

5 Providing for works

5.1 General

When developing a TMP, it is important to consider the impact of the works and its management within the road corridor. This includes the operation of traffic control and works vehicles and activity specific considerations that need to be made.

5.2 Providing safe movements for works traffic

5.2.1 General

In addition to the requirements outlined in, Section 4 Inputs to a Traffic Management Plan planning must also be undertaken to determine the management of works traffic within and around the work site. In particular, the vehicle entry to and exit from the site, and their movements on the road network surrounding the work site, to ensure the safety of workers and road users while maintaining the service provided by the road network.

For the purposes of this document, works traffic is any light or heavy vehicle associated with the undertaking of the work being performed, and includes, but is not limited to:

- Work trucks or utes carrying crews, signage or equipment;
- Haulage trucks delivering or receiving plant, materials or goods; and
- Any light vehicle attending site that is associated with the work.

When planning and designing for works traffic the following core principles must be considered and applied:

- **Safety**—providing safe movements within and around site for construction works vehicles while not increasing the risk to the general traffic.
- **Efficiency**—ensuring access to construction sites does not impede traffic flows and is designed and managed to minimise impact on traffic efficiency.
- **Consistency**—ensuring consistent and uniform access treatments are applied, so that the message conveyed to road users is consistent.

Safe movement for works traffic must be provided such that vehicles can safely manoeuvre:

- **To and from the site**—ensuring safe access and egress from or into live lanes of traffic; and
- **Around the site**—ensuring safe travel paths are available for access to ancillary and off site turn at work areas such as depots, stockpile sites, quarries and gravel pits.

The impact of works traffic or any associated TTM measures on general road users must be considered.

All vehicles on a work site must have the ability to warn workers of the potential hazard of reversing vehicles. This includes clearly audible and working reversing alarm and lights.

5.2.2 Vehicle movement plans

A vehicle movement plan (VMP) is a document or diagram showing the safe travel paths for works traffic and may include details of safe entry, drive through, exit or navigation around the site. A VMP must be developed if any of the following applies:

- Vehicles will be entering or leaving from a high speed road with an existing permanent speed limit of greater than 75 km/h;

- Vehicles will be entering or leaving from a divided carriageway;
- Where site access constraints require complex manoeuvres on-site;
- Where site access constraints require off-site location movements to turn around;
- Where repetitive movements of plant (greater than 20 per day) are present;
- Where plant on-site may travel faster than 35 km/h;
- Where plant may reverse long distances (greater than 100 m) without the protection of temporary safety barriers; or
- Where specific hazards to vulnerable road users are identified from plant carrying out the work on-site.

A VMP should be developed using the considerations provided in [Table 5-1](#).

Table 5-1. Key considerations for the movement of vehicles

Key consideration	Details
Existing traffic conditions	Hourly traffic flows (including peak hour), traffic speed (85th percentile) and traffic composition (i.e. light vs heavy) will influence the road capacity to accommodate works vehicle movements. Possible source of data is the Transport Traffic Volume Viewer .
Site access	The site environment and constraints will influence the type of access that can be provided and the vehicle movements that can be accommodated.
Expected works traffic movements	The number of works vehicle movements, class of works vehicles (light vs heavy vehicles) and the origin/ destination of works vehicles.
Speed zone	The roadwork speed zone will influence the type and design of the site access and whether additional control measures are required to operate the access. Consideration needs to be given to balancing site access requirements for works traffic with the need to minimise the delay for to general traffic.

When developing works traffic VMP, the project manager or other person as nominated by divisional requirements must:

- Ensure that satisfactory arrangements are planned and implemented for vehicles associated with works;
- Ensure a VMP is developed that provides for safe access to, from and around the worksite; and
- Approve and make available a VMP before work begins.

Where a VMP identifies the installation of additional TTM on the road network, a PWZTMP qualified person must approve the relevant VMP and supporting TGSs.

For long-term, high risk or complex works, multiple VMPs may be needed for a project, and should reflect project staging and work areas. Preparation of a VMP must consider the whole of route for significant suppliers and haul requirements (i.e. from quarries, or through town sites for girder delivery, for example). Subject matter experts in road design or traffic engineering should be consulted to determine the safest and most appropriate treatments.

All drivers of vehicles at work sites are responsible for driving safely and in accordance with the road rules, exercising care and working in accordance with VMPs. Care must be taken by all drivers at work sites when entering and leaving traffic streams and turning at work sites. Contractors and agents of Transport should adopt the principles contained in Transport’s [Safe Driving Policy](#).

Although this Section of the Technical Manual details the requirements for VMPs associated with access *to* and *around* a work site, it does not specify the requirement for the development of a VMP *through* a work site to ensure the separation of workers and plant. For information relating to the management of the risk of workers on foot and separation of plant and workers see the Transport WHS procedures for [Working with Mobile Plant](#).

5.2.3 Access to and from the work site

5.2.3.1 General

When developing a TMP, site accesses must be identified and designed in accordance with Austroads [Guide to Road Design](#) and Austroads [Guide to Traffic Management](#). Work sites may be accessed through the options provided in [Table 5-2](#), depending on the location of the works.

Table 5-2. Site access options

Access type	Description
Access via local roads	The use of the existing road network to access construction site off local roads, where generally the safety and traffic risks are lower. A safety assessment of the proposed route should be undertaken as upgrade work and stakeholder consultation may be required.
Left in/left out only	Utilising existing road treatments (roundabout, U-turn bay, alternate route) or designated acceleration and deceleration lanes to provide left only movements to and from site. This requires planning for works vehicles to turn around, when on the road network. This option minimises impact to existing traffic flow while also minimising the safety risks for turning construction vehicles. This may require widening of existing pavement, utilising existing shoulders, narrowing of the existing travel lane, or a combination of these. The design should be prepared in accordance with normal design practice and subject to a Road Safety Audit.
Restricted / separated access	To maintain safe and efficient access, turn movements may be separated or restricted (e.g. no right turn out movements).
Full access	All movements in and out of the site are provided at one intersection. The safety and efficiency impacts should be considered.
Dedicated access	Dedicated work site accesses, such as auxiliary lanes must be designed by a suitably qualified and experienced road designer. Auxiliary lanes are also used to eliminate the need to stop traffic for work site vehicles to enter or exit the site, thus removing the need for traffic controllers and reducing the risk of rear end collisions. Dedicated work site accesses should always be located and designed using the same principles and technical guidance as a permanent treatment.

