

8.7 Road marking edition 2 discussion section (new material)

8.7.1 General

The support of Downer EDI Works ITS in assisting in the preparation of this section and their permission to use their intellectual property is gratefully acknowledged. The responsibility for the material contained herein is Auckland City Council's.

Road marking operations progress down the carriageway in the direction of traffic flow. Where a single centre line or flush median type B markings are to be marked they are marked from the side that maximises rear visibility.

The methodologies and contingencies detailed below may be used by reference in an approved TMP to undertake this work.

8.7.2 Type A marking

General

Type A work is done using road registered vehicles equipped to spray paint onto the road surface as intermittent or continuous lines and is suitable for applying centre lines, lane lines and flush median boundary lines.

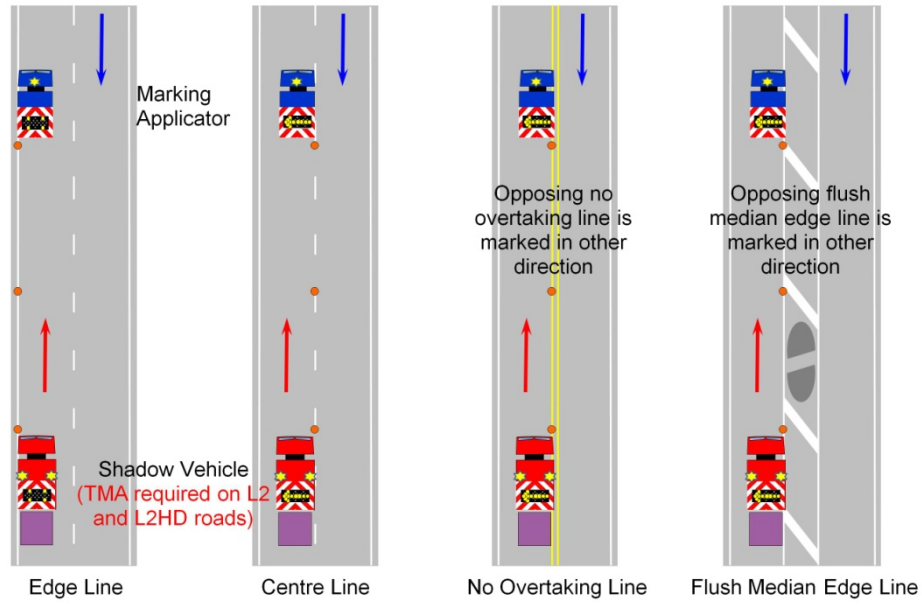
Mobile closures are used for this work as detailed below.

Type A marking speed will be dependent on the marking material and is typically between 5 and 25kph.

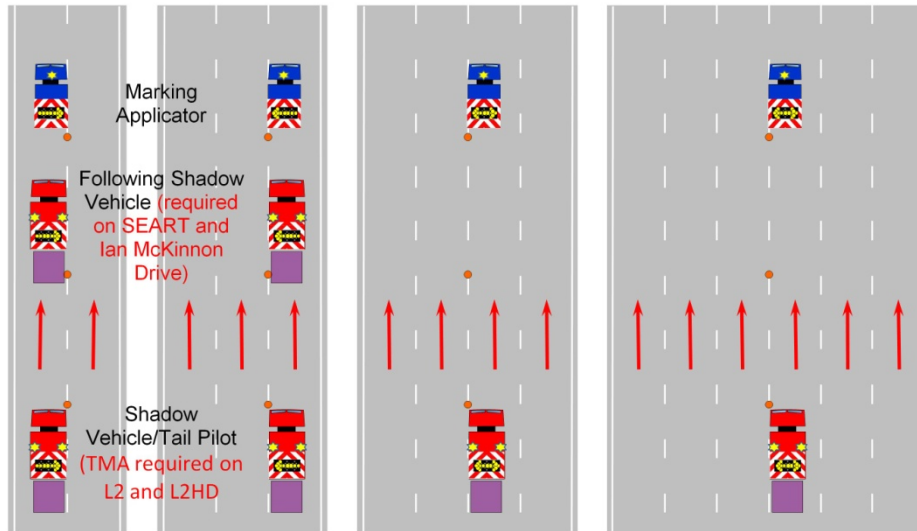
Methodology

1. The shadow vehicle takes up position immediately beside the line to be marked approximately 50 metres prior to point where painting is to commence but always where there is at least 3 metres to pass to the left as shown below:

