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ROAD MANAGEMENT ACT 2004

WORKSITE SAFETY – TRAFFIC MANAGEMENT

CODE OF PRACTICE

SPECIAL

Road Management Act 2004

NOTICE OF MAKING OF A CODE OF PRACTICE FOR
WORKSITE SAFETY - TRAFFIC MANAGEMENT

I, Peter Batchelor, Minister for Transport, in accordance with section 29 of the **Road Management Act 2004**:

1. publish the Code of Practice for Worksite Safety – Traffic Management, a copy of which is set out below; and

2. give notice that –

   (a) the date of commencement of the Code of Practice is 1 January 2005; and

   (b) copies of the Code of Practice may be obtained from VicRoads Head Office, 60 Denmark Street, Kew.

Dated 9 December 2004

PETER BATCHELOR
Minister for Transport

Note: A copy of the Code of Practice may be viewed on the VicRoads website at www.vicroads.vic.gov.au.

Road Management Act 2004

CODE OF PRACTICE FOR
WORKSITE SAFETY – TRAFFIC MANAGEMENT

I, Peter Batchelor, Minister for Transport, in accordance with section 28 of the **Road Management Act 2004**, make a Code of Practice for Worksite Safety – Traffic Management.

Dated 9 December 2004

PETER BATCHELOR
Minister for Transport

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Road Management Act 2004

CODE OF PRACTICE

WORKSITE SAFETY – TRAFFIC MANAGEMENT

1. Purpose of Code

(1) The purpose of this Code of Practice is to provide practical guidance to any person conducting, or proposing to conduct, any works on a road in Victoria.

(2) This Code is intended to –

(a) establish and maintain a standardised approach to the conduct of works on roads (whether on the roadway or roadside) that protects the safety of road users and persons engaged in the carrying out of such works;

(b) establish a risk based assessment of worksite conditions to enable the identification and implementation of appropriate control measures to ensure a safe worksite;

(c) support the planning for, and management of, traffic to pass safely through, past or around a worksite, including the preparation and implementation of a traffic management plan; and

(d) support the engagement of appropriately trained and qualified persons to carry out the works or direct traffic.

2. Authorising provisions

This Code of Practice ("this Code") is made under section 28 of the Road Management Act 2004 ("the Act").

3. Consultation

In accordance with section 28 of the Act, the Minister consulted relevant road Ministers, relevant utility Ministers, the Utilities' Infrastructure Reference Panel and the Municipal Association of Victoria before this Code was made.

4. Application

(1) This Code applies to any person conducting, or proposing to conduct any works on a highway (being a road or road related area) in accordance with section 99A(1) of the **Road Safety Act 1986**, and to the preparation of traffic management plans for the purpose of conducting works.

(2) This Code commences on the date specified by a notice in the Government Gazette in accordance with section 29 of the Act.

5. Interpretation

(1) Unless the context otherwise requires, terms used in this Code of Practice that are defined in the Act or the **Road Safety Act 1986** will have the same meaning as in these Acts.

(2) Additional terms and definitions in this Code –

"long term" has the meaning as generally defined in the Australian Standard *AS 1742.3 – 2002: Manual of Uniform Traffic Control Devices, Part 3: Traffic Control Devices for Works on Roads*, being works where a traffic management plan "is required to operate both day and night and may be left unattended".

"mobile works" has the meaning as generally used in the Australian Standard *AS 1742.3 – 2002: Manual of Uniform Traffic Control Devices, Part 3: Traffic Control Devices for Works on Roads*, being "works which entail vehicles moving along the roadway continually at a speed significantly lower than other traffic and obstructing or partially obstructing traffic lanes".

"short term" has the meaning as generally defined in the Australian Standard *AS 1742.3 – 2002: Manual of Uniform Traffic Control Devices, Part 3: Traffic Control Devices for Works on Roads*, being works where a traffic management plan "is required only while work personnel are in attendance and … generally limited to the duration of a single shift or lesser period where road conditions are returned to normal when the shift or lesser period ends".

"traffic management plan" means the details of proposals for the management of traffic during the conduct of works on roads (whether on the roadway or roadside). Section 99A(4)(a) of the **Road Safety Act 1986** requires that a traffic management plan "comply with the prescribed requirements" of any relevant Regulations.

"very short term" has the meaning as generally used in the Australian Standard AS 1742.3 – 2002: Manual of Uniform Traffic Control Devices, Part 3: Traffic Control Devices for Works on Roads, being works that take no longer than five minutes to complete.

"worksite" has the meaning as defined in the Australian Standard *AS 1742.3 – 2002: Manual of Uniform Traffic Control Devices, Part 3: Traffic Control Devices for Works on Roads*, being "an area which includes the work area(s) and any additional length of road required for advance signing, tapers, side-tracks, or other areas needed for associated purposes".

(3) Where there is an inconsistency between a provision of this Code and the Australian Standard (or any other document) incorporated into this Code, then the provisions of this Code shall prevail.

(4) References to Australian Standards (or any other documents) that are applied, adopted or incorporated in this Code are references to that Australian Standard (or other document) as amended from time to time.

(5) This Code is to be interpreted in accordance with the **Interpretation of Legislation Act 1984** as if it were a subordinate instrument within the meaning of that Act.

6. Legal effect of the Code

(1) The legal effect of a Code of Practice is set out in section 24(4) and section 27 of the Act.

(2) A Code of Practice is admissible in evidence in any proceeding to which the Act or section 99A of the **Road Safety Act 1986** applies.

PART 1 – WORKSITE SAFETY – TRAFFIC MANAGEMENT

Division 1 – Introduction

7. Preliminary

(1) This Code incorporates the Australian Standard *AS 1742.3–2002: Manual of Uniform Traffic Control Devices, Part 3: Traffic Control Devices for Works on Roads* ("AS 1742.3–2002"). The provisions of AS 1742.3–2002 are varied only to accommodate relevant Victorian legislation or to include particular work practices which have been fully investigated and evaluated. This Code also amplifies some provisions of AS 1742.3–2002 to assist in its application.

(2) It is vital to constantly review the management of traffic (eg. passenger, commercial and public transport vehicles, motorcycles, cyclists, pedestrians and persons with disabilities) in relation to the general principles of this Code. These principles and guidelines have been established in recognition of driver performance factors, information needs, and the safety of workers, and should be observed in planning, designing, installing, operating and removing any traffic management arrangements for works on roads.

(3) Activities on land abutting a road reserve – the requirements of this Code may apply where activities on land abutting a road reserve (eg. civil or commercial construction works, tradesman activities, goods delivery) result in the use of, or restrict the use of, the roadway or roadside.

8. Reference Documents

The documents referenced in this Code are listed in Appendix A.

9. Responsibility for Approval to Conduct Works on Roads

The **Road Management Act 2004** requires any person proposing to carry out works in, on, under or over a road to obtain the consent of the coordinating road authority, except where an exemption applies. Part 2 of Schedule 7 of the Act sets out the powers and responsibilities of the coordinating road authority in considering any such works proposal.

10. Responsibility for Conducting Works on Roads and Traffic Management

(1) The responsible road authority, "infrastructure manager"[1] or "works manager"[2] is responsible for the conduct of the works, the management of traffic, and the safety of all road users and persons engaged in the carrying out of such works in accordance with the **Road Management Act 2004** and section 99A of the **Road Safety Act 1986**.

Note: 1 – 'infrastructure manager' has the same meaning as defined in section 3(1) of the **Road Management Act 2004**, being either "in relation to road infrastructure, the responsible road authority" or "in relation to non-road infrastructure, the person or body that is responsible for the provision, installation, maintenance or operation of the non-road infrastructure" (eg. a State road authority, a municipal council, utility).

Note: 2 – 'works manager' has the same meaning as defined in section 3(1) of the **Road Management Act 2004**, being "any person or body that is responsible for the conduct of works in, on, under or over a road" (eg. a road authority, contractor or sub-contractor for a road authority or utility, a plumber acting alone or as an agent of a utility, a truck driver responsible for the unloading of goods or equipment from a truck parked on the road, a tow truck operator or roadside assistance personnel, workers operating on the roadside, persons responsible for waste bins placed on the road or roadside).

(2) Responsibility for planning, designing, auditing and implementing traffic management plans and signing schemes for works on roads, and conducting the works, should be clearly established and documented in an arrangement between the various parties responsible for the subject works.

(3) The infrastructure manager has the following responsibilities –

(a) clearly define the scope of, and any relevant contractual requirements for, the works.

(b) carry out audit and surveillance on the works manager.

(c) review, as appropriate, what has been provided.

(d) specify management system requirements.

(4) The works manager (being the person or body responsible for the carrying out of the works) has the following responsibilities:

(a) manage traffic at the worksite through the preparation and operation of a traffic management plan.

(b) carry out risk assessments of each worksite or each generic worksite.

(c) obtain any necessary approvals for the works (refer clause 9 of this Code) and/or the use of certain traffic control devices[3] (eg. speed limit signs, portable traffic signals).

(d) manage traffic engineers, road safety auditors and subcontractors.

(e) carry out, where appropriate, compliance audits, road safety audits and surveillance on itself or its subcontractors.

(f) ensure traffic control signs and devices are used for their intended purposes.

Note: 3 – the term 'traffic control device' as used in this Code includes traffic control items under current Regulations.

(g) ensure the minimisation of health and safety risks to others and/or himself/herself.

(h) comply with any relevant contractual requirements.

11. Duty of Care

(1) Section 99A of the **Road Safety Act 1986** requires that any person conducting, or proposing to conduct works on a road "must ensure that the works … are conducted in a manner that is safe for road users and persons engaged in carrying out the works …".

(2) Further, any person responsible for conducting works on a road that is open to traffic has a duty of care under common law to take all reasonable measures to prevent accident or injury to persons carrying out the works and also to members of the public using the road.

(3) Also, the **Occupational Health and Safety Act 1985** requires –

(a) an employer to provide so far as is reasonably practicable a safe place of work for its employees (including independent contractors and their employees); and

(b) any person in control of a workplace to take measures to ensure that the workplace, non-employees and access to that workplace (including road users) are, so far as is reasonably practicable, safe and without risks.

(4) The duties of care as referred to in this clause should be exercised in addition to all other duties and responsibilities relevant in conducting the works.

(5) Road users, in accordance with section 17A of the **Road Safety Act 1986**, have an obligation to drive safely having regard to the road, weather and traffic conditions, and to avoid unreasonable risks to other road users.

12. Records Management

A road authority, infrastructure manager or works manager undertaking works on a road should keep a record of the traffic management plan and any application seeking a written authorisation or consent for the erection of traffic control devices (refer clause 16 of this Code). This record should include details of the traffic control signs and devices arrangement, the use of traffic control devices (eg. when and where speed limit signs are displayed), and any changes to the traffic management plan made during the conduct of the works. Records should also be kept of any traffic related incident or accident that occurred during the works, and of audit and surveillance activities undertaken. *Appendix A: Daily Routine Tasks and Record Keeping* of AS 1742.3–2002 provides guidance on the keeping of such records. These records may be required as evidence in legal proceedings and greatly assist in establishing pre-existing worksite conditions on which claims for damages are usually based. As a general rule, any such records maintained by a road authority, infrastructure manager or works manager conducting works on a road should be kept for the legal period required for particular records concerned, or if a public record, in accordance with the **Public Record Act 1973**.

13. Traffic Management Plans

(1) The management of traffic is an essential requirement of any work undertaken on roads (whether on the roadway or roadside). The objectives of traffic management are to –

(a) provide a safe environment for all persons working on, and traffic travelling along, roads;

(b) minimise the impact of the works on traffic (and where possible, give priority to public transport conveyances) and adjacent landowners/occupiers;

(c) cater for the needs of all road users; and

(d) communicate the arrangements for, and impacts of, any activities affecting traffic.

(2) Section 99A(3)(a) of the **Road Safety Act 1986** requires any person conducting works on a road to "have in operation a traffic management plan", while section 99A(4)(a) requires that a traffic management plan "comply with the prescribed requirements" of any relevant Regulations. At the time of publication of this Code, Regulations were being made.

(3) Where a standard diagram as contained in the Standards Australia Field Guides is used as a traffic management plan, or forms part of a traffic management plan, the standard diagram should clearly identify any relevant variations necessary to relate the standard diagram to the specific conditions of the worksite.

(4) In preparing a traffic management plan, especially for those works having a higher site risk rating (eg. high, very high) as determined by the risk management process detailed in Part 2 of this Code, consideration should be given to the following matters where relevant (in addition to any prescribed requirements) –

(a) overall strategy for the management of traffic, including traffic staging methodology during various phases of the work.

(b) arrangement of traffic control signs and devices for each stage of the works.

(c) emergency access – for both workers and any emergency services vehicles travelling through the worksite.

(d) any unusual hazards or job specific requirements eg. nearby school or access to shops.

(e) use of alternative routes as required.

(f) provision for over-dimensional vehicles.

(g) provision of safe passage for pedestrians, cyclists and people with disabilities.

(h) provision for, and impact on, public transport (eg. delay to buses/trams, potential for traffic to queue across an adjacent railway crossing), including where possible, priority for public transport conveyances.

(i) provision for access to abutting properties.

(j) duration and times for conducting the works (eg. day or night operation).

(k) emergency contact details.

(l) communication arrangements.

(5) A traffic management plan should be prepared by a person who is suitably experienced and competent in traffic management (refer clause 15 of this Code), having regard to the nature and complexity of the works, and the type of traffic management plan required. Consultation with workers who have experience in working on trafficked sites can be beneficial in ensuring that a practicable traffic management plan is prepared.

(6) Where a traffic management plan proposes the use of certain traffic control devices as part of the subject works that require a written authorisation or consent, a copy of the traffic management plan should be included with the authorisation or consent application for the use of those traffic control devices (refer clause 16 of this Code).

14. Audit and Surveillance

(1) Audit and surveillance activities undertaken by a responsible road authority or an infrastructure manager (as represented in clauses 9 and 10 of this Code) should

focus on the surveillance of works activities performed by the works manager, together with audits of the works manager's management systems and procedures for the conduct of the works (eg. worksite safety, OH&S, records management).

(2) Audits of any traffic management plans to ensure worksite safety, to be undertaken by the works manager, may include –

(a) Compliance Audits – these audits, which are undertaken to verify compliance with a traffic management plan when in operation, should be carried out at least once on all works exceeding one week duration. On works that take less than one week, a sample of traffic management plan compliance audits should be undertaken by the works manager to give confidence of satisfactory performance. The number of sample audits to be undertaken should have regard to the likely safety risks associated with the works.

(i) When to Audit – having regard to the nature and complexity of the works and associated safety risks, consideration should be given to undertaking compliance audits at the following stages of the works –

- at the start of the works.
- at each major change to the traffic management plan.
- during both day and night operation for long term works.
- whenever the operation of a traffic management plan results in unexpected significant disruptions to traffic.
- at the request of the site safety committee or OH&S representative(s), or affected employees where no OH&S representative(s) exists.