When planning and designing a work site access, [Table 5-3](#) must be referenced as part of the traffic management planning and risk assessment process.

Table 5-3. Planning and designing for work site access

Consideration	Detail
Existing traffic conditions	<p>Review TMP data or collect recent data to understand existing traffic conditions and to support evidence based decision making. Data may include:</p> <ul style="list-style-type: none"> • Traffic volumes (daily and hourly peak) including the number of heavy vehicles; • Speed data; • Crash history; • Vulnerable road user volumes and desire lines; and • Public transport (i.e. bus routes and frequency).
Site environment/constraints	<p>Consider site specific constraints such as:</p> <ul style="list-style-type: none"> • Existing lane widths; • Shoulder widths; • Horizontal and vertical alignment; • Existing public road intersections and private property accesses; • Pavement type and condition; and • Road furniture (e.g. barriers, poles, gantries).
Construction traffic	<p>Estimated construction traffic movements into and out of the work site (light and heavy vehicles). Origin and destinations of these vehicles and the turning movements at each access point should also be considered.</p>
Speed zone	<p>The roadwork speed zone will influence the type and design of the site access based on fundamental design considerations. When determining whether a reduced speed zone is required consideration needs to be given to balancing the site access requirements with the need to minimise the delay/increased travel time to non-construction traffic.</p>
Positioning of site access gates	<p>Positioned along the road length where sight distance is adequate and can operate unattended without the need for traffic controllers. See Section 4.3.6 Sight distances</p>
Design vehicles	<p>Appropriate turn paths, lane widths and auxiliary lane lengths must be provided as the size and type of work traffic will influence the access design.</p>
Median crossovers	<p>Median crossovers must only be used by work traffic as a predetermined work site access point when the sight distances detailed in Section 4.3.6 Sight distances are met.</p> <p>Any use of a median crossover for median work site access must be consulted with the relevant traffic management centre and be documented as part of the work site TMP, TGS and VMP.</p>

As part of the risk assessment and design process, additional site specific risks may be identified that warrant the provision of auxiliary lanes beyond the normal design requirements.

5.2.3.2 Designing site access on multi-lane roads or high speed environments

Work site vehicles entering and leaving through traffic lanes from a multi-lane road can represent a significant hazard for both road workers and road users, particularly in a high speed, high traffic volume road environment. To mitigate this potential risk, Transport has developed a standard all work site access treatment to be adopted for work sites on motorways which provides a clear and consistent message for road users driving through roadwork sites in NSW. The treatment may be adapted for access in the near or offside shoulders.

The delineation and sign posting of the standard work site treatment shown in *Figure 5-1* must be adopted at the roads and localities given in *Table 5-4* and designed in accordance with this Technical Manual, with reference to AS 1742.2, the Transport [Delineation guide](#) and relevant linemarking specifications.

Table 5-4. Road names and route numbers for applicable to auxiliary lane provisions

State road name	Route number	Locality
Pacific Motorway	M1	Wahroonga to Beresfield
Princes Motorway	M1	Waterfall to Yallah
Eastern Distributor	M1	Entire
Western Distributor	A4	Entire
Hume Motorway	M31	Casula to Sutton Forrest
Hunter Expressway	M15	Entire
Westlink	M7	Entire
Western Motorway	M4	Entire
The Hills Motorway	M2	Entire
South Western Motorway	M5	Entire
NorthConnex	No route number	Entire
WestConnex	M8, M5, M4	Entire
Lane Cove Tunnel	A1, M2	Entire
Sydney Harbour Tunnel	M1	Entire
Sydney Harbour Bridge	No route number	Entire

The work site access treatment shown in *Figure 5-1* should also be adopted on high speed, high volume roads. The treatment may also be used in other situations where the road environment and/or other site-specific risks require a higher level of site access control.

When designing these accesses, clear and uninterrupted travel lanes should be maintained for motorists travelling past the work site. As such, retroreflective markers should not be used in the shoulders for the specific use of guiding work vehicles into or out of a work site. All work site acceleration and deceleration lanes must be designed by a qualified road designer in accordance with Austroads *Guide to Road Design*, unless specific requirements or distances are specified in this Technical Manual.

When used, the following provisions apply:

- All yellow linemarking and diagonal chevron markings must—
 - Be Golden Yellow colour Y14 in accordance with QA spec R145 Pavement Marking (Performance Based) and AS 2700;
 - Not have any retroreflective pavement markers; and
 - Have dimensions, spacing and angles in accordance with *Figure 5-2*.
- For the ingress, a Yellow C1 (broken) line marking should be installed on the outside of an edge line to delineate the diverge area of the travel lane and where vehicles enter the work site (i.e. work site deceleration lane). Refer to *Table 5-5* for the length of the C1 line;
- The Golden Yellow (Y14) diagonal markings are an alternative delineation method and a higher control to a Yellow C1 line. The diagonal markings should be used when:

- The pavement surface in this location is not the permanent pavement surface after the works are completed; and
- An unacceptable risk is present for public vehicles to enter the work site, or a high risk of vehicles stopping or in the shoulder. Increased risk occurs in poor vertical or horizontal alignment, high speed road, road furniture and vegetation, etc.

Note: *In such cases, Golden Yellow (Y14) diagonal markings in the shoulder should be installed for a length of at least the diverge length and may extend further. Refer to [Table 5-5](#) for minimum length of diagonal markings.*

- For the egress, a white continuity C1 (broken) line must be installed where the merge taper is located on the work site acceleration lane, to delineate for vehicles exiting the lane to merge and give way to through traffic. Refer to [Table 5-5](#) for length of C1 line;
- A minimum of 3 yellow angled pavement arrow markings (ARU5), spaced in accordance with [Table 5-5](#), must be placed in merge taper of the work site access acceleration lane, to indicate to road users of merging works traffic. The middle arrow must be located at the commencement of the C1 line;
- A NO ENTRY (R2-4n) sign with a CONSTRUCTION VEHICLES EXCEPTED (R9-203-1) supplementary plate must be installed at the commencement of the work site deceleration lane diverge taper;
- A Trucks symbolic (W5–22 or T2-25) sign must be installed at D and 2D in advance of the commencement of the work site deceleration lane diverge taper. A supplementary plate ‘___m ON RIGHT (or LEFT)’ (W8-207n) must accompany the first sign at 2D; and
- A Trucks symbolic (W5–22 or T2-25) sign must be installed with relevant supplementary plates ‘MERGING’ at D and ‘___m ON RIGHT (or LEFT)’ (W8-207n) at 2D in advance of the commencement of the work site diverge area (white C1 line). The spacing of these may be lengthened to suit any existing or temporary barriers or road furniture.