2 Lane 2 Way Roads



Multiple Same Direction Lanes



Layout may also be used on 3, 4, 5 and 6 lane situations

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Line should be marked from lane closest to centre line or edge of carriageway.

Where line is in centre of lanes carrying traffic in the same direction, the safest adjoining lane is to be used for vehicle placement.

All vehicles to display double headed arrows.

2. The applicator is positioned at the start point in front of the shadow vehicle.
3. Both vehicles use arrow boards directing traffic to the left or right as shown above as and when there is sufficient room.
4. When ready, the applicator proceeds forward and 450mm cones are placed from the applicator at 50 metre centres to keep road-users off the markings until set or dry.
5. Naturally occurring situations, e.g. intersections, lay-bys, etc are used to allow for the dispersal of traffic where there is insufficient shoulder widths.
6. Where traffic queues following the applicator build up back to the shadow vehicle, the applicator must stop applying markings and clear the carriageway sufficiently to allow the traffic to pass the operation. Once traffic has cleared, the applicator is repositioned on the markings and the operation continues.

7. The shadow vehicle remains positioned at a start of cones until such time as work vehicle has reached next intersection or 2000 metres (maximum permitted run length).
8. On completion of the run, the work vehicle immediately returns to the start point waits for the paint to have dried and collects cones in front of shadow vehicle.
9. The shadow vehicle follows the work vehicle for this operation.
10. Once cone collection is complete, both vehicles continue to move together to start point of the next marking run.

On SEART and Ian McKinnon Drive the tail pilot fulfils the function of the shadow vehicle detailed above and the shadow vehicle follows applicator 40 – 60 metres behind as detailed below. All vehicles move in convey for the cone pick up operation. The following diagrams detail this operation:

8.7.3 Type B marking

This type of working is normally performed by personnel on foot using semi static type closures except as specified below. All work areas are to be protected by shadow vehicles and 900mm cones spaced in accordance with COPTTM, LRS or clause 7.3.2 for L2HD roads **as appropriate for the designation of the road.**

Where due to width restraints, it is necessary for the applicator operator to enter the adjoining live lane briefly, i.e. for marking continuity lines, limit lines and/or diagonal stripes, the following process should be adopted:

1. A lookout must be deployed in a position where visibility is maximised for all directions for traffic approaching the operation.
2. This may be the same person where already required for side road controls below.
3. The lookout will not interfere with any traffic movements.
4. Where an MTC is in use, that person should be instructed to hold all approaching traffic along the side road being marked.
5. The lookout will direct the applicator operator when it is safe to enter the live lane. N.B. This is deemed to be when there is no traffic approaching the operation from any other direction except where being controlled by an MTC.