(ii) Items to Consider – when auditing compliance with a traffic management plan, and having regard to the nature and complexity of the works and associated safety risks, consideration should be given to the following –

- safety of workers on the worksite, road users and the public.
- signs, road markings, temporary safety barriers, lighting, and facilities for pedestrians and cyclists.
- traffic compliance with the implemented traffic management plan.
- access to abutting properties.
- affect of the works on surrounding land use (eg. residential, commercial/industrial, car parking).
- differences in weather conditions.

(iii) A Worksite Safety – Traffic Management Checklist is included as Appendix B to this Code as a guide to reviewing the traffic management arrangements at a worksite.

(b) Road Safety Audits – road safety audits, which are independent audits of the crash potential and safety performance of a traffic management plan during conduct of the works, should be performed on major or larger scale works, and works involving complex traffic arrangements or staging. These audits gauge overall safety performance and identify issues requiring resolution. These audits should be conducted by suitably qualified persons in accordance with the Austroads Road Safety Audit Guide 2002.

(i) When to Audit – consideration should be given to undertaking a road safety audit –

- following preparation of a traffic management plan and prior to the works commencing.
- at each major change point in the traffic management plan.

(ii) Items to Consider – when undertaking a road safety audit, consideration should be given to the following –

- safety of workers on the worksite and road users.
- speed and geometry of the road.
- accident history of the worksite.
- traffic volumes and composition (eg. commercial vehicles).
- appropriateness of speed restrictions, signs, road markings, temporary safety barriers, lighting, and facilities for pedestrians and cyclists (during both day and night).
- aspects of the traffic management arrangements that may confuse road users travelling through the worksite.
- traffic compliance with the implemented traffic management plan.

(3) Retrievable records of all audits (both compliance and road safety) should be kept as evidence of compliance with the requirements of this Code. All audits should be undertaken by persons with appropriate experience and competence in traffic management and/or road safety audits.

15. Training of Persons Involved in Traffic Management

(1) Section 99A(3)(c) of the **Road Safety Act 1986** requires any person conducting works on a road to "engage appropriately trained and qualified persons to carry out the works or ….. direct traffic".

(2) Personnel involved in traffic management and traffic control should possess a certificate, issued by a Registered Training Organisation accredited under the Australian Qualifications Framework, evidencing completion of training in –

(a) Traffic Control, including the model instructions for traffic controllers as contained in *Appendix B: Model Instructions for Traffic Controllers* of AS 1742.3–2002.

(b) General Traffic Management, including the requirements of the management of traffic through worksites as set out in –

(i) AS 1742.3–2002.

(ii) this Code of Practice.

(3) In particular, the training should cover the following –

(a) legal aspects.

(b) risk based assessment of worksite conditions.

(c) Victorian practices.

(d) this Code of Practice.

(4) It is highly desirable that all personnel involved in traffic management and traffic control attend an appropriate refresher training course every three years following receipt of an initial certificate.

16. Memorandum of Consent

(1) Various written authorisations and consents are required for the erection of certain traffic control devices at worksites under Regulations made under the **Road Safety Act 1986**. At the time of publication of this Code, the Regulations were under review. To ascertain the requirements in relation to the erection of traffic control devices by persons other than road authorities, reference should be made to the Road Safety (Road Rules) Regulations 1999 as amended or substituted at the relevant time.

(2) A written authorisation or consent as required under the relevant Regulations is provided through the submission of an application to VicRoads (refer Appendix C of this Code for an example of a typical application for a written authorisation or consent). An application for a written authorisation or consent should include the traffic management plan for the subject works, setting out the details for the proposed use of those traffic control devices for which authorisation or consent is sought.

(3) The traffic control devices most commonly used on worksites for which written authorisation or consent may be required include speed limit signs, end speed limit signs, traffic signals (including portable traffic signals), and STOP HERE ON RED SIGNAL signs (but excludes a STOP/SLOW bat).

(4) The works manager responsible for the roadworks should keep detailed records of the use of traffic control devices on the worksite (eg. where and when worksite speed limit signs or portable traffic signals are in operation).

PART 2 – WORKSITE RISK MANAGEMENT PROCESS

Division 1 – Introduction

17. General

(1) *Section 2.2.3: Risk management* of AS 1742.3–2002 recommends that a risk assessment be carried out on each worksite. The risk assessment should include the identification and analysis of all safety risks likely to arise during the works in the (i) Planning; (ii) Setting Up; (iii) Operating; (iv) Changing; and (v) Dismantling phases of a traffic management plan.

(2) The general road environment is not risk free, even without any works. Accordingly, the level of risk that is considered to be tolerable will depend on the actual conditions at each individual worksite and the surrounding environment.

(3) A systematic approach is necessary to identify areas of risk, to prioritise the critical risks from the lesser risks, and to identify effective ways of eliminating or significantly reducing risks that may have an undesired or unexpected outcome. It is considered important that consultation should form an integral part of this systematic approach to risk management at a worksite.

(4) This section sets out a methodology for the risk based assessment of worksite conditions. The broad approach is shown in Figure 1.

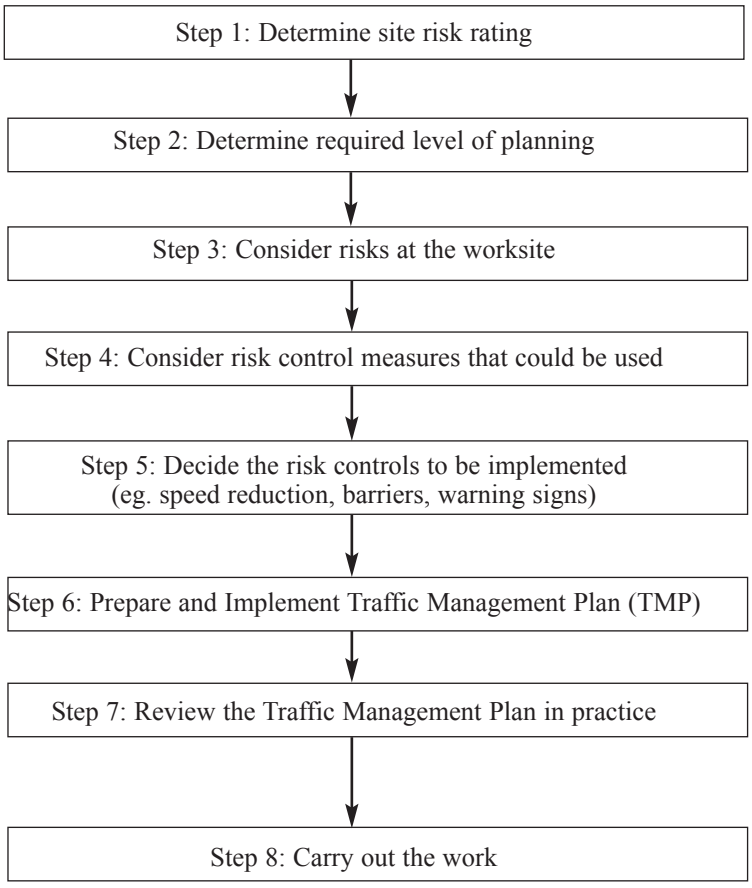


Figure 1: Risk Assessment Methodology

Division 2 – Process for Determining Worksite Conditions

18. General

(1) The conventional risk assessment methodology (as set out in *AS/NZS 4360–2004: Risk Management*) requires consideration of the likelihood of an event occurring and the consequences should the event occur. These two factors are then combined in a standard matrix to determine the level of risk.

(2) For worksite traffic management, the major risk factors are –

(a) speed of traffic adjacent to or through the worksite.

(b) clearance between moving traffic, workers and roadworks plant and equipment.

(c) traffic volume and vehicle composition.

(d) geometry of the worksite, and approaches to the worksite.

(3) Other factors that should be considered include the type of work being carried out, time of day, sight distance, weather, presence of pedestrians or cyclists, or major changes in local conditions during the course of the works.

(4) A major risk at any worksite (whether located on the roadway or roadside) is where an errant vehicle runs out of control and collides with workers or roadworks plant or equipment at the worksite, or another vehicle or person passing through the worksite. Such an occurrence may cause injuries to workers on the worksite, the vehicle occupants, or pedestrians or cyclists travelling through the worksite. Every effort should be made to eliminate or reduce the risk of such an occurrence.

(5) Set out below is a structured methodology to consider all likely risks and then to determine appropriate measures to reduce the risk by consideration of a "hierarchy of control".

(6) The Traffic Management Plan Checklist, which is included as clause 47 for Short term works, and clause 64 for Long term works, in this Code, can be used to document the process followed in undertaking the risk assessment of a particular worksite.

19. Step 1 – Determine Site Risk Rating

(1) Determination of a 'site risk rating' is based on consideration of the main risk factors present at the worksite, and is intended to provide an overall assessment of the risk of a crash occurring within the worksite if there were no protective measures in place.

(2) Determination of the 'site risk rating' will enable a decision to then be made on the degree of planning and detail required for a traffic management plan as set out in Step 2 of this worksite risk management process.

(3) The site risk rating is established in slightly different ways depending on whether the works are short term or long term. For more information on planning for short term and long term works, refer to Parts 3 and 4 respectively of this Code. There are four levels of site risk rating (consistent with AS/NZS 4360–2004), being Low (L), Medium (M), High (H), and Very High (V).

20. Step 2 – Determine Required Level of Planning

(1) The level of planning required at each worksite to eliminate or reduce the risk level depends on the site risk rating, and any prescribed requirements to be included in a traffic management plan as detailed in the relevant Regulations (refer clause 13 of this Code).

(2) Where the site risk rating is High or Very High, a site specific traffic management plan should be prepared by a person experienced and competent in traffic management, and discussed and accepted by those on the worksite. The traffic management plan should also be reviewed by a person appropriately trained and qualified in traffic management, and where necessary, road safety audits.

(3) Where the site risk rating is Low or Medium, a traffic management plan should be prepared under the supervision of a person competent and experienced in traffic management, with due regard to this Code, and any occupational health and safety requirements. The traffic management plan could comprise either a standard diagram, safe operating procedure or site specific plan.

21. Step 3 – Consider Risks at the Worksite

(1) Before any detailed evaluation is made of the risks involved at a worksite, consideration should be given to what events may occur and what needs to be done to eliminate or reduce them. Table 1 lists some of the possible events and causes, with other issues to be identified on a site specific basis.

CONSEQUENCE	EVENT	CAUSE
Injury to worker	• Penetration of worksite by a vehicle	• Failure to observe work signs • Failure to navigate through the worksite • Inadequate controls • Failure to comply with controls
	• Worker straying onto roadway or clear zone	• Inadequate delineation • Inadequate clearance • Inadequate procedures
Injury to motorists or motorcyclists	• Obstacles on worksite	• Untidy worksite • Worksite left unattended • Improper attention given to motorists or motorcyclists
	• Failure to navigate through the worksite	• Poor signing • Inappropriate signing • Inadequate delineation
	• Works vehicle impacting on motorists or motorcyclists	• Inadequate signing • Inadequate delineation • Inadequate instructions for workers • Inadequate controls
Injury to pedestrians or cyclists	• Obstacles on worksite	• Untidy worksite • Worksite left unattended • Improper attention given to the needs of pedestrians/cyclists
	• Failure to navigate through the worksite, or poor route through/past worksite	• Poor or inappropriate signing • Inappropriate route through or past worksite • Inadequate delineation or separation from other traffic

Table 1: Worksite Risks

(2) A detailed consideration of all relevant risks should be undertaken to be able to determine the appropriate measures required to reduce the level of risk. The methodology set out below is based on the standard approach known as the "Hierarchy of Control".

(3) This approach considers (in the order listed below) the following –

(a) Hazard Elimination/Substitution – Can the hazard/risk be eliminated (eg. divert the traffic away from the worksite)? Can a sidetrack be installed or can the road be closed for the duration of the works?

(b) Engineering Controls/Isolation – What engineering measures or protective devices can be implemented to either eliminate or control the hazard (eg. installation of safety barriers, lane closures, reversible (contra) traffic flow, portable traffic signals, crash attenuators or vehicle crash attenuators, use of escort (pilot) vehicles)? Can the clearance to the worksite be increased?

(c) Administrative/Behavioural Controls – What can be done to adjust the behaviour of traffic travelling through the worksite (eg. speed restrictions, signage, traffic controllers, Variable Message Signs (VMS), delineation of travel path)? Can the work be more safely undertaken at night?

(4) When investigating how to manage risk and keep a safe worksite, so far as is reasonable practicable, consideration should be given to –

(a) the severity of the hazard or risk.

(b) the state of knowledge about that hazard or risk.

(c) the nature of the works (eg. long term or short term).

(d) the availability and practicability of possible hazard or risk control measures.

(e) the cost of removing or mitigating that hazard or risk.

(5) In all situations, all personnel working on the worksite should wear personal protective equipment ie. as a minimum, a high visibility garment that meets the requirements of *AS/NZS 4602–1999: High Visibility Safety Garments* ("AS/NZS 4602–1999") and is appropriate to the viewing conditions (eg. day or night), together with any other appropriate personal protective clothing (eg. safety helmet, safety footwear) (refer also to Part 5, Division 1 of this Code).

22. Step 4 – Consider Risk Control Measures that Could be Used

(1) In considering the risk control measures that could be used at the worksite, it should be recognised that there is often a need to satisfy competing objectives such as –

(a) maximising the safety of workers and all road users;

(b) minimising the delay to traffic (including public transport) and the attendant costs incurred; and

(c) managing the costs of the risk control measures so that they relate to the costs of the associated works.

(2) Table 2 provides guidelines to consider the various hazard/risk factors associated with each worksite and the measures that may be implemented to eliminate or reduce the risks using the hierarchy of control. Note that the table provides guidelines only, and does not necessarily list all risks (eg. prevailing weather conditions) that may occur at a particular worksite. The guidelines should be used as follows –

(a) work through each of the hazard/risk factors listed on the left side of Table 2;

(b) identify whether that hazard/risk factor is present at the worksite (if the particular hazard is not listed in the table, consider the degree of risk that it generates relative to those in the table to determine possible control measures that could be used); and

(c) consider the hierarchy of control to determine necessary measures to eliminate or reduce the risk. Note that –

(i) more than one control measure can be used at each worksite.

(ii) if one control measure is not practicable to implement, record the reason and go to the next step in the hierarchy of control.