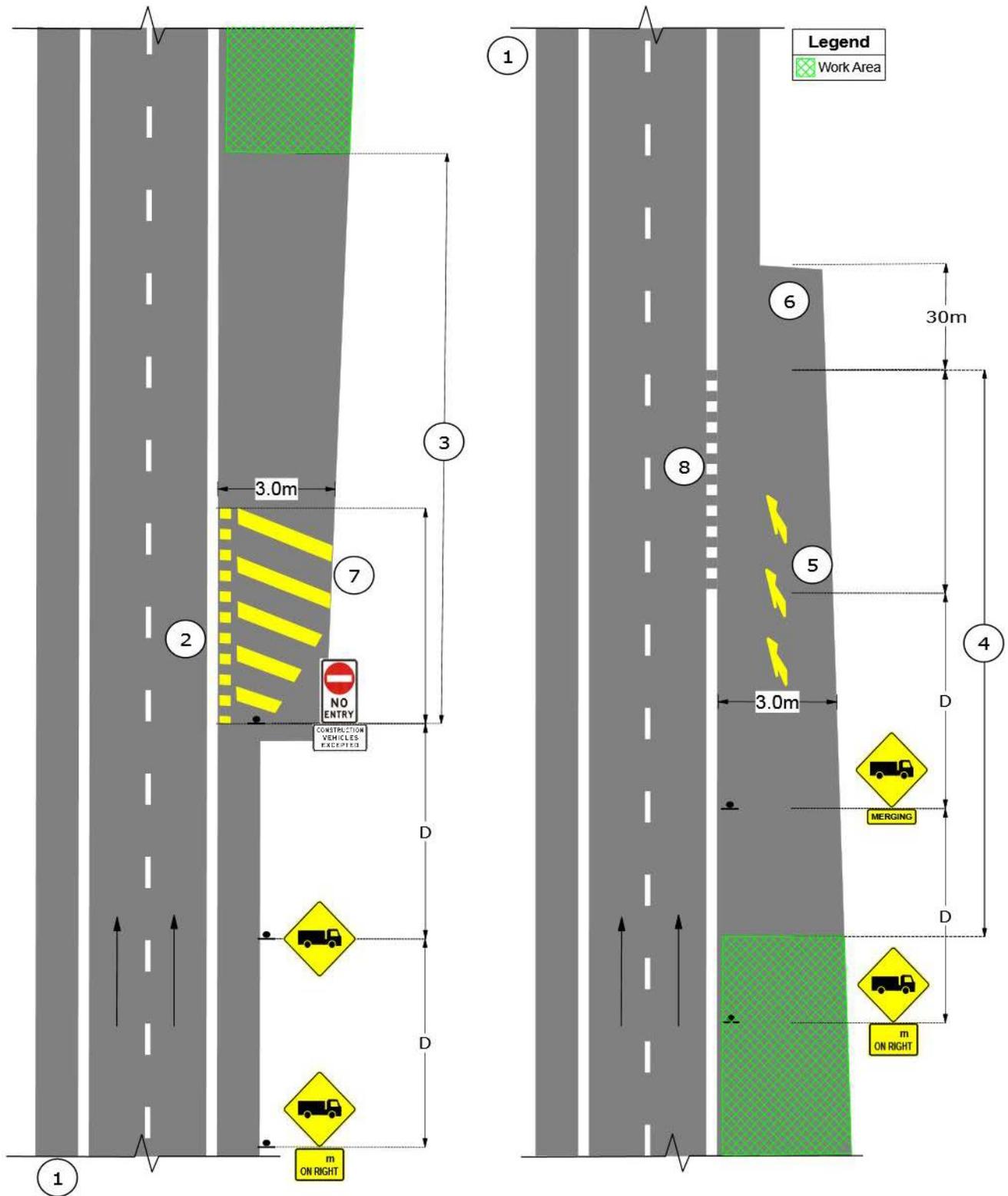


Figure 5-1. Concept layout for a deceleration and acceleration lane into a work area located in an 80 km/h zone in the median of a dual carriageway

Notes to Figure 5-1:

1. Additional temporary traffic management signage may be required subject to the risk assessment;
2. Length of yellow C1 (unbroken) line is as per [Table 5-5](#);
3. Deceleration length (or diverge length) of work site access deceleration lane to be designed in accordance with Austroads Guide to Road Design Part 4a by a suitably qualified and experienced road designer;
4. Length of acceleration lane for work site access to be designed in accordance with Austroads Guide to Road Design Part 4a by a suitably qualified and experienced road designer;
5. Yellow angled pavement arrow markings (ARU5) spaced in accordance with as per [Figure 5-2](#) with middle arrow placed at start of C1 line.
6. Run off area of 30 m x 3 m at end of work site acceleration merge must be included;
7. Yellow (Y14) diagonal markings are an alternate treatment option and higher order control to the yellow C1 (broken line. The dimensions, spacing and width of the diagonal are shown in [Figure 5-2](#) and [Table 5-5](#);
8. White C1 (broken) line is as per [Table 5-5](#)

Table 5-5. Lengths of C1 line and spacing of angled arrow pavement markings

D	Length of Yellow C1 line and diagonal markings (min.)	Length of white C1 line	Spacing of angled arrow pavement markings
60	40 m	138 m	30 m
80	50 m	175 m	40 m
100	62 m	212 m	60 m

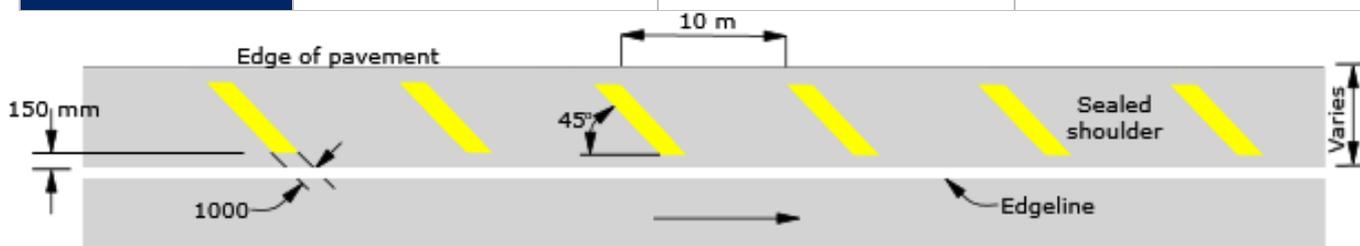


Figure 5-2. Required yellow linemarking and diagonal marking dimensions, spacing and angles

5.2.3.3 Providing for truck movements

Providing for truck movements includes any instance where trucks will be crossing or using a public road to access or leave site.