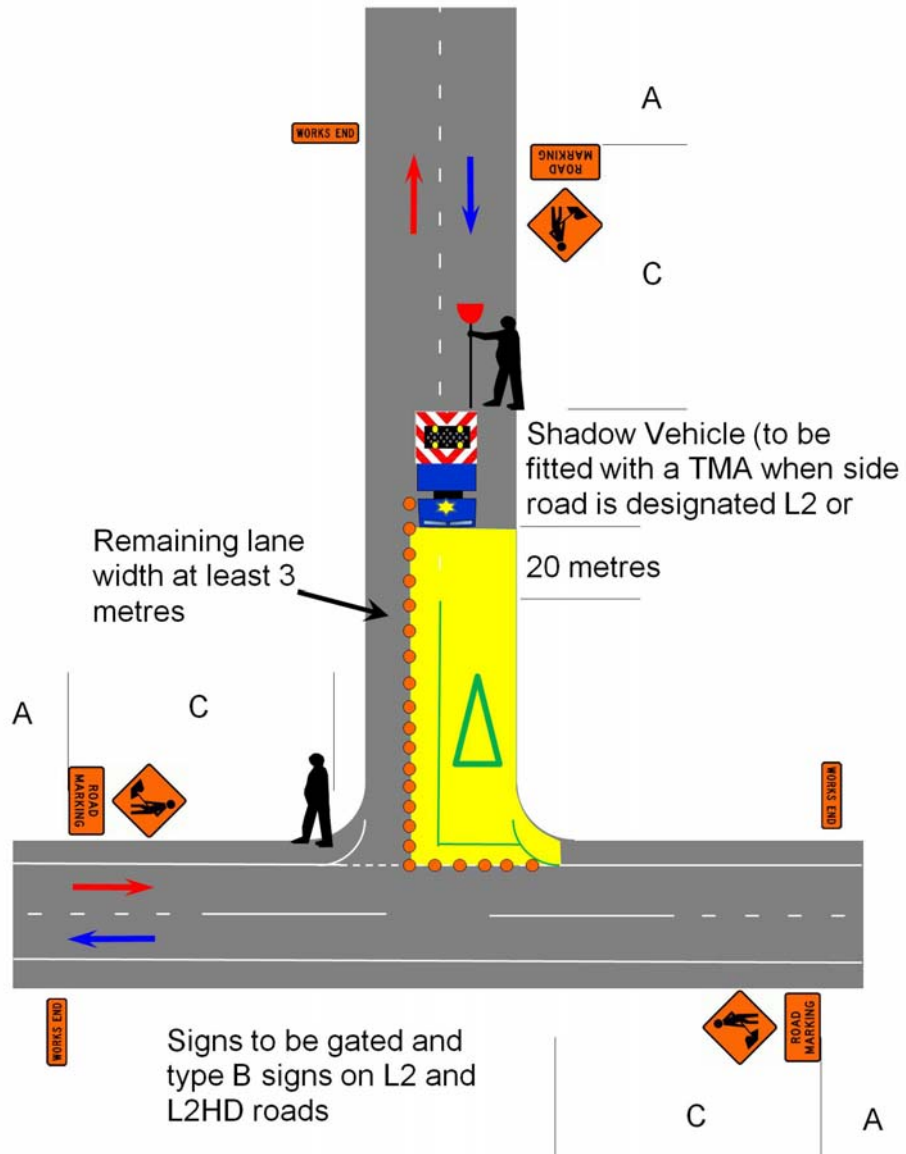
6. On receipt of the all clear from the lookout, the applicator operator will immediately pull the applicator back into the live lane, line up on the line to be marked and commence marking re entering the closed area as soon as practicable.
7. All involved personnel must be equipped with two way radios with a dedicated channel for their sole use.
8. If the lookout or MTC, if applicable, warns of unexpected approaching traffic whilst the applicator operator is in the live lane, the operation must be aborted and the operator and applicator must immediately re enter the working space.
9. Safety zones to be the maximum available without compromising the other dimensions specified in this section.