Table 2: Risk Control Selection Table

SAFETY HAZARD / RISK FACTORS	HIERARCHY OF CONTROL Consider the practicability of controls, from left to right. Select the most practical given the circumstances and level of risk. Record the reason if a higher-level control is not considered practicable.		
	ELIMINATION/ SUBSTITUTION	**ENGINEERING/ ISOLATION**	**ADMINISTRATIVE/ BEHAVIOURAL**
Clearance to Traffic **(Lateral clearance between the nearest edge of a lane carrying traffic and the entire worksite, including all roadworks vehicles or equipment, and pedestrian workers)**	• Road Closure • Detour • Side Track	• Safety Barriers • Lane closure • Vehicle Crash Attenuators	• Speed Reduction • Warning signs / VMS • Delineation of travel path
High Speed Traffic through Worksite	• Road Closure • Detour • Side Track	• Safety Barriers • Lane closure • Portable traffic signals • Vehicle Crash Attenuators	• Speed Reduction • Warning signs / VMS • Traffic controller
Poor Advance Sight Distance to Worksite (< 200 metres)	• Road Closure • Traffic Diversion	• Vehicle Crash Attenuators • Lead and/or Tail vehicle(s)	• Extra advance warning signs / VMS • Speed reduction • Delineation of travel path
Poor observance by Motorists of Directions / Instructions	• Road Closure • Traffic diversion	• Lane closure • Portable traffic signals	• Speed Reduction • Police presence on site • Extra signs / VMS • Re-assessment of information provided
Narrow Pavement Width with no escape route **(< 2.9 metres width)**	• Road Closure • Traffic Diversion	• Safety Barriers	• Speed Reduction • Delineation of travel path
Presence of Workers at the Worksite	• Road Closure • Traffic Diversion	• Safety Barriers • Increased separation from vehicular traffic	• Speed Reduction • Warning signs • Delineation of travel path and worksite
Excavation Adjacent to Traffic **(>300 mm deep within 1.2 metres of traffic)**	• Road Closure • Traffic Diversion	• Different Construction Method • Safety Barriers	• Speed Reduction • Delineation of travel path
Presence of Unprotected Hazards within Clear Zone	• Road Closure • Traffic Diversion	• Safety Barriers	• Speed Reduction • Delineation of travel path
Rough or Unsealed Road Surface due to Roadworks	• Road Closure • Traffic Diversion		• Speed Reduction • Warning signs / VMS

High Volume of Traffic through Worksite (> 10,000 vehicles per day)	• Road Closure • Detour • Side Track	• Safety Barriers • Lane closure • Portable traffic signals	• Speed Reduction
High Volume of Heavy Vehicles through Worksite	• Road Closure • Detour • Side Track	• Safety Barriers • Lane closure • Portable traffic signals	• Speed Reduction
Works Vehicles Entering / Leaving Worksite		• Safety Barriers • Lane closure • Portable traffic signals	• Speed Reduction • Warning signs / VMS • Delineation / control of access points
Cyclists / Pedestrians Through Worksite	• Alternative Pathway	• Adequate separated or shared road space	• Speed Reduction • Warning signs / VMS • Delineation from other traffic

23. Step 5 – Decide the Risk Controls to be Implemented

(1) Having considered all hazard/risk factors from Table 2, determine the risk controls to be applied, in consultation with those who will be working on the worksite or supervising the works.

(2) In general, the controls implemented are likely to be a combination of the following –

(a) lane closures or traffic diversions.

(b) speed reduction for traffic travelling through the worksite.

(c) use of safety barriers.

(d) warning sign arrangement.

(e) use of Variable Message Signs (VMS).

(f) high visibility clothing for all workers.

(g) various other measures.

(3) Lane Closures or Traffic Diversions

(a) Lane closures or traffic diversions can provide effective ways of increasing the separation between workers on or near a road, and the passing traffic. This can allow the works to be undertaken more efficiently and permit traffic to pass through or around the worksite at higher speeds.

(b) However, it should be appreciated that if the lane closures result in extensive traffic congestion or unsafe traffic conditions (eg. potential for traffic to queue across a rail crossing), or the diversions require large numbers of vehicles to travel over lengthy detours or along unsuitable roads, the community cost of such measures can be quite considerable.

(c) *Section 4.4.2: Lane closures* of AS 1742.3–2002 sets out recommended taper lengths for lane closures on two-lane two-way and multi-lane roads. In addition to lane closures, minimum lane widths to be provided through or past a worksite should generally be a minimum of 3.0 metres, unless the exceptions as set out in *Section 4.11.3 Lane widths* of AS 1742.3–2002 apply.

(d) Where a traffic diversion is proposed, pre-planning for the works should give consideration to the suitability of the alternative detour route to accommodate the volume and type of traffic expected to be diverted.

(4) Speed Reduction Through Worksite

(a) Worksite speed limits should conform to the general speed management policies and practices expected by the community. Accordingly, speed limits should reflect the level of works or activity, inactivity, reduced road space and proximity of potential hazards. The speed limits should be consistent with driver expectations and not be unrealistic such that a significant number of road users do not comply. Clauses 32 and 50 provide guidelines on the establishment of speed limits through short term and long term worksites respectively.

(b) In certain situations where pedestrian workers are on the road within 1.2 metres of traffic, consideration could be given to lower than normal worksite speed limits (eg. 30 km/h). However, such speed limits should only be used when their need is obvious to road users, and normally in conjunction with the use of a traffic controller. Further information on the authorisation or consent requirements for the installation of any roadworks speed limit signs is included in clause 16 of this Code. Further information on the use of speed limit signs is included in Part 5, Division 2 of this Code.

(5) Use of Safety Barriers

Part 4, Division 2 of this Code is to apply where safety barriers are to be used on a worksite for the protection of both road users and workers. For short term works, the use of safety barriers may not be practical, and in such cases other measures (eg. speed reduction, warning signs, traffic cones) could be used.

(6) Use of Warning Signs

(a) Having determined the risk level, the type of temporary treatment required, and the speed limit through the worksite, the actual signing arrangement can then be determined.

(b) Reference should be made to AS 1742.3–2002, the relevant Standards Australia Field Guide, and this Code for typical signing arrangements.

(c) The Standards Australia Field Guides have been published as handbooks to provide illustrations of the layout of traffic control signs and devices at typical worksites under a variety of situations.

(d) Warning signs, or other traffic control signs or devices used at a worksite should be regularly inspected to ensure that they are still standing (or operating) and are clearly visible to the road user.

(e) The Field Guides that have been produced include –

HB 81		Field guide for traffic control at works on roads
HB 81.1	Part 1:	Short-term urban works, daytime only
HB 81.2	Part 2:	Short-term rural works, daytime only
HB 81.3	Part 3:	Mobile works
HB 81.4	Part 4:	Short-term night works
HB 81.5	Part 5:	Works on unsealed roads
HB 81.6	Part 6:	Bituminous surfacing works
HB 81.7	Part 7:	Short-term works on freeways
HB 81.8	Part 8:	Long-term partial closures and detours on urban roads
HB 81.9	Part 9:	Long-term partial closures and detours on rural roads

(f) These Field Guides contain only those provisions of AS 1742.3–2002 which are considered to apply in the particular cases with which they deal. In any cases where there appears to be differences in specified requirements or recommendations, or where matters could be interpreted differently from AS 1742.3–2002, this Code or any specific job specification should prevail.

(7) Use of Electronic Variable Message Signs

Part 5, Division 5 of this Code is to apply where electronic variable message signs (VMS) can be used at a worksite.

(8) High Visibility Clothing

Part 5, Division 1 of this Code is to apply where high visibility clothing is worn on a worksite.

(9) Various Other Measures

Other measures which could be considered are to be carried out in accordance with the recommendations of an experienced traffic engineer or an independent road safety auditor as appropriate, and used in a manner consistent with AS 1742.3–2002. Such measures may include –

(a) lead and/or tail vehicles.

(b) pilot vehicles.

(c) vehicle mounted signs and devices (eg. illuminated flashing arrow signs, vehicle mounted crash cushions).

(d) sign trailers (eg. speed sign trailers).

(e) look out person.

(f) traffic cones and temporary bollards.

24. Step 6 – Prepare and Implement Traffic Management Plan

Section 99A of the **Road Safety Act 1986** requires any person conducting works on a road to "have in operation a traffic management plan". Clauses 13 and 20 (Step 2) of this Code provide guidance in the preparation of a traffic management plan.

25. Step 7 – Review the Traffic Management Plan in Practice

After the traffic management plan has been implemented, a review should be undertaken to ensure that it is operating as expected. This review should take place before work commences on site (refer also clause 14 of this Code).

26. Step 8 – Carry Out The Work

PART 3 – SHORT TERM WORKS

Division 1 – Introduction

27. General

(1) The works that are generally included within the meaning of "short term" range from tasks that are undertaken from moving vehicles to works that are in place for no more than one work shift. Whilst some of the traffic management measures normally used for fully protected longer term static worksites may not be required (because of possible work inefficiencies due to the short term or mobile nature of the works), a risk assessment should be undertaken to ensure that the proposed measures are appropriate for the safety of the particular worksite and workers (refer Part 2 of this Code). This risk assessment should take into consideration factors such as traffic volume and speed, road geometry and width, and the general behaviour of road users. Tables 3 and 4 of this Code provide guidance on the possible risk control measures, speed limits and traffic management treatments that could be provided for typical short term works on either the road or roadside.

(2) There are some differences in the traffic management measures that should be used for works on roads carrying high speed traffic and those where traffic travels at low speeds. The definitions used for high speed and low speed roads are the same as those used in AS 1742.3 – 2002, being –

(a) low speed roads – roads that have a posted or general speed limit of 60 km/h or less.

(b) high speed roads – roads that have a posted or general speed limit of greater than 60 km/h.

(3) In undertaking short term works as described in this section, a works manager should give consideration to the following –

(a) the type of work or activity to be performed (refer clause 13 of this Code).

(b) the most appropriate traffic management plan required for the works (having regard to the worksite risk assessment process as detailed in Part 2 of this Code).

(c) the location of all traffic control signs and devices having regard to road geometry, terrain, vegetation, habitation and other conditions that affect visibility and sight distance.

(d) the order of erection of all signs and other traffic control signs and devices (eg. signs should be erected in the following order - (i) advance warning signs; (ii) condition warning signs; (iii) warning of plant/road worker signs; (iv) driving instruction guidance signs).

(e) the removal, or cover up, of permanent signs that conflict with temporary signs.

(f) the inspection of the worksite and all traffic control signs/devices at normal speed.

(g) the recording of the traffic management arrangements for the worksite.

(h) the adequacy of access to side roads and abutting property.

(i) the safe provision of access for pedestrians, cyclists and people with disabilities.

(j) the removal of all signs and other traffic control signs and devices at the completion of the works (ie. in the reverse order to their erection).

28. Typical Works

(1) Table 3 lists examples of typical mobile, very short term and short term works and provides references to the sections of this Code where more details of the traffic management measures can be found. Table 3 below should be read in conjunction with Table 4.

Typical Works	Duration	Reference (in this Code)
Linemarking or pavement testing	Mobile works	See Part 3, Division 2
Mobile inspections (eg. road, utility)	Very short term works	See Part 3, Division 4
Grass cutting	Moving plant – frequently changing work area	See Part 3, Division 4
Shoulder grading	Moving plant – frequently changing work area	See Part 3, Division 4
Traffic signals and roadside sign maintenance	5 minutes or less Greater than 5 minutes and less than one working shift	See Part 3, Division 4 See Part 3, Division 6
Pavement maintenance and repairs, shoulder resheet, sprayed seal works	5 minutes or less Greater than 5 minutes and less than one working shift	See Part 3, Division 4 See Part 3, Division 6
Survey works	5 minutes or less Greater than 5 minutes and less than one working shift	See Part 3, Division 4 See Part 3, Division 6
Emergency works	5 minutes or less Greater than 5 minutes and less than one working shift	See Part 3, Division 4 See Part 3, Division 7
Overhead sign or utility cable installation or maintenance	Less than one working shift	See Part 3, Division 6
Utility works, including installation, maintenance and testing	Less than one working shift	See Part 3, Division 6

Table 3: Typical Works on Roads
(To be read in conjunction with Table 4)

(2) The site risk rating (refer Part 2 of this Code) for short term works can be determined from experience with previous similar works, the need for speed limit reductions at the worksite (refer Table 4 of this Code), and Table 5 of this Code which shows the site risk rating for long term works. The site risk rating determines the level of planning required to produce the traffic management plan (refer Part 2, Division 2 of this Code).

Division 2 – Mobile Works

29. General

(1) Mobile works are those which entail vehicles moving along the roadway continually at a speed significantly lower than other traffic and obstructing or partially obstructing traffic lanes. The works may involve an occasional stop of very short duration (eg. less than a minute). These works could include activities such as linemarking and pavement testing, using mobile plant. Additional information is provided in *Section 4.9: Mobile Works* of AS 1742.3–2002.

(2) Where a risk assessment indicates a need, mobile works may comprise the following vehicles –

(a) a lead vehicle which warns on-coming traffic of the presence of the work vehicle and protects the work vehicle and the workers from approaching traffic.

(b) the work vehicle then follows.

(c) a tail vehicle which provides advance warning to following traffic approaching from behind of the works that are taking place ahead. The driver of the tail vehicle is also able to alert the workers ahead of a possible hazard.

(3) Any traffic control signs or warning devices should be displayed on the vehicles.

30. Low Speed Roads

(1) On low speed roads, consideration can be given to omitting the lead vehicle unless the work vehicle could encroach onto the wrong side of the road. If a lead vehicle is provided, it should be 30 to 100 metres ahead of the work vehicle. If a lead vehicle is not provided, it is important that the work vehicle has warning lights and signs that are clearly visible to on-coming traffic.

(2) A tail vehicle should be located approximately 200 metres behind the work vehicle. In an urban area, distances between the lead vehicle, work vehicle and tail vehicle may be reduced having regard to the conditions of the worksite, sight distances to the worksite, and likely safety risks at the worksite.

31. High Speed Roads

(1) On high speed roads, a lead vehicle should be provided unless the works are being carried out on a divided road. The lead vehicle should operate at least 200 metres in advance of the work vehicle to ensure that approaching motorists are given adequate advance warning of the works.

(2) On freeways or multi-lane roads, two tail vehicles should be used in such a way as to form a mobile taper to guide following traffic past the work vehicle. The tail vehicle(s) should be at least 500 metres behind the work vehicle.

Division 3 – Speed Zones for Short Term Works

32. General

(1) Worksite speed limits should be considered when one or more of the following conditions apply –

(a) the safety of workers may be compromised by the proximity of high-speed traffic.

(b) moving roadworks plant or equipment shares the road through the worksite.

(c) loose material or stones are present on the road surface.

(d) sprayed seal works are being undertaken on heavily trafficked and/or high speed roads.

(e) the standard of vertical or horizontal road geometry (eg. restricted sight distance) at the approach to, or within, a worksite is reduced below that of the adjacent sections of the road.

(f) the unobstructed clear width of the carriageway is significantly reduced.

(g) the safety of road users travelling through the worksite is otherwise compromised at normally permitted speeds.

(2) The risk factors to be considered when determining the speed limit to be adopted through a worksite should include -

(a) clearance to the worksite.

(b) traffic volume and vehicle composition.

(c) type of work.

(3) Table 4 below provides guidance on the worksite speed limit that should apply depending on the speed of the traffic, the clearance between the worksite and the traffic, and the volume of traffic passing through the worksite. The worksite speed limits as shown in Table 4 may be varied following a risk assessment of a particular worksite and the type of works to be undertaken.

(4) The installation of any roadworks speed limit signs is subject to any requirements of the relevant Regulations (including where necessary, the written authorisation or consent of VicRoads) as set out in clause 16 of this Code.