Care must be exercised when designing traffic control for haul roads that cross public roads. Traffic control for haul roads must be one of the following:

- PTC D;
- Traffic controllers; or
- STOP (R1–1) signs;

Where sight distance is less than 2D, [Table 5-6](#) must be used for determining controls for managing truck movements where auxiliary lanes are not provided, depending on traffic volumes, sight distance, number of truck movements and traffic speed. Where sight distance is greater than 2D, [Table 5-7](#) must be used.

Table 5-6. Providing for truck movements where sight distance is less than 2D

ADT	300 – 1500		More than 1500	
	less than or equal to 20	greater than 20	less than or equal to 20	greater than 20
Number of truck movements per shift				
Traffic control required		Yes	Yes	Yes
VMP required	Yes	Yes	Yes	Yes
Warning signs required during shifts		Yes	Yes ^{Note2*}	Yes

Note 1 to Table 5-6: Where approach speed is greater than 95 km/h every effort should be made to choose turning locations where sight distance exceeds 2D.

Note* 2 to Table 5-6: Not required when approach speed is less than 85 km/h

Table 5-7. Providing for truck movements where sight distance is greater than 2D

ADT	300 – 1500		More than 1500	
	less than or equal to 20	greater than 20	less than or equal to 20	greater than 20
Number of truck movements per shift				
TGS with traffic control		Yes	Yes ^{Note1#}	Yes ^{Note 2*}
VMP required		Yes		Yes
Warning signs required during shifts		Yes		Yes

Note# 1 to Table 5-7: where approach speed is greater than 95 km/h.

Note* 2 to Table 5-7: If acceleration and deceleration cannot occur on shoulders.

In any instance where traffic control is required, then the approach speed of traffic must be reduced to 65 km/h or less as per Section 5.4 Traffic control.

Care must also be taken when vehicles are leaving work areas, to ensure that gravel or mud is not deposited on the through road. The respective environment representative should be consulted for advice regarding management of this risk. Consideration therefore should be given to the use of rumble grids and coarse gravel layers or hosing to clean the vehicles before they enter or cross the through road.

5.2.4 Access around the site

Locations for turning vehicles associated with the work across lanes carrying traffic, must be restricted to predetermined locations. The following relevant factors should be considered when selecting these locations:

- Sight distance;
- Grades;

- Volumes and approach speeds of through traffic; and
- Areas clear of traffic lanes for accelerating and decelerating.

Where roadworks generate truck turning movements remote from work sites, temporary warning signs should be used at the approaches to the points of access on through roads. This is particularly important where there might be little or no other indication of likely vehicle turning movements, for example at roadside stockpile sites or via accesses to private property. Where this occurs, the Trucks symbolic (W5–22 or T2-25) sign should be used, which may be supplemented by the ON LEFT/RIGHT (W8-207) (L) or (R) signs.

If installed, all signs must be displayed before the haulage operations begin, and removed or covered at the end of each shift.

When planning for movement of work traffic, the movements described in [Table 5-8](#) are restricted.

Table 5-8. Work site vehicle restricted movements

Movement	Conditions
U-turns	<p>Work vehicles must not perform single movement U–turns across lanes carrying traffic, unless—</p> <ul style="list-style-type: none"> • Safe intersection sight distance is achieved. The safe intersection sight distance must be determined in consultation with a technical specialist from Traffic Engineering Services or Road Design and based on the principles of the Austroads <i>Guide to Road Design</i>; or • Traffic is being controlled. <p>If single movement U-turns are required, this must be documented in the TMP, site specific risk assessment and detailed on the relevant TGS.</p> <p>The above permissions do not apply for illegal manoeuvres, such as U–turns across unbroken centre-lines.</p>
Median crossovers	<p>Median crossovers are designed for the purpose of providing access from one carriageway to another under specific controlled conditions*. For Transport work site related vehicles, median crossovers must not be used as a point of U-turn unless the following conditions are met:</p> <ul style="list-style-type: none"> • A risk assessment has been completed for each cross over; • Sight distances detailed in Section 4.3.6 Sight distances; and • Use has been consulted with the relevant traffic management centre and be documented as part of the work site TMP, TGS and VMP. <p>Where it is determined that crossovers provide a safe alternative to work site manoeuvres for a particular corridor, this must be risk assessed and documented in accordance with Section 2.8 Departures from this Technical Manual.</p>
Reversing movements	<p>Work vehicles must not reverse (including 3-point U-turns) in lanes carrying traffic, unless—</p> <ul style="list-style-type: none"> • Traffic is being controlled by a PTCO or traffic controllers; or • The approach sight distance exceeds 6D i.e. 20 seconds of travel time.

Note* to Table 5-8: Emergency vehicles such as police service, ambulance service and fire brigade as well as NRMA and nominated Transport emergency response vehicles are permitted to use the median crossover to make a U-turn, provided it is performed in accordance with the relevant organisational safety requirements.

5.2.5 Access to adjoining properties

Pedestrian and vehicle access to adjoining properties must be maintained, unless clear agreement has been reached with the occupants for a temporary restriction. Effective communication with residents must be conducted for the work to be carried out safely and efficiently.

Temporary access to adjacent side streets and properties must be trafficable under all expected weather conditions and must be constructed to reasonable standards matching the side streets and property driveways. If conditions of access cannot be maintained other arrangements must be made for those forms of movement (i.e. wheelchair, bicycle, etc.).