SIDE ROAD CONTROL – letters, symbols, limit lines and approach lines

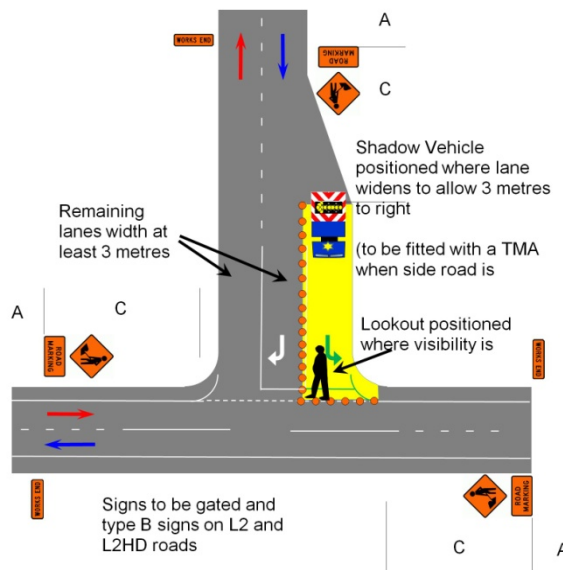
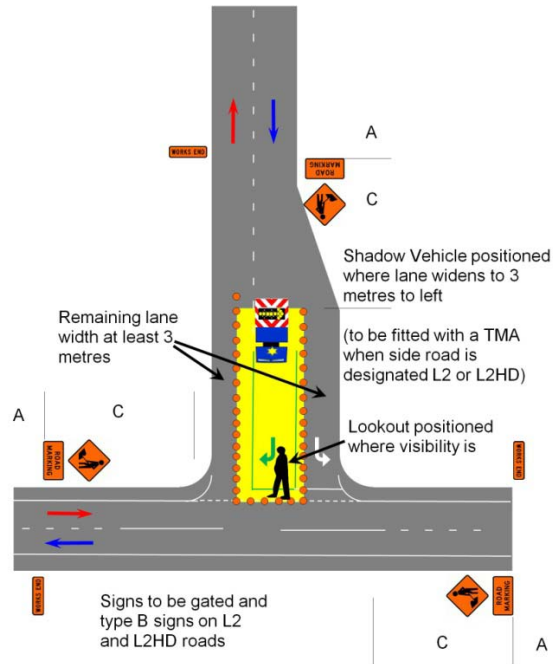
1. The shadow vehicle takes up position:
 - a. at a point where there is a single lane or 3 metres available to pass the operation to the left or right for traffic approaching the intersection as shown on the details below, or
 - b. immediately beside the line to be marked approximately 20 metres prior to point where painting is to commence on the intersection approach line.
2. Cones are placed on foot as shown on the details below always ensuring that there is at least a 3 metre wide lane for passing traffic leaving the intersection along the side road.

3. Diagrams:

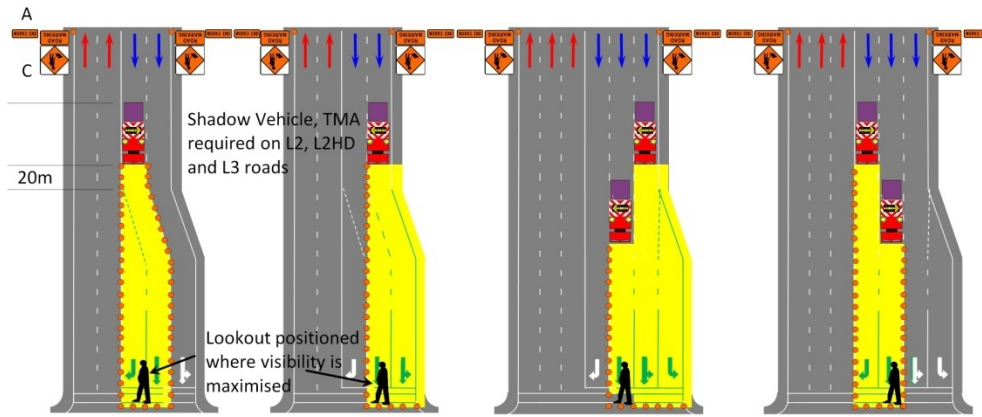
a. Two Lane Two Way Intersection



b. Two stacking lanes



c. Multiple stacking lanes



4. TW1 and TW16 signs positioned on each approach to allow for shadow vehicle positioned as each approach is marked.
5. Multiple intersections may be signed out at the same time where they lie within 100 metres of each other.
6. Pedestrian Crossing lines on side of carriageway leaving the intersection are to be marked out using semi static layouts based on layouts detailed in clause **Error! Reference source not found.**
7. Where the intersection is controlled by Traffic Signals the requirements of clause **Error! Reference source not found.** are to be followed.
8. Where there is more than 3 metres available for traffic approaching the intersection, the shadow vehicle will display an arrow to direct approaching traffic into the appropriate stacking lane.
9. Where there is less than 3 metres available for traffic approaching the intersection **on the approach being marked:**
 - a. The shadow vehicle will exhibit "caution" on its arrow board.
 - b. An MTC is to be deployed on the left shoulder at the back of the shadow vehicle to hold traffic on the side road approaching the intersection.