Posted Speed Limit and Road Type	Clearance between Traffic and Workers				
		<1.2m	**1.2m - 3.0m**	**3.0m - 9.0m**	**> 9.0m**
	40 km/h				
	Local Traffic Road				
	Collector Road or Rural Arterial 'C' Road				
	Secondary Road or Rural Arterial 'A' and 'B' Road				
	Arterial Road (urban area) and Rural 'M' Road				
	50 km/h				
	Local Traffic Road				
	Collector Road or Rural Arterial 'C' Road				
	Secondary Road or Rural Arterial 'A' and 'B' Road				
	Arterial Road (urban area) and Rural 'M' Road				
	60 km/h or 70 km/h				
	Local Traffic Road				
	Collector Road or Rural Arterial 'C' Road				
	Secondary Road or Rural Arterial 'A' and 'B' Road				
	Arterial Road (urban area) and Rural 'M' Road				
	Freeway (Urban)				
	80 km/h or 90 km/h				
	Local Traffic Road				
	Collector Road or Rural Arterial 'C' Road				
	Secondary Road or Rural Arterial 'A' and 'B' Road				
	Arterial Road (urban area) and Rural 'M' Road				
	Freeway (Urban)				
	100 km/h or 110 km/h				
	Local Traffic Road				
	Collector Road or Rural Arterial 'C' Road				
	Secondary Road or Rural Arterial 'A' and 'B' Road				
	Arterial Road (urban area) and Rural 'M' Road				
	Freeway (Urban)				

Traffic Management Treatment:

	Posted speed limit and vehicle mounted warning devices #
	Posted speed limit, vehicle mounted warning devices and advance warning signs #
	Speed limit of 60 km/h, vehicle mounted warning devices and advance warning signs #
	Speed limit of 40 km/h, vehicle mounted warning devices and advance warning signs #

Notes: # For very short-term works, a lookout person may be required (refer Part 3, Div. 4 of this Code)
Local Traffic Road - (eg. shown brown in Melway or thin black in Country Directory)
Collector Road - (eg. shown orange in Melway) or Rural Arterial 'C' Road
Secondary Road - (eg. shown red in Melway) or Rural Arterial 'A' and 'B' Road
Arterial Road (urban area - eg. shown black in Melway) and Rural 'M' Road
Freeway (urban area - eg. shown green or blue in Melway)
Note: The rural 'M', 'A', 'B' and 'C' road types are as indicated on road signs.

Table 4: Guide for Traffic Management Treatments for Short Term Works

Division 4 - Very Short Term Works

33. General

(1) These works generally comprise either –

(a) works on a roadway that take no longer than five minutes to complete and generally involve minimal equipment and few workers; or

(b) works involving a frequently changing work area (eg. grass cutting, shoulder grading, minor pavement maintenance, longitudinal survey work).

(c) mobile inspections that generally involve an inspection vehicle travelling at a speed which is less than 20 km/h below the speed limit (eg. gas leak detection vehicle).

(2) Note that a risk assessment should be undertaken to determine whether the procedures described would adequately protect both road users and the workers (refer clause 17 of this Code). Additional information is provided in AS 1742.3-2002.

(3) For mobile inspections, the following should apply –

(a) where the inspection vehicle travels on the roadway, then no protection is required.

(b) where the inspection vehicle can operate by travelling along a shoulder or verge clear of traffic, then it may operate as a single vehicle with the display of at least one flashing yellow light.

(4) Where the works are wholly confined to the roadside (eg. grass cutting), a warning device should be provided on the work vehicle and advance warning signs should be placed on the roadside at no more than 2 kilometre intervals. Care should be taken to move the warning signs as the site of the work moves along the road.

34. Low Speed Roads

(1) Works that are of such a duration that they could be carried out during gaps in the traffic do not require the placement of roadside signs or delineation provided that –

(a) a suitable warning device is mounted on the work vehicle;

(b) a lookout person can see approaching traffic for a distance of at least 150 metres; and

(c) the work vehicle and equipment do not encroach onto the roadway.

(2) If the works would take less than five minutes, or involve a frequently changing work area, and the vehicle mounted warning devices are visible for a distance of at least 150 metres, the works can proceed without the use of other signs or warning devices. However, a lookout person should be used to warn the workers of the approach of a vehicle whose size or speed may be a safety risk. In addition, there should be sufficient space for two-way traffic to safely pass the worksite without crossing double lines (refer Figures 2 and 3 of this Code).

35. High Speed Roads

(1) Works that are of such a duration that they could be carried out during gaps in the traffic, do not require the placement of roadside signs or delineation provided that –

(a) a suitable warning device is mounted on the work vehicle;

(b) a lookout person can see approaching traffic for a distance of at least 250 metres; and

(c) the work vehicle and equipment does not encroach onto the roadway.

(2) Note that works such as retrieving debris from the roadway may be undertaken in this way. However, tasks such as patching small potholes in the roadway which could be undertaken as a series of separate steps, should be carried out as a continuous process and the appropriate traffic management plan used.

(3) If the work would take less than five minutes and the vehicle mounted warning devices are visible for a distance of at least 250 metres, the work may proceed without the use of other signs or warning devices. However, a lookout person should be used to warn the workers of the approach of a vehicle whose size or speed may be a safety risk. In addition, there should be sufficient space for two-way traffic to safely pass the worksite without crossing double lines (refer Figure 2 of this Code).

(4) If the work involves a frequently changing work area or a series of small works taking place in a number of locations over a 2 kilometre length of roadway, warning signs facing approaching traffic should be placed at each end of the worksite. The signs should not be placed more than 2 kilometres apart (refer Figure 3 of this Code).

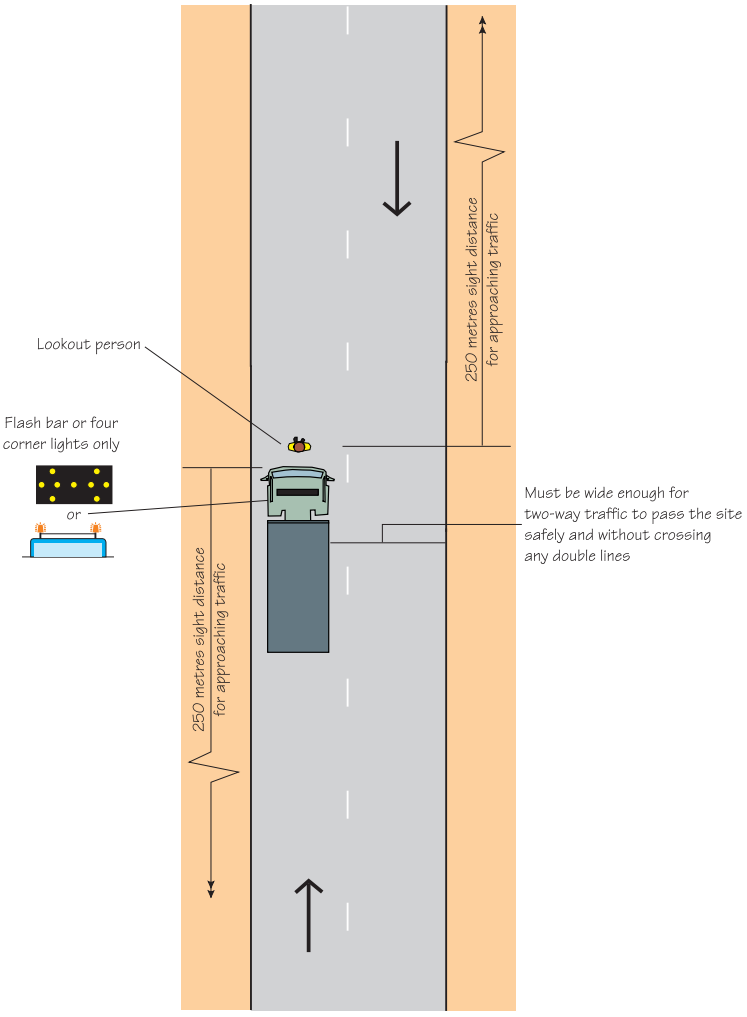
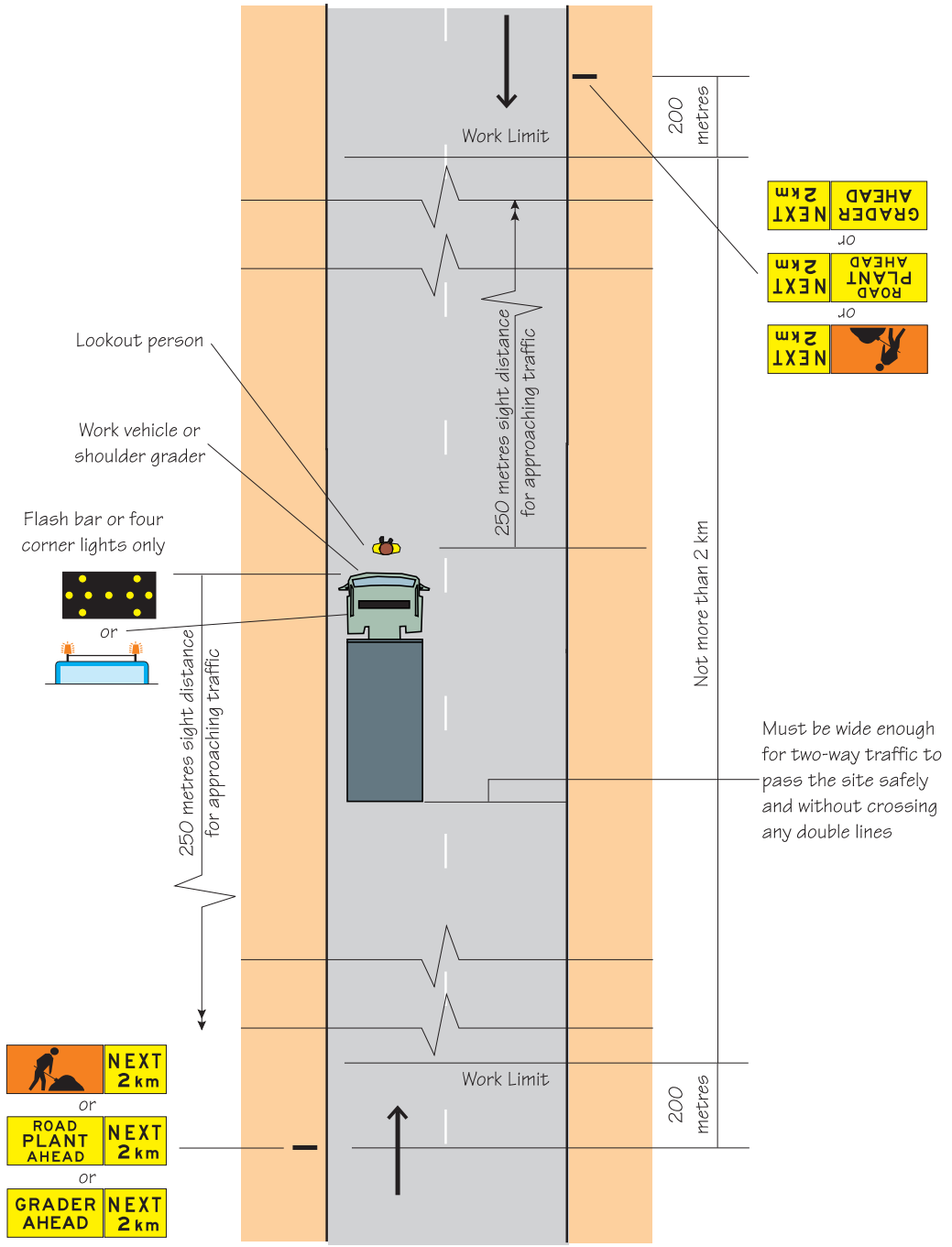


Figure 2: Very Short Term Works

This traffic management plan can be used for works at an isolated location, not taking longer than five minutes and where approaching traffic can see the vehicle-mounted warning device for at least 150 metres (low speed roads) and 250 metres (high speed roads). If there are workers on foot on the roadway, they should only work on the same side of the road as the truck and there should be a lookout person ready to warn them of approaching traffic.

Figure 3: Frequently Changing Work Area (and Shoulder Grading)



This traffic management plan can be used when there are a series of short term works involving a frequently changing work area (eg. shoulder grading, grass mowing) along the road. If there are workers on foot on the roadway, they should only work on the same side of the road as the truck and there should be a lookout person ready to warn them of approaching traffic.

Division 5 – Applicability of Preceeding Sections

36. General

If the requirements of Part 3, Divisions 2 and 4, and associated sub-sections cannot be satisfied, then the task should be considered to be short term works (refer Part 3, Division 6 of this Code) and the traffic management measures applied accordingly.

Division 6 –Short Term Works

37. General

Having regard to the meaning and nature of short term works, any traffic management measures provided to protect the worksite should be removed when the workers are no longer present on the worksite (unless some form of residual hazard remains eg. an excavation).

38. Low Speed Roads

On roads carrying low speed traffic, the advance warning signs may be omitted if the warning device on the work vehicle can be seen for at least 150 metres and there is sufficient width for two-way traffic past the worksite. If there is only width for a single lane past the worksite, then a traffic controller should be used with the associated advance warning signs. The traffic controller may be omitted if the road carries less than 200 vehicles per day.

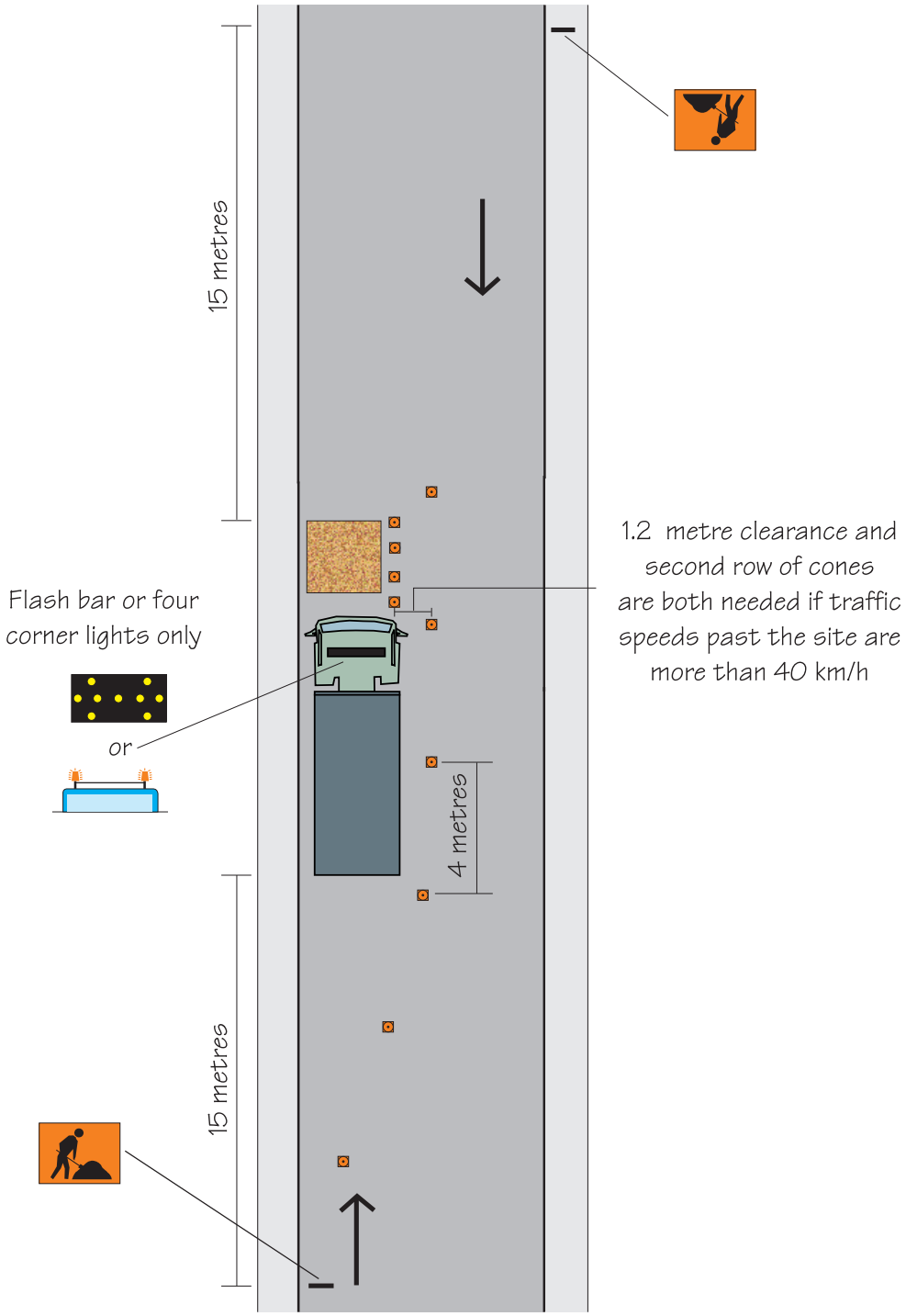
39. High Speed Roads

On roads where traffic travelling at high speed can be expected, roadworks speed limits should be used if the traffic speed cannot be reduced to 60 km/h. Advance warning signs should be provided. The traffic management plans contained in AS 1742.3-2002 should be followed.