5.3 Work site specific requirements

5.3.1 Traffic incident management

A TMP must include a traffic incident plan. The following is a list of recommended inclusions in a traffic incident plan:

- Names and contact details of nominated personnel responsible for dealing with traffic incidents occurring at the work site;
- Contact details of the person responsible for the works, TMC operation representative, police, and emergency services representatives (where appropriate);
- Procedure to be followed in the event of a traffic incident at the site;
- List of plant that will be available for moving portable concrete safety barriers (if in use on-site);
- Inventory of safety barriers, signs etc. and their storage location(s) that will be available to replace damaged barriers in event of a traffic accident (if in use on-site);
- Procedure for carrying out investigations of traffic incidents involving members of the public or workers. This should include:
 - Checking that the traffic control measures in place are in accordance with the TMP and its component plans, and ROL conditions;
 - Carrying out a “drive through” and video recording of the roadway, including the location where the incident has taken place;
- Information required for initial notification to the person responsible for the works, and where necessary, other relevant authorities; and
- Format for reporting and communication of the results of traffic incident investigations, and lessons learned.

5.3.2 Working at intersections

Intersections vary greatly in type, number of legs, number of traffic lanes and forms of traffic control. Due to the complex nature of working at intersections, the following principles should be considered when developing a TMP that requires work at these locations:

- Sufficient capacity should be maintained, and delays should be kept to acceptable levels, for example, excess capacity should be avoided which encourages high speeds;
- Blockages at the intersection from downstream queuing should be avoided;
- Provision for alternative routes should be made if right hand turns or other movements are temporarily prohibited at the intersection;

- Work periods should be restricted to outside peak traffic flows if the intersection is a critical one within the road network;
- Work areas should be clearly defined so that road users can easily identify paths available for traffic within the intersection;
- Guide signs should be clearly visible and not obstructed by road plant or temporary signs. If necessary they should be relocated; and
- Effective control using signs, traffic signal or controllers, linemarking and delineation should be maintained.

Where distance between intersections is sufficient, standard treatments for the signs and tapers on the approaches must be used. Within the intersection, the work usually needs to be staged so that sufficient lanes are kept open to handle the traffic flows. These stages of the work must be clearly defined using closely spaced traffic cones or temporary barriers. An audit should be undertaken on all temporary works arrangements, prior to a traffic switch or similar being implemented at intersections. If the works are to be in place during night hours, the audit should also be done at night to ensure appropriate delineation is in place.

5.3.3 Working at or close to traffic signals

A need to work at or near traffic signals may arise for a variety of reasons including operation and maintenance of equipment, emergency fault repairs, pavement resurfacing or linemarking.

When planning works that involve or impact traffic signals the following should be considered:

- Consultation with police where major or complex traffic signals will need to be flashed yellow or blacked out;
- Where permanent traffic signal are still in operation, alternative traffic control arrangements, such as a PTCB or a traffic controller with a manual STOP/SLOW bat must not be used to control traffic;
- Determine if turn restrictions or detours are necessary and:
 - Check that alternative routes are available and satisfactory for all classes of vehicle being detoured;
 - Consider the impact that additional traffic will have on the operation (phasing) of any traffic signals on the alternative route;
 - Consider the impact that any lane closures, particularly turn lanes will have on signal operation (phasing) and intersection efficiency.
- Where there are likely to be significant impacts on the operation of traffic signals or coordination between signals engage with Transport Network Operations for advice and mitigation measures;
- Notification to road users in advance of proposed works of impact to the signals. This may be by way of advertising, for example using VMS roadside noticeboard advertising, letter drops or press releases; and
- Ensure that adequate provision is made for pedestrians and mobility aid users if it is necessary to turn off pedestrian signals or close a pedestrian crossing at intersection traffic signals.

This variety of works means that the scale and complexity of the TTM required to facilitate the work activities will also vary significantly. When determining TGS requirements, [Section 7.7.4.2 Working at traffic signals](#) must be followed.

5.3.4 Working in the vicinity of railway lines

The safety procedures provided in this Section must be applied whenever work is carried out in or adjacent to the rail corridor (refer to the [Rail Safety National Law National Regulations](#) and the [Work Health and Safety Act 2011](#) for additional requirements).

For the purposes of this Section, the terms and definitions of *Table 5-9* apply.

Table 5-9. Terms and definitions applicable to working in the vicinity of railway lines

Term	Definition
Danger zone	everywhere within 3 m horizontally from the nearest rail and any distance above or below these 3 m
Protection officer	authorised qualified worker responsible for managing the rail safety component of work site protection
Rail corridor	area within rail boundary fence lines, or if there are no fences, everywhere within 15 m of the outer most rails and includes rail tracks, rail junctions, level crossings, station buildings, platforms, signal boxes, tunnels, bridges and other associated structures
Rail Infrastructure Manager	owner and maintainer of the rail network
Rail traffic	trains and all other on-track vehicles

When working in or adjacent to the rail corridor, the rail owner and the relevant rail infrastructure manager should be consulted early during development of the TMP and risk assessment, to ensure all constraints, risks and requirements are identified and mitigated. This includes the completion of an Access Application Form (and requires at least 20 working days for processing).

If the situation is such that any person, plant or equipment are required to be within the rail corridor, then the manager authorising the work must ensure that the rail infrastructure manager is advised and arrangements are made for the provision of a protection officer to ensure the safe interaction between the work and the rail network. The rail infrastructure manager must also be notified if the work affects or has the potential to impact the railway line or rail structures. This includes travel to and from the work site within the rail corridor ensuring vehicle and personnel remain outside the Danger Zone.

When performing work where a protection officer is required, all workers must follow the instructions of the protection officer and work must not be carried out without the presence of the protection officer.

The supervisor in charge of the site must ensure that:

- All workers understand the need to follow instructions of the protection officer;
- All workers must wear approved rail standard safety vests and other personal protective equipment as required by the rail infrastructure manager;
- Where required, arrangements are made with the rail infrastructure manager to provide persons with applicable rail safety awareness training; and
- Work must not be carried out within the danger zone when the protection officer is off-site.

Notwithstanding the fact that the manager authorising the work may be satisfied that there is a physical barrier of solid construction that prevents persons or their equipment from coming into contact with rail traffic or overhead wiring, the manager must still notify the rail infrastructure manager of the work and comply with the its requirements.