- c. A **lookout** is to be positioned at the intersection in a position where visibility is maximised for all directions for traffic approaching the side road being remarked.

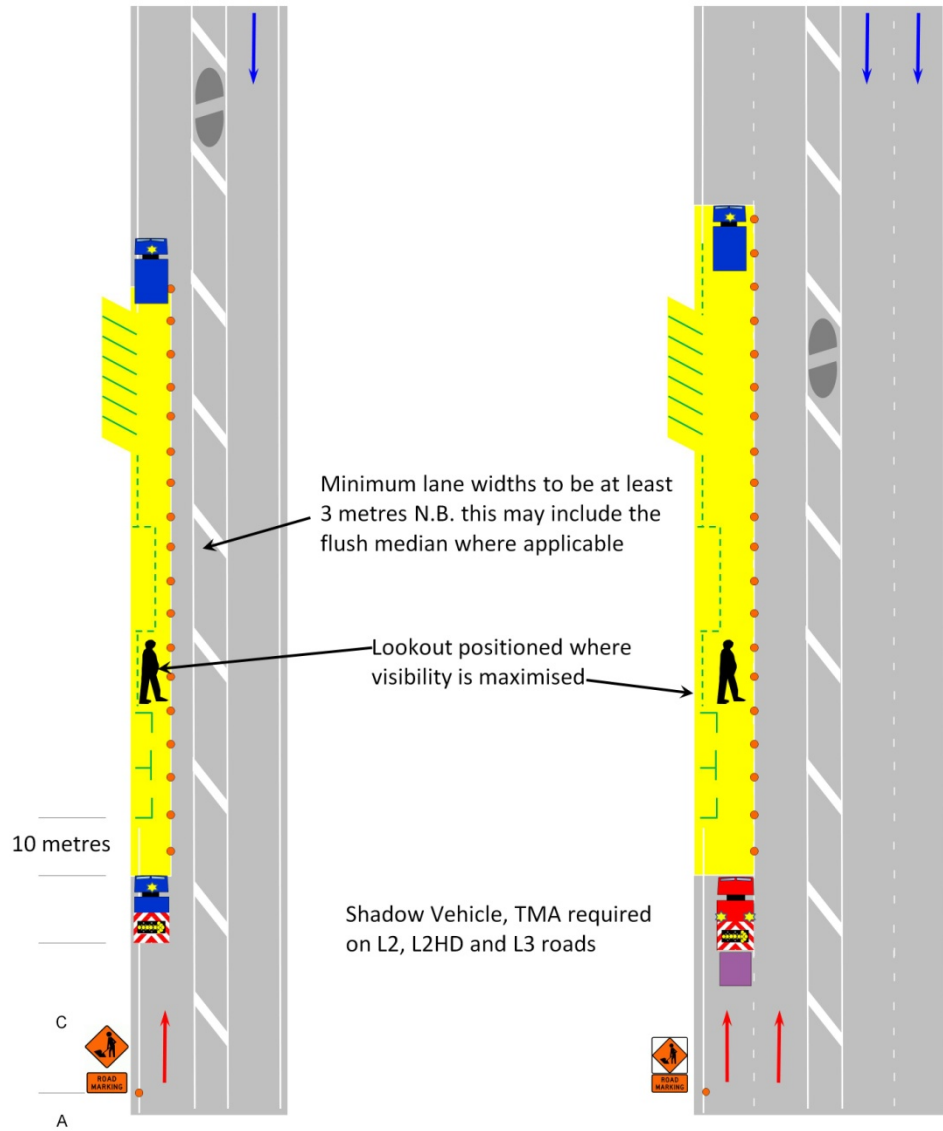
N.B. this person may also guide the applicator operator when it is necessary for that person to enter a live lane as detailed in the general conditions above.