40. Examples of Traffic Management Plans

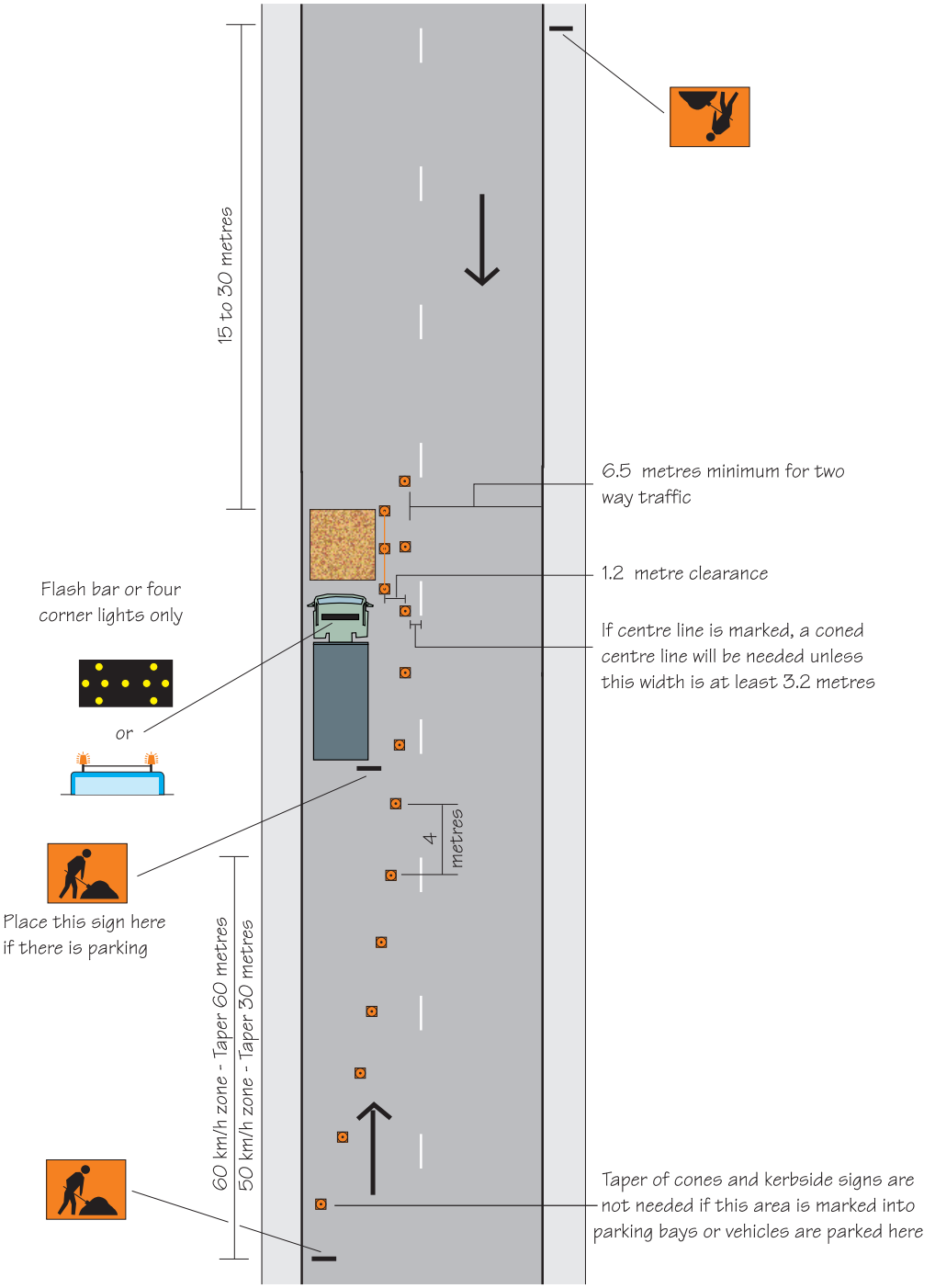
Examples of traffic management plans for a number of different worksites, which are based on those in AS 1742.3-2002, are shown in Figures 4 to 9 of this Code.

Figure 4: Partial Closure on a 50 km/h Residential Street



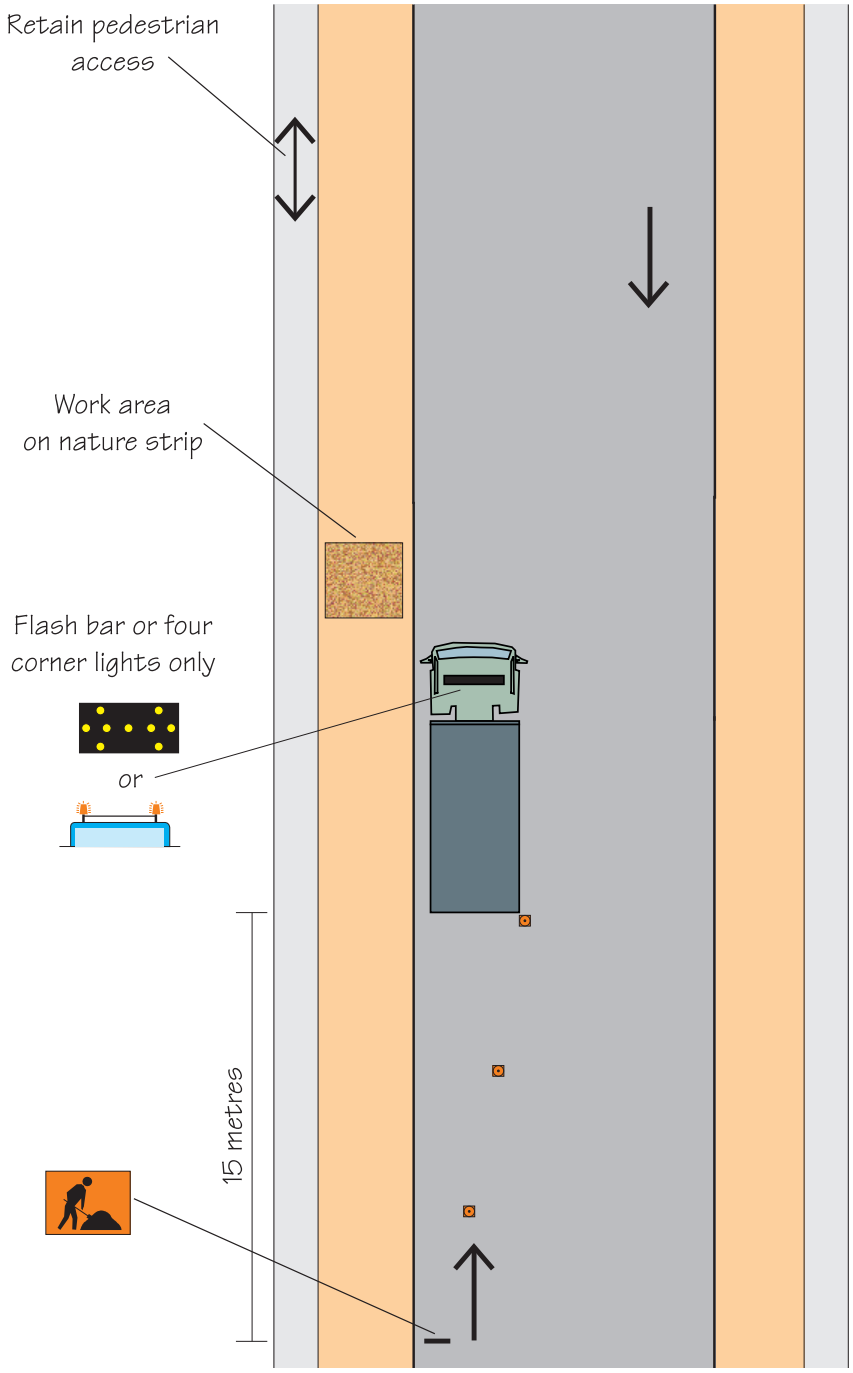
This traffic management plan can be used when traffic volumes are less than 40 vehicles per hour and only an occasional vehicle travels at a speed greater than 50 km/h.

Figure 5: Partial Closure of the Left Lane on 60 km/h Urban Road



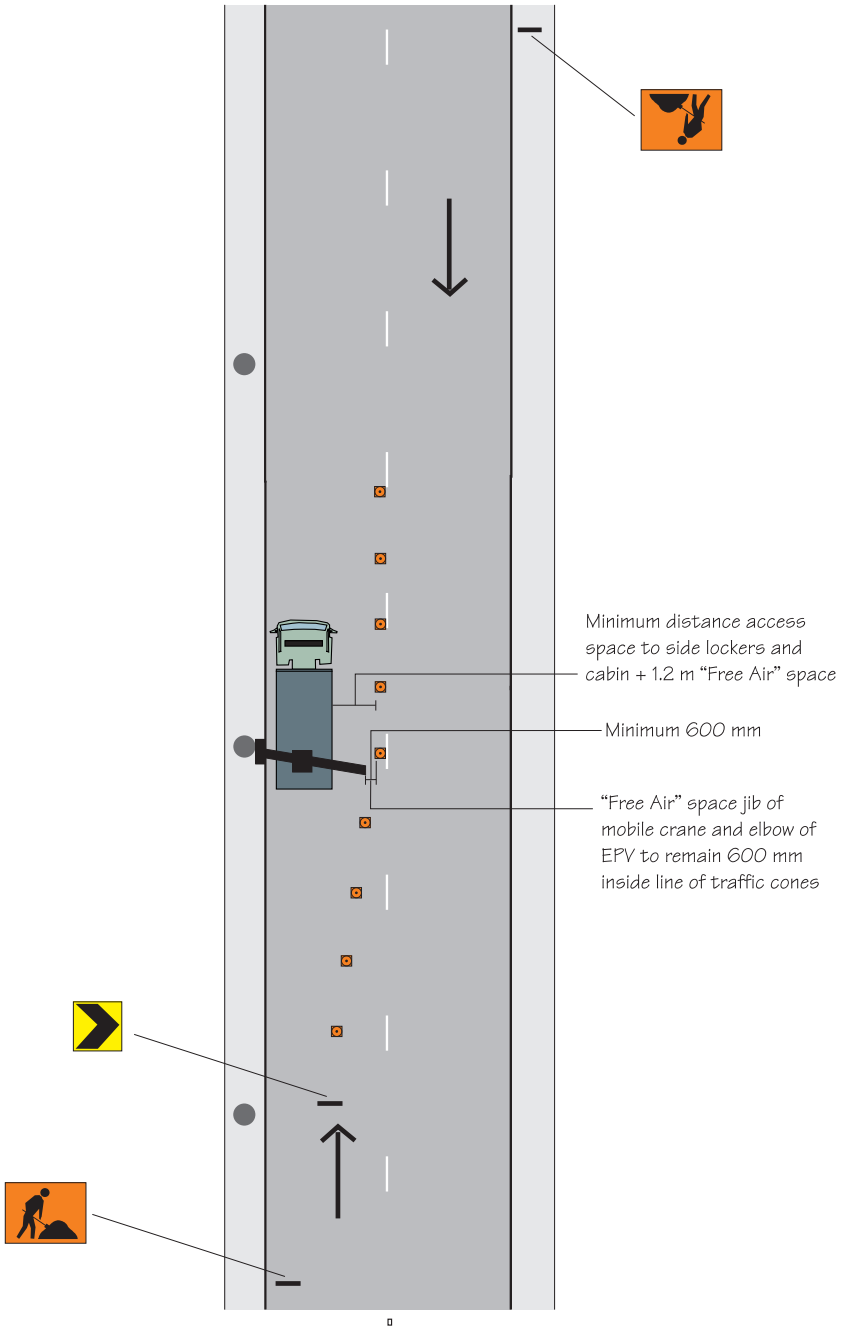
Parking may need to be banned on the opposite side of the road to provide enough width for two-way traffic to pass the work area.

