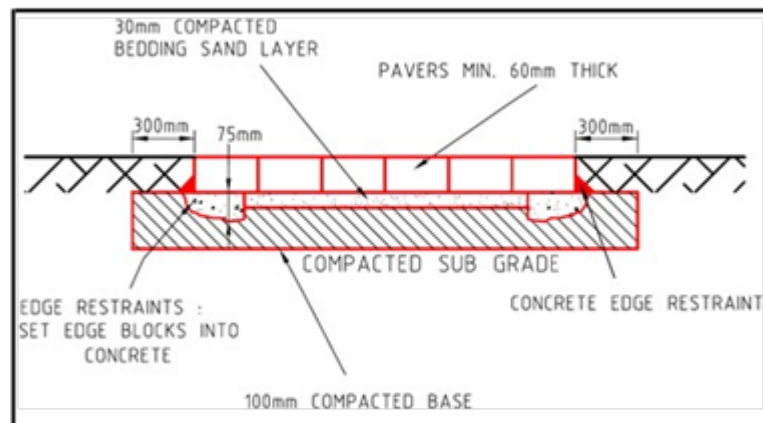
1.2.3 Once the existing ground and topsoil has been removed to the required depth, the exposed ground surface (sub-grade) shall be properly compacted and trimmed to provide a uniform surface true to the levels and cross sections. Compaction tests shall achieve no less than seven (7) blows per 300 mm as measured on a standard Perth penetrometer.

1.3 Base course construction

- 1.3.1** The base course shall consist of a uniform layer, 100 mm thick, of either crushed limestone or road base
- 1.3.2** The base course material shall be loosely spread in a single layer to the required levels and compacted using overlapping passes of a vibrating plate compactor or vibrating pedestrian roller. After compaction, the material shall be trimmed to the final shape and grade.

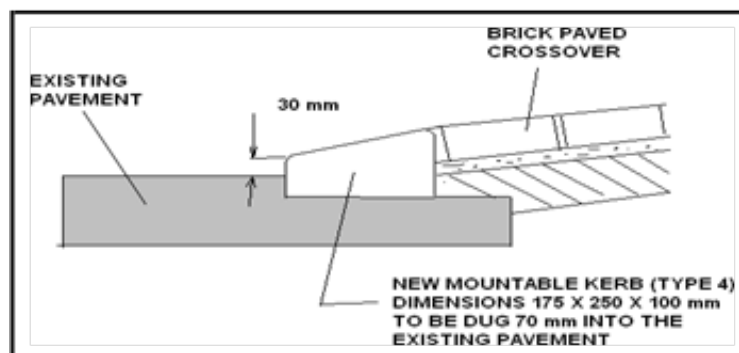
1.4 Edge restraints

1.4.1 Side Edge Restraint



- 1.4.2** The edge restraint shall consist of 25 mpa concrete with a maximum nominal aggregate size of 10 mm.
- 1.4.3** All edge restraints shall be without any cold joints throughout the whole length of the edge that is being restrained.

1.4.4 Front Kerb Edge Restraint



1.5 Sand bedding layer

1.5.1 Bedding sand shall be well-graded sand passing a 4.75 mm sieve and be free from soluble and deleterious salts or other contaminants that may cause efflorescence on the paving.

1.5.2 Grading limits shall be as follows:

AS Sieve Size (mm)	4.75	2.36	1.18	0.60	0.30	0.15	0.075
% Passing	95-100	80-100	50-85	25-60	10-30	5-15	0.10

1.5.3 Bedding sand shall be protected against rain when stockpiled on site. It shall be spread after being brought to uniform moisture content in the range of 4% to 8%. Spreading shall produce a sand bed of precise and even depth. The sand bedding shall be screeded in a loose condition to the design profile to enable the bedding layer to be 30 mm thick with -0 to +10 mm allowable variation after compaction.

1.6 Laying and compaction of brick paving units

1.6.1 Before laying the paving units, the sand bedding is to be brought to design levels and profiles by not less than two (2) passes of a suitable plate compactor.

1.6.2 Brick paving units shall be placed on the screeded sand bed to the nominated laying pattern.

1.6.3 Brick paving units shall be placed with 2 to 4 mm gaps between adjacent units ensuring all joints are correctly aligned.

1.6.4 Header courses should adjoin and be secured against an edge restraint.

1.6.5 Full paving units shall be laid first in each row;

1.6.6 Closure paving units shall be sawn and fitted accordingly. Such closure units shall be sized not less than 25% of a full paving unit.