In the event that the physical barrier becomes dismantled or damaged in such a way as to allow the possibility of persons coming into contact with rail traffic or overhead wiring, then the supervisor must stop

all work on-site and notify the rail infrastructure manager so that the barrier can be re-established or the situation reviewed.

Persons on-site must not damage or attempt in any way to overcome a physical barrier.

5.3.5 Working at night or in low visibility

When working in any poorly lit situations, such as during periods of fog or working in tunnels, a TGS must specify the requirements and details provided in [Table 5-10](#). For night works in particular, it should be noted that;

- Obstacles are less conspicuous and peripheral vision is reduced; and
- There is a higher risk of motorists being fatigued, alcohol-impaired or driving at higher speeds.

Table 5-10. TGS requirements for sites with poor visibility

Requirement	Details
The work site has appropriate flood lighting	PTCDs or traffic controllers with STOP/SLOW bats at the approaches to a night time work area must be clearly visible to road users. This may require additional lighting. The ITCP, works supervisor or team leader must check floodlighting at work sites to ensure that floodlights do not adversely affect road users, adjacent dwellings or businesses. These checks must be made by driving around, past and through the work site in all directions of travel. On divided carriageway roads, these checks must be carried out from all carriageways, even if the work area is only on one carriageway.
Additional signs and devices	On high speed, high volume roads and on busy roads in built-up areas, flashing arrow signs must be used at night. Care must be taken to ensure that the dimming facility is operating correctly. It is recommended that back-up units are made available on critical works. Only type-approved flashing arrow signs must be used in NSW. For information and approval requirements, see Section 6.9.2 Illuminated flashing arrow signs .
Delineation in accordance with AS 1742.3.	The standard ROADWORK AHEAD (T1-1), Worker symbolic (T1-5) and Traffic Controller symbolic (T1-34) signs must be used for night works. All signs must be manufactured with Class 400 or Class 400T (retroreflective) yellow sheeting. As of 30 June 2020 the NIGHT ROADWORK AHEAD (T1- 223), Worker symbolic (T1-224 and T1-5-2) and Traffic Controller symbolic (T1-200-2 and T1-200-3) must not be used.
All personnel on the site wear approved high visibility clothing	In addition to traffic controllers, all personnel working at night must wear approved high-visibility external clothing, including wet weather clothing, in accordance with Transport’s current Personal Protective Equipment Procedure . PPE must be clean and bright. Additional PPE such as hearing, eye and foot protection must also be worn as required by the relevant SWMS and in accordance with Transport’s current Personal Protective Equipment Procedure .

5.4 Traffic control

5.4.1 General

Traffic control must be used if road users will be directed to disobey a traffic regulation, such as crossing a barrier line.

In instances of inclement weather where visibility and skid resistance is compromised, traffic control should not be used, or additional controls may be required to ensure the safety of road workers and road users. Prior to installation of traffic control, a contingency plan should be developed to determine the actions and controls that are required in the instance of inclement weather, such as rain.

At any point of traffic control, four cones must be placed at 4 m spacing on the centre line, edge line or both, prior to the traffic control point. Traffic cones are used to highlight the traffic control position, where vehicles are to stop and for traffic management purposes.

5.4.2 Traffic control types

For all work sites requiring traffic control, a PTCD must be used when the existing permanent speed limit is above 45 km/h. This requirement is not applicable to instances and environments of emergency response.

A manual traffic controller may be used provided all of the following conditions are met:

- The use of a PTCD is demonstrated to not achieve the safest outcome;
- The decision to use a manual traffic controller instead of a PTCD is documented in the TMP or supporting risk assessment; and
- Approval is granted by the one-up manager of the PWZTMP qualified person responsible for the works relevant TMP.

Under the Road Transport Act 2013 a person must not install or display a prescribed traffic control device on, above or near a road without appropriate authority. All traffic control devices, including road markings, traffic signals, or any other device used to direct or warn traffic at a roadwork site must be accepted for use in accordance with this Technical Manual.

Devices detailed in this Technical Manual and the relevant specifications where required, provide the authorisation and conditions for use by which those devices can be installed on a Transport work site. Only approved PTCDs detailed in Section 6.6 Portable traffic control devices (PTCDs) must be used.

Any device that is not accepted for use in this Technical Manual must not be used unless the conditions in Section 2.8.3 Use of unaccepted devices have been met or approval has been obtained by a person with appropriate authority under Part 11 of the Transport Delegations.

5.4.3 Requirements for traffic controllers

Table 5-11 provides the general requirements that must be applied when a traffic controller is used, including the use of a PTCD.

Table 5-11. General requirements for the use of a traffic controller

Aspect	Requirements
Training	Traffic controllers must be trained in their duties and verified as competent. At a minimum, traffic controllers must have the ‘Traffic Controller’ qualification and be deemed competent in the use of the relevant PTCD or STOP/SLOW bat.
Identification	All traffic controllers performing traffic control work must be identified as such. This must be by wearing a badge or other distinguishing mark clearly stating “traffic controller”. Reference to Transport (or RMS/RTA) is not permitted unless the traffic controller is an employee of Transport.
Fitness for duty	Traffic controllers must be fit for duty when reporting for work and remain so during working hours (including breaks and travel time). Traffic controllers must comply with the drug and alcohol procedure in place at their work site.