Figure 6: Work on Nature Strip with Vehicle Parked on an Urban Road



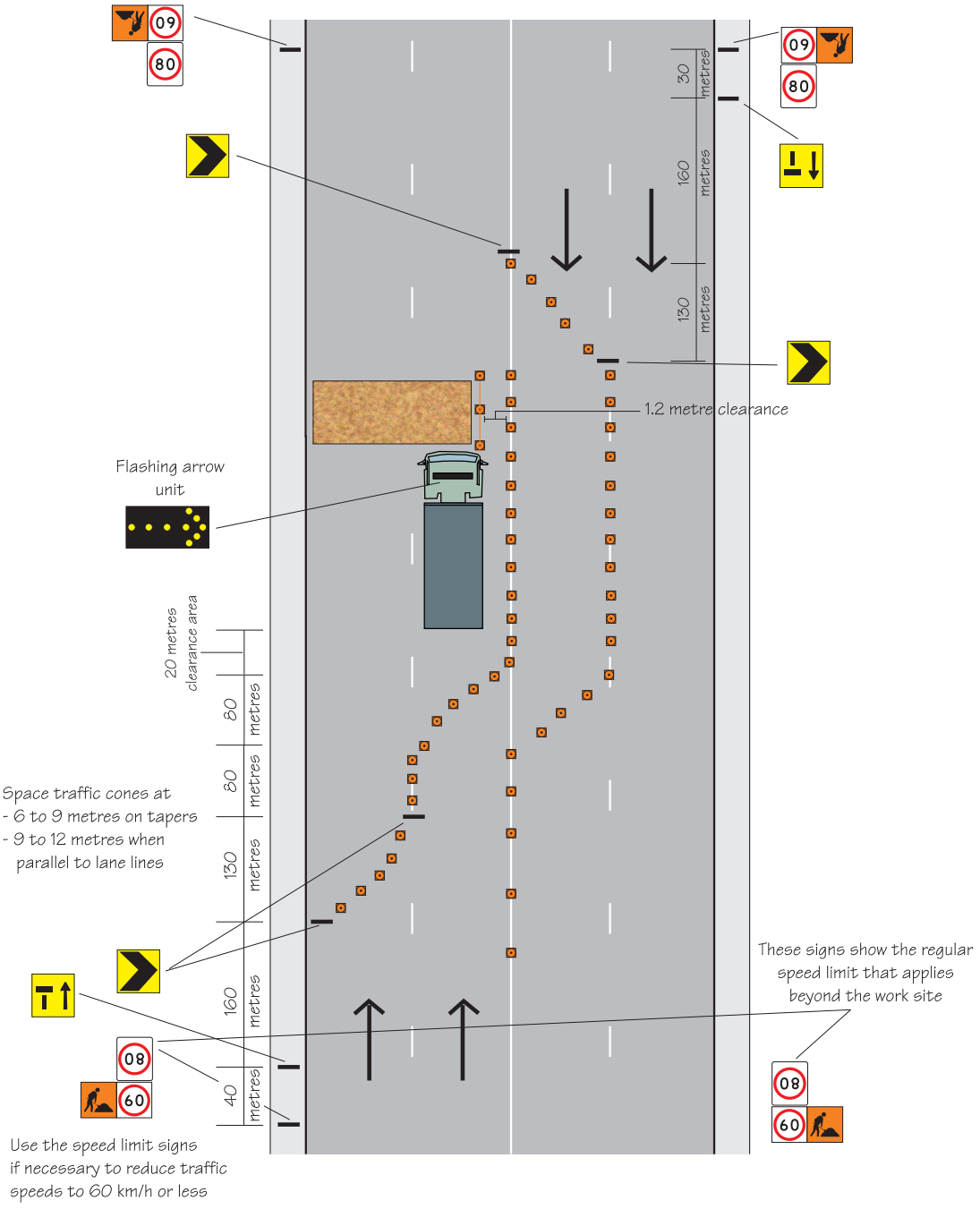
This traffic management plan is appropriate for works on a nature strip, or off the roadway, where a work vehicle is used as a buffer between the work area and passing traffic. The speed of passing traffic should be 60 km/h or less. Pedestrian and bicycle access past the work area should be maintained.

Figure 7: Overhead Sign or Utility Cable Installation or Maintenance



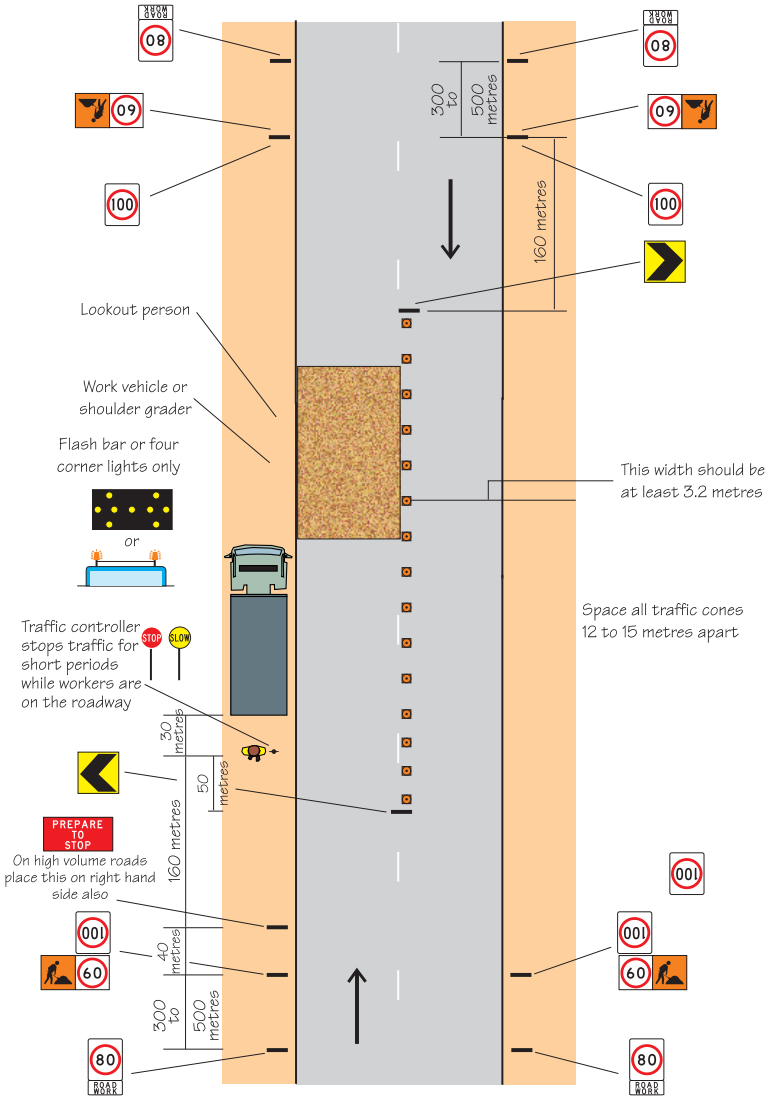
This traffic management plan, which can apply to overhead sign or utility cable installation or maintenance works, could also apply to overhead vegetation pruning (or similar) works. Where equipment will be working near overhead power lines, works should be undertaken having regard to the WorkSafe Victoria "Framework for Undertaking Work Near Overhead and Underground Assets - Guide to the No Go Zones", July 2004.

Figure 8: Half Closure on an 80 or 100 km/h Multi-Lane Urban Road



A temporary speed limit may be required (as shown) if the traffic speed through the worksite cannot be reduced to 60 km/h. This layout can also be used for one side of a divided road. The traffic can be diverted into either the median shoulder or the left shoulder by changing the direction of the line of cones forming the taper.

Figure 9: Traffic Can Run Through the Work Area



This traffic management plan can be used whenever works need to block the road for only a few minutes at a time, and traffic can move through the worksite at other times. A speed limit of 60km/h or lower (and an 80km/h buffer zone if needed) should be used. If workers or plant are working within or close to the road and there is no containment fence to keep them at least 1.2 metres clear of traffic, then a 40km/h speed limit should be used.

41. Provision for Pedestrians and Cyclists

Special provision should be made for pedestrians (including people with disabilities) and cyclists if they are expected to pass through the worksite. The path to be taken should be smooth and free from obstructions, and clear directions should be given where the path changes direction. If the works make it necessary for pedestrians or cyclists to cross the road within the worksite, particular attention should be paid to the crossing point to ensure that the pedestrians or cyclists are visible to both the approaching traffic and the operators of roadworks plant and equipment on the worksite.

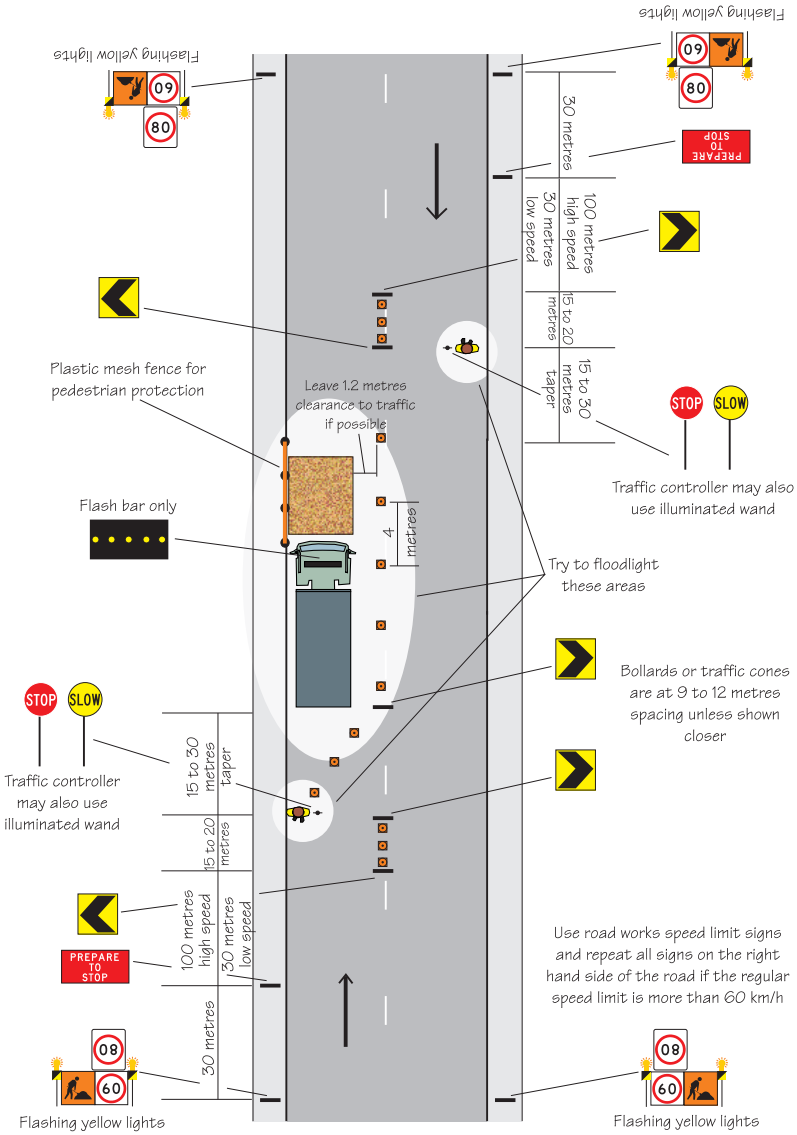
42. Short Term Works at Night

(1) The traffic management plans for works at night are generally similar to those used during the day. However, advance warning signs should always be used. Wherever practicable, traffic controllers and the worksite should be floodlit to make them more obvious to approaching traffic.

(2) All workers on the site should wear the appropriate high visibility clothing (refer Part 5, Division 1 of this Code).

(3) Lighting should be provided if this would assist pedestrians and cyclists passing through the worksite, particularly in urban areas that have existing street lighting.

Figure 10: Short Term Works at Night



On a residential street, a traffic controller may not be needed provided that road users can see past the work area.

Division 7 – Emergency and Unplanned Works

43. General

(1) In the case of an emergency (eg. fire, flood, major road or utility incident), or where works cannot be planned, the safety of road users and workers on the worksite is paramount. Therefore, some traffic delays or congestion can be accepted during the works or whilst the traffic management measures are being deployed. However, possible adverse effects on traffic should be assessed in planning any traffic management measures.

(2) A number of road and service authorities have prepared incident or emergency response plans for dealing with urgent or unplanned works. Where such plans (which may involve assistance from the Police in the control of traffic) are available, these should be used in preference to the generic traffic management plans as provided in this Code. Generic traffic management plans should be used, however, where planned works or activities are undertaken by emergency services authorities (eg. fuel reduction burning, herbicide use or hydrant inspections).

(3) If the works are expected to take more than two hours and the disruption to traffic is severe, consideration should be given to using the media and/or Variable Message Signs to advise the public of the cause of the delay and its expected duration.

(4) Once the worksite is protected, other signs and warning devices should be deployed in accordance with the requirements of this Code as determined by the expected duration of the works.

44. Low Speed Roads

When traffic speeds are low, whether due to the inherent nature of the road or the effects of the emergency, the initial traffic control may be achieved by the use of a work vehicle on which are mounted suitable warning signs or devices. After the worksite is protected, other signs and warning devices should be deployed in accordance with the requirements of this Code as determined by the expected duration of the works.

45. High Speed Roads

On roads where the approach speeds of traffic are high, the initial traffic control should be achieved by the use of a work vehicle on which are mounted suitable warning signs or devices. As soon as the worksite is secure, action should be taken to provide advance warning to approaching road users. This can be achieved by the use of a second vehicle and appropriate signs. However, it is critical that the safety of the worksite is not prejudiced by removing traffic management measures including the work vehicle, to provide advance warning.

Division 8 – Traffic Management Plans

46. Other Traffic Management Plans

(1) The traffic management plans shown in this Code cover a variety of situations and can be modified to accommodate other circumstances. The Standards Australia Field Guides also provide a large number of examples of other plans associated with a range of works on roads. If none of these plans cover the circumstances of the particular works being contemplated then it may be necessary to have the traffic management plan prepared by a person who is suitably experienced and competent in traffic management.

(2) Where a standard diagram as contained in the Standards Australia Field Guides is used as a traffic management plan, or forms part of a traffic management plan, the standard diagram should clearly identify any relevant variations necessary to relate the standard diagram to the specific conditions of the worksite.

47. Traffic Management Plan Checklist

The form in Figure 11 below can be used to undertake the risk assessment of the works to be carried out (on either the road or roadside), and to record the key decisions made when determining the traffic management plan to be used for the works. The completed form should be filed for record purposes.

Work Location:		
Step 1 – Site Risk Rating Traffic volume ..... Clearance between workers and traffic		Traffic speed ..... Site Risk Rating: V H M L
Step 2 – Required Level of Planning Plans required		
Step 3 - Risks at Worksite and Step 4 – Risk Control Measures		
Safety Hazard/Risk Factors	**Present at Worksite**	**Risk Control Measure/s**
Clearance to traffic High speed traffic through worksite Poor advance sight distance to worksite (<200 metres) Poor observance of directions/ instructions by motorists Narrow pavement with no escape path (<2.9 metres width) Presence of workers at the worksite Excavations adjacent to worksite Presence of unprotected hazards within the clear zone Rough or unsealed road surface High volume of traffic through worksite (>10,000 vpd) High volume of heavy vehicles		
Works vehicles entering/leaving worksite		
Cyclists/pedestrians through worksite		
Other		
Step 5 – Risk Control Measures to be Used ..... **Step 6 – Traffic Management Plan Prepared and Implemented** ..... **Step 7 – Traffic Management Plan in Practice Reviewed** ..... **Step 8 – Carry out the Work**		

Figure 11 – Traffic Management Plan Checklist - Short Term Works

PART 4 – LONG TERM WORKS

Division 1 – Traffic Management

48. General

Works that are generally included within the meaning of "long term" require that a traffic management plan is required to operate both day and night, and the worksite may be left unattended. As a consequence, it is expected that any traffic management arrangements should also be suitable for traffic operations over night. However, it is most important that all traffic management measures are removed (or covered), when they are no longer required.

49. Traffic Management Plans

(1) The major factors in assessing the site risk rating of a worksite are the road type, speed limit and clearance between the traffic and workers on the worksite. Table 5 provides a methodology for assessing the site risk rating of the worksite.