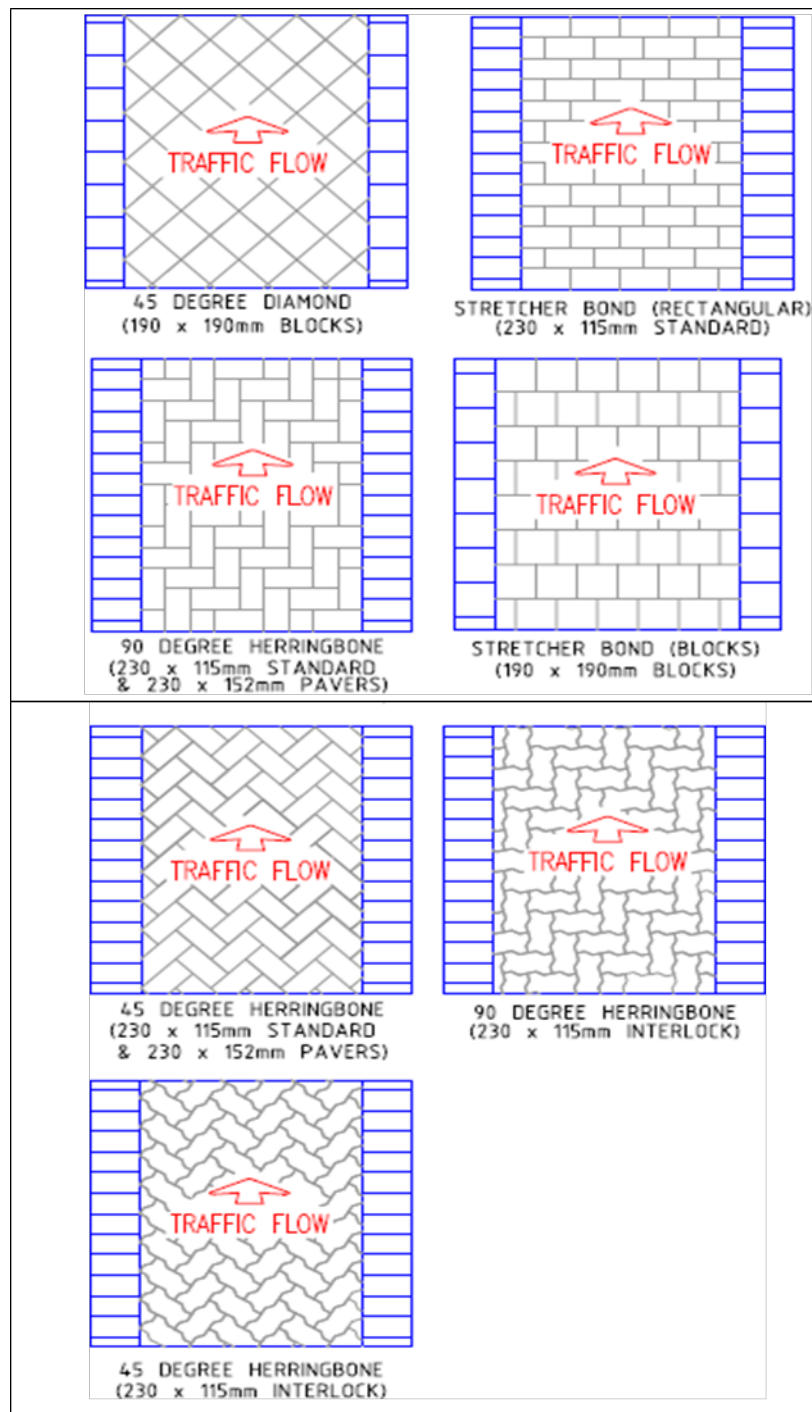
1.6.7 Brick paving units must be cut using a purpose built brick-cutting machine utilising running water. Gaps between the paving units of between 25 mm and 50 mm wide shall be filled with 20 mpa concrete with a nominal aggregate size of 10 mm. The concrete shall be colour-matched to the proposed surrounding pavement colour with approved oxide pigmentation.