- d. The lookout will direct the MTC when it is safe to allow traffic held on the approach that the intersection is clear. N.B. This is deemed to be when there is no traffic approaching the intersection from any other direction.
- e. Both individuals must be equipped with two way radios sets for communication.
- f. The lookout will not interfere with any traffic movements.

- 10. Work vehicles are to be placed to maximise protection to workers without endangering the public.

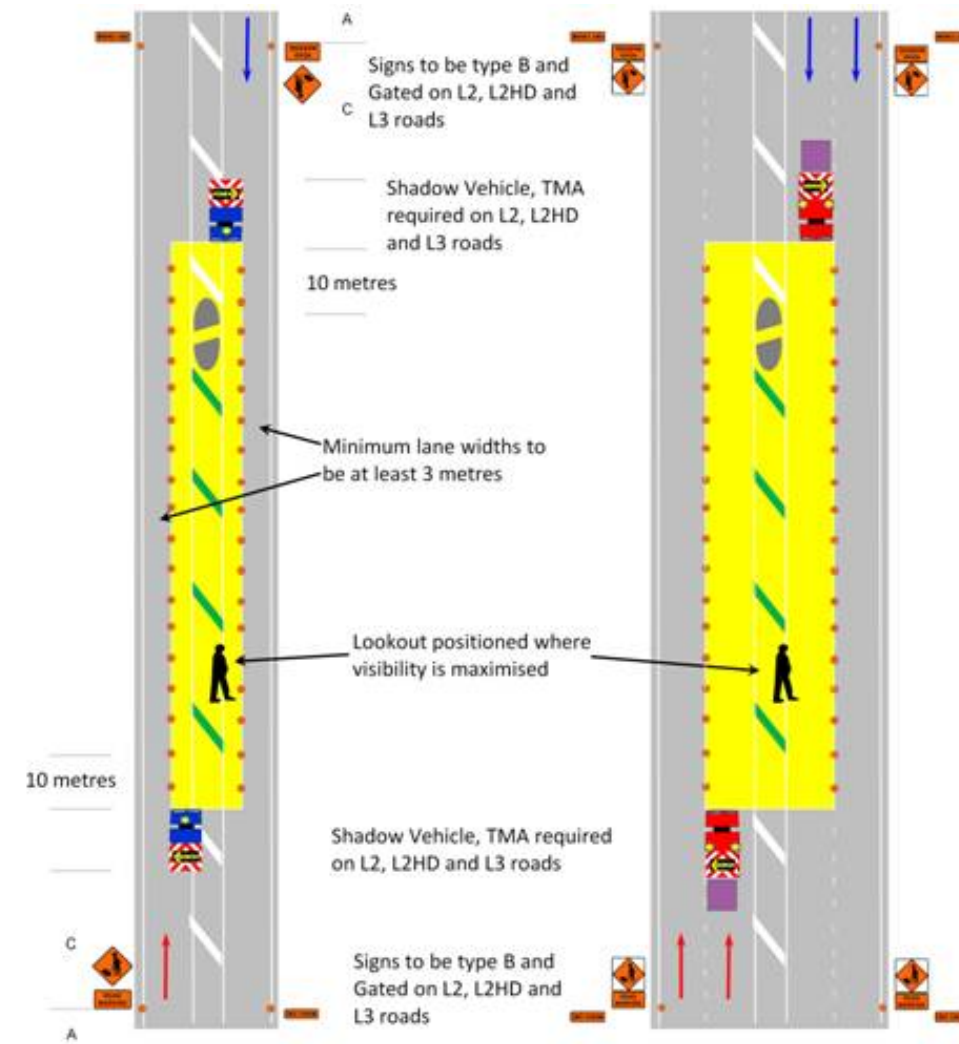
MISCELLANEOUS EDGE MARKING – shoulder markings (parking, no stopping, bus stops, etc)

- 1. The shadow vehicle takes up position at a point 20 metres prior to the first item requiring marking.
- 2. 900mm cones are deployed from a lead vehicle to a point where the entire length of road side requiring type B markings is protected.
- 3. An informed worker is tasked to manage any pedestrian movements around the area being marked.
- 4. A minimum lane width of 3 metres is to be maintained.
- 5. As a consequence, where it is necessary for a person to enter a live lane to apply the mark, this must be done as detailed in the Type B general conditions above.