Posted Speed Limit and Road Type	Clearance to Traffic			
	Clearance Between Traffic and Workers			
	<1.2m	1.2m - 3.0m	3.0m -9.0m	> 9.0m
40km/h				
Local Traffic Road	L	L	L	L
Collector Road or Rural Arterial 'C' Road	M	L	L	L
Secondary Road or Rural Arterial 'A' and 'B' Road	M	L	L	L
Arterial Road (urban area) and Rural 'M' Road	M	M	L	L
Freeway (Urban)	H	M	L	L
50 km/h				
Local Traffic Road	L	L	L	L
Collector Road or Rural Arterial 'C' Road	M	L	L	L
Secondary Road or Rural Arterial 'A' and 'B' Road	M	L	L	L
Arterial Road (urban area) and Rural 'M' Road	H	M	M	L
Freeway (Urban)	H	M	M	L
60 km/h or 70 km/h				
Local Traffic Road	L	L	L	L
Collector Road or Rural Arterial 'C' Road	M	L	L	L
Secondary Road or Rural Arterial 'A' and 'B' Road	H	M	L	L
Arterial Road (urban area) and Rural 'M' Road	H	M	M	L
Freeway (Urban)	V	H	M	L
80 km/h or 90 km/h				
Local Traffic Road	M	L	L	L
Collector Road or Rural Arterial 'C' Road	H	M	L	L
Secondary Road or Rural Arterial 'A' and 'B' Road	V	H	M	L
Arterial Road (urban area) and Rural 'M' Road	V	H	M	M
Freeway (Urban)	V	V	H	M
100 km/h or 110 km/h				
Local Traffic Road	H	M	M	L
Collector Road or Rural Arterial 'C' Road	V	H	H	M
Secondary Road or Rural Arterial 'A' and 'B' Road	V	H	H	M
Arterial Road (urban area) and Rural 'M' Road	V	V	H	M
Freeway (Urban)	V	V	V	M

- Local Traffic Road - (eg. shown brown in Melway or thin black in Country Directory)
- Collector Road - (eg. shown orange in Melway) or Rural Arterial 'C' Road
- Secondary Road - (eg. shown red in Melway) or Rural Arterial 'A' and 'B' Road
- Arterial Road (urban area - eg. shown black in Melway) and Rural 'M' Road
- Freeway (urban area - eg. shown green or blue in Melway)

Note: The rural 'M', 'A', 'B' and 'C' road types are as indicated on road signs.

L: Low risk
M: Medium risk
H: High risk
V: Very High risk

Table 5: Site Risk Rating for Long Term Works

(2) The level of planning required in preparing a traffic management plan at a worksite to eliminate or reduce the risk level is dependent on the site risk rating and any prescribed requirements as detailed in the relevant Regulations (refer clause 13 and Part 2, Division 2 of this Code). As a general guide –

(a) Site risk rating: High or Very High – a site specific traffic management plan should be prepared by a person suitably experienced and competent in traffic management, and discussed and accepted by those on the worksite. The traffic management plan should also be reviewed by a person appropriately trained and qualified in traffic management, and where necessary, road safety audits.

(b) Site risk rating: Low or Medium – a traffic management plan should be prepared under the supervision of a person suitably competent and experienced in traffic management, with due regard to this Code, and any occupational health and safety requirements. This traffic management plan could comprise either a standard diagram, safe operating procedure or site specific plan.

50. Speed Limits Through Worksites

(1) Worksite speed limits should be considered when one or more of the following conditions apply –

(a) the safety of workers may be compromised by the proximity of high speed traffic.

(b) moving roadworks plant or equipment shares the road through the worksite.

(c) loose material or stones are present on the road surface.

(d) the standard of vertical or horizontal road geometry (eg. inadequate sight distance) at the approach to, or within, a worksite is reduced below that of the adjacent sections of the road.

(e) the unobstructed clear width of the carriageway is significantly reduced.

(f) the safety of road users travelling through the worksite is otherwise compromised at normally permitted speeds.

(g) The safety of pedestrians, cyclists and people with disabilities may be compromised.

(2) The risk factors to be considered when determining the speed limit to be adopted through a worksite should include –

(a) clearance to worksite.

(b) traffic volume and vehicle composition.

(c) type of work.

(d) duration of work.

(3) The speed limit to be applied to long term works should be determined from Table 6.

Clearance to Traffic (metres)	Road Type	Safety Barrier in place	Worksite Speed Limit (km/h)
Within 1.2m	All	No	40
1.2m to 3.0m	Local Traffic Road	No	60
	Collector Road or Rural Arterial 'C' Road	No	60
		Yes	Speed Limit
	Secondary Road or Rural Arterial 'A' and 'B' Road	No	40
		Yes	80
	Arterial Road (urban area) or Rural 'M' Road	No	40
		Yes	80
	Freeway (urban)	No	40
		Yes	80
3.0m to 9.0 m	Local Traffic Road	No	80
	Collector Road or Rural Arterial 'C' Road	No	80
		Yes	Speed Limit
	Secondary Road or Rural Arterial 'A' and 'B' Road	No	80
		Yes	Speed Limit
	Arterial Road (urban area) or Rural 'M' Road	No	60
		Yes	80
	Freeway (urban)	No	60
		Yes	80
> 9.0m	All	No	100 or 110

Table 6: Guide to the Selection of Worksite Traffic Management Speed Zones Long Term Works

(4) When workers are not present at the worksite, the worksite speed limit signs should be removed or covered up so that the posted speed limit is reinstated. Alternatively, the appropriate worksite speed limit signs should be displayed if deemed necessary for traffic safety purposes as provided in *Section 4.3: Maintaining a Safe Workplace* or *Table 4.2: Guide to the Selection of Speed Limit at Roadworks* of AS 1742.3–2002.

(5) Where the worksite speed limit determined from Table 6 of this Code is higher than the posted speed limit on the road, the posted speed limit should remain.

(6) Clearance to worksite is measured to the edge of the nearest running traffic lane.

(7) In certain situations where pedestrian workers are on the road within 1.2 metres of traffic, consideration should be given to lower than normal worksite speed limits (eg. 30 km/h). However, such speed limits can only be used when their need is obvious to road users, and normally in conjunction with the use of a traffic controller.

(8) Where appropriate on longer-term worksites (eg. for roadworks of more than five days duration) having regard to the outcome of the worksite risk assessment process (refer Part 2 of this Code), the physical separation of traffic and the work area is preferred, rather than introduce speed limits. Physical separation is safer, more effective for job productivity, and reduces traffic delays.

(9) For long term works, the requirements of *Section 4.3: Maintaining a Safe Workplace* and *Table 4.2: Guide to the Selection of Speed Limit at Roadworks* of AS 1742.3–2002 should be adopted. Any temporary speed limits should only apply when workers, roadworks plant and equipment, or traffic controllers are present on the worksite. At other times (eg. out of hours / night time when workers not present), any speed restriction signs should be removed or covered up, unless necessary for the safety of traffic having regard to the worksite conditions (eg. rough or slippery unsealed road surface).

(10) The installation of any roadworks speed limit signs is subject to any requirements of the relevant Regulations (including where necessary, the written authorisation or consent of VicRoads) as set out in clause 16 of this Code.

51. Provision for Pedestrians and Cyclists

Special provision should be made for pedestrians (including people with disabilities) and cyclists if they are expected to pass through the worksite. The path to be taken should be smooth and free from obstructions, and clear directions should be given where the path changes direction. Lighting should be provided if this would assist users of the path, particularly in urban areas that have existing street lighting. If the works make it necessary for pedestrians or cyclists to cross the road within the worksite, particular attention should be paid to the crossing point to ensure that the pedestrians or cyclists are visible to both the approaching traffic and operators of roadworks plant and equipment on the worksite.

52. Traffic Management at Night

(1) Whenever practicable, any restrictions on traffic should be removed if not required to apply over night. Some restrictions on traffic can remain where the worksite is located on a multi-lane road and there is sufficient capacity available to carry the expected overnight traffic volumes.

(2) Traffic control signs and certain other traffic control devices are normally manufactured using retroreflective materials. However, the signs and devices can be damaged or become dirty, in use. Therefore, any such signs and devices should be maintained in good condition. In addition, these signs and devices should be checked in place at night to ensure that they are readily visible to road users.

(3) Single lane operation without any traffic control should not normally operate at night unless the traffic volume is less than 200 vehicles per day and the length of road involved is not greater than 60 metres. In other situations, traffic signals should be used to control traffic on the single lane section.

(4) For long term works, the speed limit should be determined from Table 6 of this Code and the requirements of *Section 4.3: Maintaining a Safe Workplace* and *Table 4.2: Guide to the Selection of Speed Limit at Roadworks* of AS 1742.3–2002.

Division 2 – Use of Safety Barriers at Worksites

53. General

(1) This section provides guidance in the use of safety barriers at worksites. A safety barrier, in accordance with AS 1742.3–2002 is a "physical barrier separating the work area and the travelled way, designed to resist penetration by an out-of-control vehicle and, as far as practicable, redirect colliding vehicles back onto the travelled path." A safety barrier also provides protection for workers from passing traffic. Safety barriers come in many shapes and are made from a variety of materials including concrete, steel and plastic.

(2) Figure 12 of this Code provides general guidelines for the use of safety barriers at worksites. The 'hierarchy of control' (refer Part 2, Division 2 of this Code) should be applied to determine the appropriate control (as far as is practicable) to be used.

(3) While Figure 12 and Table 6 of this Code indicate that safety barriers may not be required where the clearance from traffic to the worksite is greater than 9 metres, consideration may need to be given to increasing this clear zone where there are potential hazards (eg. steep road embankments) beyond the 9 metre clearance that may present an unacceptable risk to an errant vehicle.

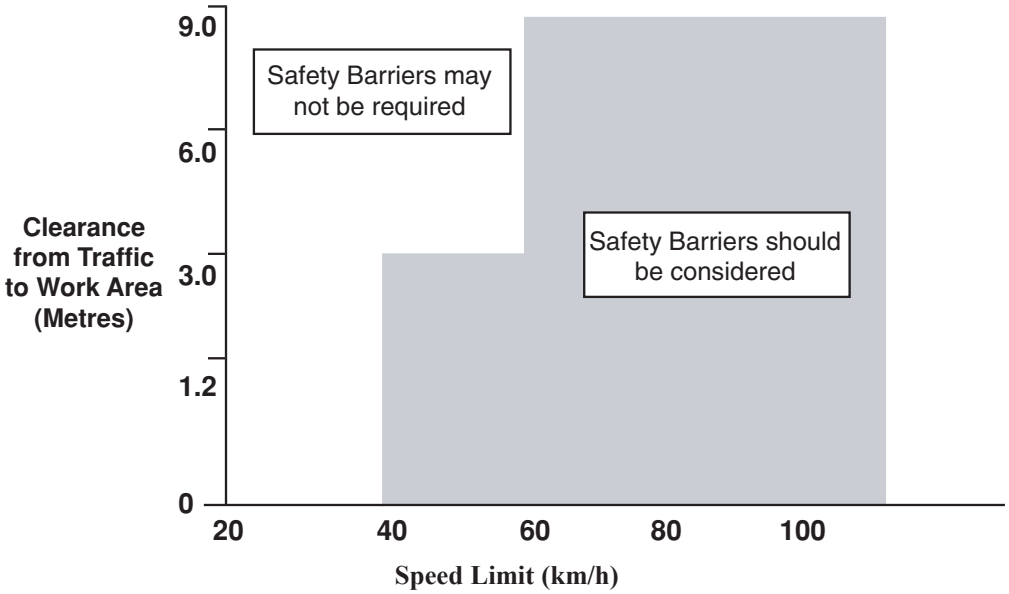


Figure 12 – Guidelines for use of Safety Barriers

(**Note:** This Figure should be read in conjunction with Table 6 of this Code)

54. Shape and Strength Requirements

(1) AS 1742.3–2002 provides that all safety barriers "shall conform to the requirements of *AS/NZS 3845–1999: Road Safety Barrier Systems*" ("AS/NZS 3845–1999"). AS/NZS 3845–1999 provides that –

(a) "all road safety barrier systems and crash attenuators shall be tested in accordance with the procedures specified in this (AS/NZS 3845–1999) Standard"; and

(b) *NCHRP Report 350: Recommended Procedures for the Safety Performance Evaluation of Highway Features* ("NCHRP 350") "shall be the basis of testing procedures" for safety barriers.

(2) In adopting AS 1742.3–2002 as the basis for worksite safety traffic management on roads in Victoria, this Code provides that '*Section 3.10.2: Safety barriers*' of AS 1742.3–2002 does not come into operation until a day to be proclaimed, or if it does not come into operation before 1 January 2006, it comes into operation on that day. This provision, which relates to safety barriers conforming with the safety performance testing requirements of AS/NZS 3845–1999, will allow for a transition from existing safety barrier designs currently in use to those conforming with the safety performance testing requirements of AS/NZS 3845–1999.

(3) Having regard to this transition period, clause 57 of this Code provides guidance on a safe system of work approach for the use of existing safety barriers on worksites as a means of phasing in (over a 12 month period) full compliance with the safety performance testing requirements of AS/NZS 3845–1999 as required by

AS 1742.3–2002. This phasing in of full compliance, which has regard to the cost to the roadworks industry of achieving full compliance, involves the following process –

(a) firstly, VicRoads should communicate to the roadworks industry from 1 January 2005 the process for achieving full compliance with AS 1742.3–2002 and AS/NZS 3845–1999, together with the safe system of work approach included in this Code.

(b) secondly, VicRoads should develop by 1 July 2005 guidelines (incorporating the safe system of work approach as included in this Code, and the results of any crash testing of existing safety barrier designs where undertaken) on how to comply with the safety performance testing requirements of AS/NZS 3845–1999 as required by AS 1742.3–2002.

(c) thirdly, infrastructure managers and works managers should from 1 January 2006 commence auditing compliance with AS 1742.3–2002 and AS/NZS 3845–1999 in the use of safety barriers.

55. Types of Safety Barriers

Safety barriers meeting the shape, protection, performance and test requirements of AS/NZS 3845–1999 standards are acceptable for use on worksites. Such safety barriers may be manufactured from either concrete, steel or plastic materials.

56. When Safety Barriers Should be Used

As set out in *Section 2.4.6: Safety barriers* of AS 1742.3–2002, safety barriers should be used when –

(a) there is potential for traffic conflicts (eg. head-on collision).

(b) there are hazardous objects or deep excavations near traffic.

(c) workers or roadworks plant and equipment need protection.

(d) footpaths or bicycle paths need to be separated from traffic.

57. Safe System of Work

(1) Where, following the completion of the worksite risk assessment process (refer Part 2 of this Code), safety barriers are to be used at a worksite, a safe system of work should be developed taking into consideration the following –

(a) the type, shape, protection, performance and test characteristics of the safety barrier (as stated by the manufacturer);

(b) the speed of traffic travelling through the worksite; and

(c) the clearance between the traffic and work area.

(2) In particular, attention should be paid to the following characteristics:

(a) strength of materials used to manufacture the safety barrier.

(b) performance test level of the safety barrier.

(c) maximum deflection at test level loading.

(d) connection details of individual units to ensure that when joined together they act appropriately.

(e) base requirements and whether they need horizontal support or "keying" into the existing pavement.