1.6.8 Brick paving units shall be neatly sawn to finish flush around any road reserve infrastructure assets.

1.6.9 Use of dry packed mortar (water added after packing) to fill gaps between paving units is unacceptable

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- 1.6.10** The compaction of the brick paving units shall be undertaken by a high frequency low amplitude mechanical flat plate compactor having a plate area sufficient to cover a minimum of 12 units and an energy output suitable to compact the bedding sand layer.
- 1.6.11** Compaction shall proceed as closely as possible to follow the laying of the brick paving units and prior to any traffic load.
- 1.6.12** Any brick paving units damaged and cracked during compaction shall be immediately removed and replaced.
- 1.6.13** Brick paving patterns shall be constructed in accordance with the following laying patterns:

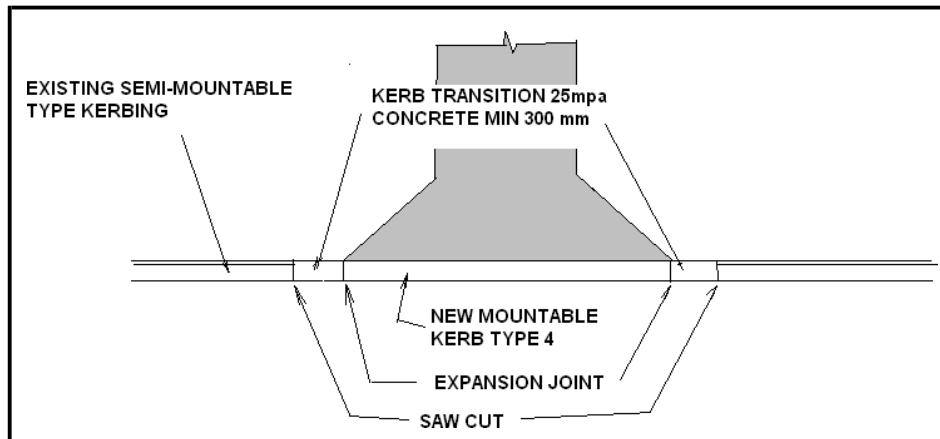


1.7 Filling joints

- 1.7.1 For all reinstatement and new works, the joint filling sand shall be spread over the pavement as soon as practical after compaction of the paving units.
- 1.7.2 The joint filling sand shall pass a 1.18 mm sieve and have 10% of material passing a 75 micron sieve.
- 1.7.3 The joint filling sand must be clean, free of all soluble and deleterious salts or other contaminants and not stain the paving units.
- 1.7.4 The sand should be placed onto the brick paving units and swept into all joints by means of a stiff broom. When joints are filled, the paving units should be run over with a vibrating plate compactor and then topped up and swept.
- 1.7.5 The sand must be swept to completely fill all joints.
- 1.7.6 All excess dry sand shall be removed immediately following works. This operation will be particularly important if the brick paving units are to be coated later.

1.8 Kerbing

- 1.8.1 The adjacent existing kerb on either side of the crossover splays shall be neatly sawn as shown:



- 1.8.2 The cut out kerb segment shall be filled with 25 mpa strength concrete with maximum aggregate size of 10 mm with the kerbing infill formed to rise gradually from a 30 mm height at the splay tip, to the height of the existing kerb at the point of the saw cut.

1.9 Tolerances to design profile

- 1.9.1** The completed brick pavement shall not vary in level from the designed or specified level by more than +5 mm at any location, nor shall the finished levels vary by more than 5 mm against a 3 m straight edge when placed along a constant grade line.
- 1.9.2** The property owner shall finish all pavements to lines and levels to ensure positive drainage at 2% fall towards the road.

1.10 Clean-up

- 1.10.1** The clean-up of a job site is the responsibility of the property owner including the removal and responsible disposal of all spoil generated by the works.
- 1.10.2** Clean-up shall be undertaken immediately on completion of works, or if works continue for more than one (1) day, on a daily basis.
- 1.10.3** If clean-up work is not to the City's satisfaction, the City may make good the site and charge the property owner accordingly.

1.11 Bitumen reinstatement

1.11.1 There are two (2) acceptable methods to repair bitumen surfaces that have been damaged during crossover works, as shown below:

1.11.1.1 Method 1

- Remove loose material and excess concrete from area to be reinstated;
- Place and compact base course material utilising mechanical compaction;
- Base course material will be emulsion-stabilised limestone or equivalent;
- Provide single coat emulsion seal with aggregate (diorite or granite) maximum size 7 mm;
- Seal excess emulsion with aggregate;
- Sweep excess aggregate away from the repair and remove excess material.

1.11.1.2 Method 2

- Repair the bitumen surface with hot or cold asphalt to a minimum thickness of 30 mm.