FLUSH MEDIAN MARKING – median bar Markings, RRPMS and right turn bays

1. Two shadow vehicles will be necessary for this operation positioned as shown below:



2. An informed worker/lookout is tasked to manage the following:
 - a. Any pedestrian movements around the area being marked.
 - b. Any vehicle movements through or around the closed area for right turns using the safest and most convenient route available.
 - c. To give direction as noted in the general type B conditions where the applicator operator needs to briefly enter a live lane.
3. 900mm cones are deployed from each shadow vehicle to enclose the entire length of flush median requiring type B markings and RRPMs.
4. The lateral position of the cones should be to ensure that a single 3 metre wide lane is left for road users for 2 lane roads. Where the road has 2 or more lanes available in any direction, the right lane only on each affected side is to be blocked by the relevant shadow vehicle with cones placed along the permanent lane line.
5. Marking proceeds as necessary entirely within the enclosed area except as noted in the Type B general conditions above.
6. When it is necessary to move the closure along the road the shadow vehicle at the end to be extended may reverse when no traffic is approaching that end placing cones on that side from the vehicle. The cones on the opposite side may be extended at the same time on foot from within the closure.
7. As the paint dries, cones should be removed by the other shadow vehicle driving forward.
8. N.B. where a right turn bay is being marked, this should be closed and when complete reopened as a single operation.
9. Whilst the bay is closed any turning traffic should be directed around the operation by the informed worker as detailed in 2 above.

8.7.4 Pedestrian crossings

More than 8 metres wide

1. Where a continuous crossing has a width of at least 8 metres to either a centre line, flush median or physical island between opposing flows the marking operation can be undertaken in two separate halves using the layouts detailed below:
 - a. Left side
 - b. Right side
2. These must be installed and removed in accordance with the requirements for miscellaneous edge markings above.
3. All marking is to take place inside the working area with no compromise of safety zones permitted.
4. Pedestrians are to be managed using an informed worker in accordance with clause ??
5. Once one side is complete the closure is to be removed and re established as a separate operation on the opposite side.

Less than 8 metres wide

1. Where a continuous crossing has a width of less than 8 metres to either a centre line, flush median or physical island between opposing flows the marking operation must be undertaken using a single lane with MTCs controlling traffic and pedestrian movements in accordance with clause **Error! Reference source not found.**
2. For access ways and local roads, the appropriate TMDs may be used where applicable. Where there is no applicable TMD available, a site specific layout is to be used as detailed in Appendix ?? *(to be created)*.
3. For L2 and L2HD roads, site specific layouts are to be used as detailed in Appendix ?? *(to be created)*.
4. Once one side is complete, the operation may change sides by stopping traffic on all approaches and moving tapers to close the opposite side of the crossing.

5. The central part of the crossing which would otherwise encroach into the lateral safety zones or live lanes for either configuration is to be remarked with all paddles showing stop. The timing of this phase of the operation is to be such that queuing traffic does not extend beyond the RG4-30 signs on all approaches.

8.7.5 **Reflectorised raised pavement marking (RRPM)**

1. Where these occur in a Type B road marking area, they will either be installed as a component of the type B marking operation or using the same closure details.
2. Where these are installed Type A road marking area, they will either be installed in accordance with the diagrams below
 - a. *two lane two way carriageway edge line.*
 - b. *two lane two way carriageway centre line.*
 - c. *two lane two way carriageway double yellow line.*
 - d. *two lane two way carriageway flush median edge line.*
 - e. *four lane two way carriageway lane line.*
 - f. *six lane two way carriageway lane 2/3 line.*
 - g. *four lane one way carriageway lane 2/3 line.*
 - h. *five lane one way carriageway lane 3/4 line.*