Aspect	Requirements
Equipment	Traffic controllers must only control traffic using an accepted traffic control device as per this Technical Manual.
Approach speed	Where traffic control is used, the speed limit applied to approaching traffic must be reduced to less than 65 km/h.
Visibility	<p>Traffic controllers should be located in a position where the sight distance between them and oncoming traffic is a minimum of 1.5D.</p> <p>Locating a traffic controller less than 1.5D from oncoming traffic is permitted when:</p> <ul style="list-style-type: none"> • A site specific risk assessment has been undertaken; • Additional control measures identified in the site specific risk assessment are in place; and • It has been documented in the relevant TMP and TGS.
Positioning	<p>A traffic controller must be positioned:</p> <ul style="list-style-type: none"> • Outside the travel path of traffic; • Facing the traffic; • Where a clear and safe escape path is available; • So their body is adequately illuminated by installed lighting when working at night or in low visibility; and • Such that they do not obstruct motorists' view of other signs and devices, or be hidden by them. <p>A traffic controller must not leave their position (control point) unless directed by the ICTP qualified person, equivalent person responsible for site, or upon relief by another traffic controller.</p>
Communication	<p>Traffic controllers must ensure that they are able to communicate effectively to other nominated members of the work crew, such as other traffic controllers or plant operators. Communication may be via:</p> <ul style="list-style-type: none"> • Direct verbal communication; • Verbal communication via a two way radio; or • Through an intermediate person. <p>The use of verbal communication either directly or via a two way radio is the preferred means of communication between traffic controllers. The use of a two way radio is essential if clear sight between operators is not available, are located an extended distance apart, or they are working at night.</p>
Signage	<p>A PTC sign relevant to the device used, such as Boom Barrier symbolic (T1-272n) or Signals symbolic sign (T1-30), or a Traffic Controller symbolic sign (T1-34) must be used to give advance warning of the presence of traffic control.</p> <p>A PREPARE TO STOP (T1-18) sign must also be used when traffic is required to stop traffic at the traffic control location.</p> <p>The above signs must only be used when the traffic control is in operation and must be removed or covered up when traffic control is discontinued or during breaks, such as lunch.</p>
Period of duty	Traffic controllers must be relieved every two hours of work. They may return to traffic control duties after a minimum of 15 minutes, having either rested or placed on other duties. This also applies to traffic controllers operating a PTC.
PPE	Traffic controllers must wear all relevant PPE for their works as required by their employer. At a minimum, these requirements must meet the standard set by the Transport Personal Protective Equipment Procedure PN066P19

Aspect	Requirements
Performing duties	<p>When performing their duties traffic controllers must:</p> <ul style="list-style-type: none"> • Check that the appropriate signage has been installed or uncovered by the ITCP qualified person, prior to undertaking traffic control duties; • Remain focussed on their traffic control duties and be aware of the roadworks; • Report adverse driving behaviour from motorists in accordance with Section 8.3 Reporting work site incidents; and • Remain courteous at all times in dealing with the public. <p>Traffic controllers must not:</p> <ul style="list-style-type: none"> • Use any electronic device, including a mobile phone, unless required for communication with other traffic controllers or their team supervisor; or • Allow persons to stand near or gather around the PTCD or STOP/SLOW bat, which can cause distraction or create confusion for the travelling public.

5.4.4 Additional requirements for the use of a STOP/SLOW bat

If a manual traffic controller has been justified and approved in the TMP, the manual traffic controller must only be in place when traffic speeds have been reduced to less than 65 km/h in accordance with [Section 5.4 Traffic control](#). A traffic controller must:

- Only use approved hand signals shown in [Table 5-12](#) to direct traffic when using a STOP/SLOW bat;
- Only control one lane of traffic, and usually only in one direction;
- Be clearly visible to traffic at all times. This may require the traffic controller to reposition after the first vehicle has stopped in order to be visible to queuing traffic;
- Stay at the head of the traffic queue at a safe distance from the opposing traffic lane; and
- Stand clear of traffic when allowing it to proceed.

An illuminated wand may be used to supplement the STOP/SLOW bat during night works or when visibility is limited.

Table 5-12. Traffic controller hand signals

Traffic direction	Action	Illustration
From Slow to Stop: stop traffic	<ol style="list-style-type: none"> 1. Choose a gap in the traffic flow and/or most appropriate vehicle to stop; 2. Turn the STOP/SLOW bat to STOP; 3. Raise the free arm into the stop signal position with the palm of the hand towards the traffic. 	
From Stop to Slow: allow traffic to proceed	<ol style="list-style-type: none"> 1. Check that all traffic from the other end of the work area has passed; 2. Turn the STOP/SLOW bat to SLOW; 3. Give the proceed signal with a sweeping motion. 	
Slow traffic	<ol style="list-style-type: none"> 1. When the STOP/SLOW bat is showing SLOW extend the free arm to the side and wave hand up and down. 	

5.4.5 Traffic control locations

The traffic control locations must be considered as part of the development of the TMP. When determining the traffic control locations needed for a work site, the following must be considered:

- Type of temporary traffic management;
- Number of approaches to be controlled;
- The way in which traffic is being controlled, including the use of a PTCD;

- Sight distances and factors that impact on this including road geometry and vegetation;
- Expected duration of traffic control;
- Infrastructure such as transit stops, assessed queue lengths for planned stopping duration; and
- Weather conditions (i.e. adverse weather such as extreme heat).

Once the traffic control locations have been determined, the number of traffic controllers required to operate the traffic control devices, or STOP/SLOW bats can be determined.

To determine the number of traffic controllers for operating a traffic control device, see [Section 6.6 Portable traffic control devices \(PTCDs\)](#).

When a traffic controller is utilised for operation of a PTCD or a STOP/SLOW bat, a sight distance of 1.5D must be allowed for.

A traffic controller is not required where all of the following conditions are met (see [Figure 5-3](#)):

- ADT is less than 100 vehicles per day;
- Each entry to the work site is visible from the other end; and
- The work area is shorter than 100 m.

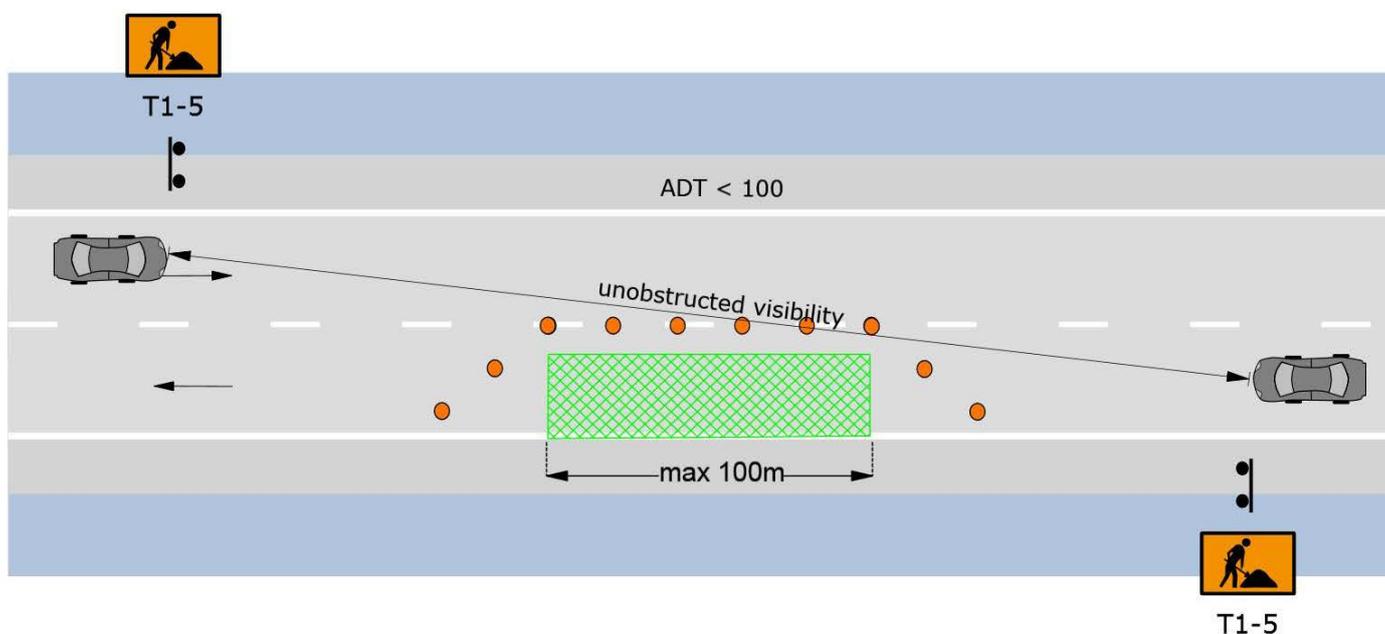


Figure 5-3. No traffic controller required

When manual traffic controller is to be used, the following conditions apply:

- One traffic controller must be in place where:
 - ADT is 500 vehicles or less; and
 - Sight distance from the traffic controller exceeds the minimum in [Table 5-13](#).
- Two traffic controllers must be in place where:
 - ADT is greater than 500 vehicles per day; or
 - The work area is longer than 250 m; or
 - Sight distance from the traffic controller in the obstructed lane to the other approach is less than the minimum provided in [Table 5-13](#).

Table 5-13. Traffic controller minimum sight distances

Approach speed km/h	Length of Work Area (L)	Minimum clear sight distance to oncoming traffic
less than 105	less than 55 m	300 m
less than 105	greater than 55 m	L + 250 m
greater than 105	less than 55 m	400 m
greater than 105	greater than 55 m	L + 350 m

When manual traffic control using STOP/SLOW is selected for a multi-lane carriageway, a merge or merges must be introduced upstream of the traffic controller so that the traffic controller is managing one lane only as per *Figure 5-4*.

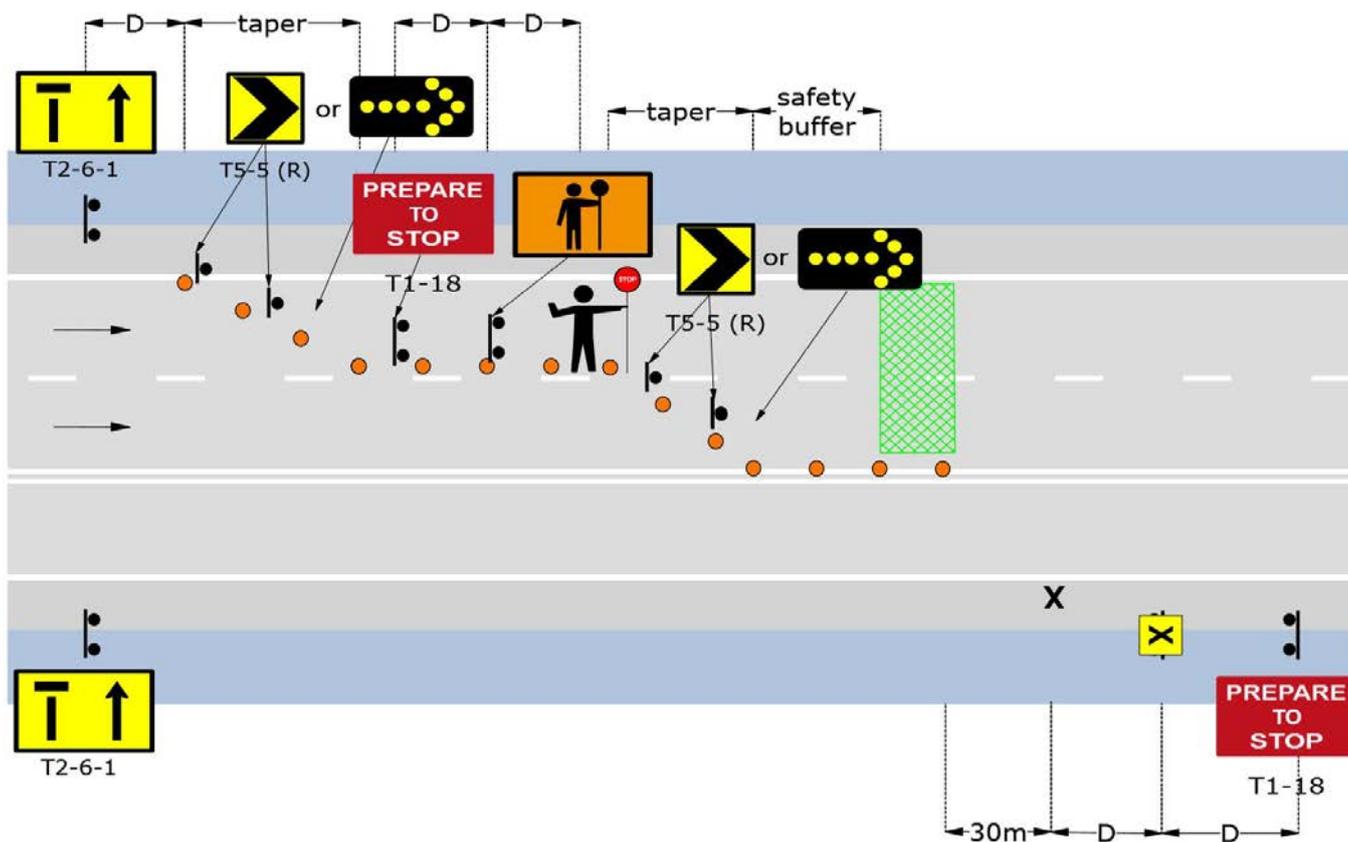


Figure 5-4. Manual traffic controller for multi-lane carriageway