(f) anchorage terminal treatments and protection.

(g) minimum length of safety barrier.

(3) The design of a safety barrier system should include an analysis of the appropriate performance test level required for the worksite, and ensure that the selected safety barrier has been crash tested to the required performance level for the worksite.

NCHRP 350 provides for safety barriers to be crash tested at a range of test levels, with the most common for temporary safety barriers being –

(a) Test Level 1 (TL1) – 50 km/h crash test with a 2,000 kg vehicle.

(b) Test Level 2 (TL2) – 70 km/h crash test with a 2,000 kg vehicle.

(c) Test Level 3 (TL3) – 100 km/h crash test with a 2,000 kg vehicle.

(4) AS/NZS 3845–1999 and AS 1742.3–2002 require that the selected safety barrier should be appropriate for the location, traffic speed and conditions for which it is to be used.

(5) Safety barriers tested to TL1 or TL2 should be used for worksites where the speed limit is at least 10 km/h below the crash test speed and where compliance with the speed limit by most vehicles can be reasonably expected. For other worksites, safety barriers tested to at least TL3 should be used.

(6) Table 7 provides guidance on the use of temporary safety barriers at worksites having regard to the fact that some safety barrier systems currently in use have not been crash tested to the relevant NCHRP 350 performance test levels. The recommended clearance or "no-go" zone to be adopted in the use of these safety barriers has been determined by theoretical analysis only and their use should take into consideration the safe system of work as set out above. The use of non-compliant safety barriers should not continue after 1 January 2006 in accordance with clause 54 of this Code.

(7) Where non-compliant safety barriers are used prior to 1 January 2006, such use should be subject to auditing to ensure that appropriate controls are put in place for the safety of traffic and workers at the worksite.

Safety Barrier Type	Maximum Speed Limit (km/h)	Recommended Clearance or "No-Go" Zone [1] (metres)
Precast Concrete Barrier (6 metre Units) — with Units not connected.	30	Not recommended for use
Precast Concrete Barrier — with Units connected by steel pin or equivalent[2] and a 30 metre minimum length.	100 80 60	1.6 1.0 0.6
Plastic Water Filled Barrier - with TL3 compliance.	100 80 60	6.0 4.0 2.5
W Beam Guard Fence — with 2.5 metre post spacing.	100 80 60	1.5 1.0 0.5
Wire Rope Barrier — with 2.5 metre post spacing.	100 80 60	3.0 2.0 1.2
Concrete, Steel or Plastic proprietary barrier systems test compliant with NCHRP 350 TL1, TL2 and/or TL3.	To only be used in accordance with NCHRP 350 test level performance and manufacturer specifications	

Notes:

[1]. Recommended clearance or "no-go" zone based on theoretical analysis only. Safety barriers that do not comply with NCHRP 350 performance test levels should not be used from 1 January 2006.

[2]. Safety barriers that are not crash tested but are structurally continuous should have a connection system with a demonstrated tensile capacity of at least 150 kN in accordance with AS/NZS 3845-1999.

Table 7: Guidelines for Use of Temporary Safety Barriers at Worksites

58. Location With Respect to Traffic

(1) When safety barriers are used parallel to traffic there should be a horizontal clearance of 1000mm (desirable) and 300mm (minimum) between the road edge line and the base of the safety barrier (refer Figure 13 of this Code). Where there is no clearance between the edge line and the safety barrier, speed limits may need to be reduced. When the work area is below the road, consideration should be given to increasing the clearance between the safety barrier and the work area.

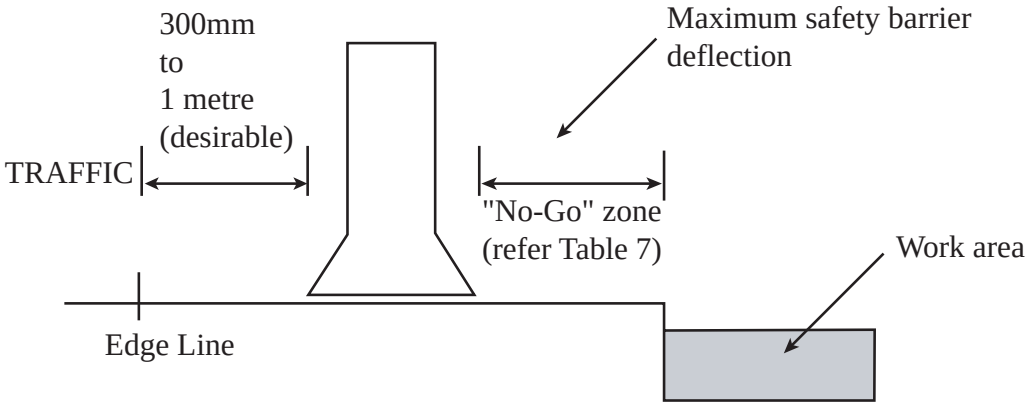


Figure 13: Safety Barrier Clearance

(2) Where possible, safety barriers should not be located behind kerb and channel so as to avoid the possibility of a speeding vehicle being launched into the air by the kerb and striking the top of the safety barrier and then rolling into the work area. Where the location of a safety barrier behind kerb and channel can not be avoided, then the safety barrier should be located such that its front face is either –

(a) less than 0.5 metres behind the kerb; or

(b) greater than 3 metres behind the kerb, but not more than 4 metres to avoid high angle impacts.

(3) The following lengths of safety barrier should generally apply –

(a) Minimum – greater of 30 metres or minimum length specified by the safety barrier manufacturer.

(b) Maximum – 1000 metres (desirable), but may be more depending on a traffic management plan.

(4) In determining the location and length of safety barrier to be used, consideration should be given to the manufacturer's stated performance characteristics of individual safety barrier systems.

59. Protection of Ends of Safety Barriers

The ends of a safety barrier system represent a safety risk to vehicle occupants. Accordingly, safety barriers should either be terminated with a crashworthy terminal treatment that complies with the appropriate test level requirements of NCHRP 350, or the safety barrier should be extended outside the clear zone at the required flare rate as specified in AS/NZS 3845–1999.

60. Working Behind Safety Barriers

(1) When safety barriers are in place, workers should not be allowed to work behind the safety barriers within the "no-go" zone as shown in Figure 13 of this Code.

(2) The width of the "no-go" zone should be the greater of the measured safety barrier deflection for the applicable NCHRP 350 test level or the recommended "no-go" zone in Table 7 of this Code.

(3) Where a safety barrier is to be used in a lower speed zone than the NCHRP 350 test level that it has been tested at, then the width of the "no-go" zone could be

reduced based on calculations of the likely deflection of the safety barrier due to impact of the test vehicle at a speed appropriate to the worksite.

(4) Where safety barriers are used at a worksite, they should only be removed after consideration of all OH&S issues and consultation with the appropriately trained personnel on the worksite.

61. Sight Restriction Screens

(1) Where safety barriers are used on heavily trafficked roads (generally volumes higher than 20,000 vpd), it is suggested that sight restriction screens be erected. These are designed to 'hide' activities from road users to avoid distracting them. Screens should generally be constructed using a flexible mesh fabric.

(2) Where it is proposed to erect a sight restriction screen, consideration should be given to the following –

(a) the effect of a screen on the stopping sight distance along the road (eg. roads with small radius curves).

(b) the stability of a screen under all conditions at the worksite.

(c) the effect of the height of a screen on the stability of the safety barrier.

(d) *Section 2.3.13: Attachments* of AS/NZS 3845–1999.

62. Methods of Moving Safety Barriers

The following general principles should be followed when moving safety barriers around a worksite –

(a) work should be carried out during daylight hours where possible.

(b) appropriate speed limits should be applied at each worksite.

(c) consideration should be given to the direction of erection of safety barriers (ie. generally facing oncoming traffic).

(d) consideration should be given to using a tail vehicle with an impact attenuator on roads with high speed and/or high volume traffic.

63. Crane Bays

Where safety barriers are used to protect mobile cranes, the following general principles should be followed –

(a) a traffic management plan should be prepared for each worksite.

(b) allowance should be made for pedestrians and cyclists where required.

(c) a clearance equivalent to the maximum safety barrier deflection for the applicable NCHRP 350 test level should be provided behind the safety barriers to any roadworks plant or equipment.

64. Traffic Management Plan Checklist

The form in Figure 14 of this Code can be used to undertake the risk assessment of the works to be carried out (whether on the road or roadside), and to record the key decisions made when determining the traffic management plan to be used for the works. The completed form should be filed for record purposes.

Work Location:		
Step 1 – Site Risk Rating Traffic volume ..... Clearance between workers and traffic		Traffic speed ..... Site Risk Rating: V H M L
Step 2 – Required Level of Planning Plans required		
Step 3 - Risks at Worksite and Step 4 – Risk Control Measures		
Safety Hazard/Risk Factors	**Present at Worksite**	**Risk Control Measure/s**
Clearance to traffic High speed traffic through worksite Poor advance sight distance to worksite (<200 metres) Poor observance of directions/ instructions by motorists Narrow pavement with no escape path (<2.9 metres width) Presence of workers at the worksite Excavations adjacent to worksite Presence of unprotected hazards within the clear zone Rough or unsealed road surface High volume of traffic through worksite (>10,000 vpd) High volume of heavy vehicles		
Works vehicles entering/leaving worksite		
Cyclists/pedestrians through worksite		
Other		
Step 5 – Risk Control Measures to be Used		
Step 6 – Traffic Management Plan Prepared and Implemented		
Step 7 – Traffic Management Plan in Practice Reviewed		
Step 8 – Carry out the Work		

Figure 14 – Traffic Management Plan Checklist – Long Term Works

PART 5 - GENERAL RISK CONTROL MEASURES

65. Introduction

This part of the Code provides guidance on measures that can be used to control risk and is additional to the provisions of AS 1742.3–2002 and the Standards Australia Field Guides.

Division 1 – High Visibility Clothing

66. General Requirements

(1) AS 1742.3–2002 provides that "High visibility clothing meeting the requirements of AS/NZS 4602–1999 shall be worn by all personnel working in or adjacent to traffic, including traffic at worksites, in quarries and on construction haul roads".

(2) Where other Australian Standards apply to the wearing of safety or protective clothing (eg. emergency services personnel involved in works such as fire fighting or fuel reduction burning; or personnel working in the vicinity of rail tracks), then those standards should apply. However, where personnel are required to work on the road in undertaking non-emergency works (eg. traffic controllers in conjunction with fuel reduction burns), then high visibility clothing meeting the requirements of AS 1742.3–2002 and AS/NZS 4602–1999, or equivalent, should be worn. The wearing of such high visibility clothing for non-emergency works should be supported by other risk management measures to protect, as far as is reasonably practicable, personnel from the risk of injury from traffic passing through the worksite.

67. Day Use Only at Road Worksites

Wherever personnel are required to work during daylight hours only at a worksite, they should wear a Class D outer torso garment (eg. vest, jacket, polo shirt, overalls) with high visibility Class F fluorescent material wherever possible. Material colours for normal use should be either 'red-orange' or 'yellow' in accordance with AS/NZS 4602–1999. Alternatively, *AS/NZS 1906.4–1997: Retroreflective Materials and Devices for Road Traffic Control Purposes, Part 4: High Visibility Materials for Safety Garments* ("AS/NZS 1906.4–1997") provides for the special use colours of 'red' or 'orange' for particular industries.

68. Day Use Next to Train Tracks

The VicTrack *'Procedures for Working on Rail Track Property and Facilities'* requires that all personnel working on or near train tracks or reserves must wear high visibility clothing that includes a vest of the type and colour designated by VicTrack. The VicTrack procedure also requires that –

(a) all personnel working in the vicinity of train tracks must ensure that they do not wear red or green clothing, including red or green hats or safety hats, or carry red or green objects. These colours have definite meanings to all operations of the railway system or signalling and safe working, and must be avoided at all times;

(b) work must not be undertaken within 10 metres of the nearest train track centreline (measured horizontally) without obtaining the prior permission of VicTrack; and

(c) all personnel working on or near train track infrastructure must complete an appropriate safety training course.

69. Night Use Only

(1) Wherever personnel are required to work at night only, they should wear a Class N outer torso garment made from a retroreflective material meeting the Class R standard specified in AS/NZS 1906.4–1997. The garment design should generally

include retroreflective horizontal hoops on the body, arms and legs in accordance with AS/NZS 4602–1999. Retroreflective material should be capable of reflecting in wet or dry conditions.

(2) Where the nature of night work is likely to get the garment dirty and reduce the retroreflectivity of the white material, consideration could be given to the wearing of a combination day/night outer torso garment (but excluding traffic controllers).

70. Combination Day and Night Use

Where personnel carry out work during a combination of day and night time conditions, they should wear a Class D/N designed outer torso garment made from a solid colour-fluorescent background material as per day use complete with retroreflective strips, preferably horizontal front and back.

71. Wet Weather Clothing

Where personnel are required to work in wet conditions, they should wear clothing made from water proof material matching as near as practicable those properties specified above for colour, and where necessary, retroreflectivity.

Division 2 – Speed Limits Through Worksites

72. General

(1) In addition to the requirements of *Section 4.5: Creating a Temporary Speed Zone at Roadworks* of AS 1742.3–2002, the following Victorian practices should be applied in relation to speed zones, repeater signs, end speed restriction signs and speed zoning.

(2) Speed limits should not be used to mask poor worksite traffic management practices.

(3) Worksite speed limit signs should not be used alone, but introduced with other traffic control signs and devices required by the worksite conditions. The aim should be to limit speeds so that the need for enforcement is minimised.

(4) Worksite speed limit signs should be placed on both sides of the road, or each carriageway of the road, on high-speed, high-volume roads, except where permanent overhead electronic signs are installed (eg. in freeway tunnels).

(5) To ensure the credibility of speed limit signs, the appropriate speed limit through the worksite should be changed to suit the conditions. In particular, speed limits should generally be lower when workers are present on the worksite.

(6) The use of these speed limits should be considered on a case by case basis, with the installation of any roadworks speed limit signs subject to any requirements of the relevant Regulations (including where necessary, the written authorisation or consent of VicRoads) as set out in clause 16 of this Code.

(7) The ROADWORK AHEAD sign or ROAD WORK supplementary plate should be erected with the first set of speed limit signs approaching a worksite to indicate to the road user the reason for the speed restriction, as shown in Figure 15.

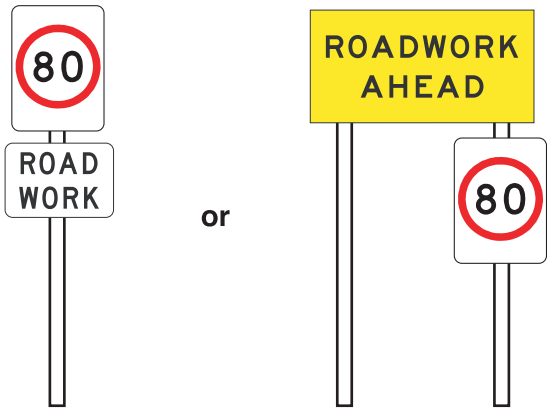


Figure 15: First Set of Speed Limit Signs

73. Buffer Zones

(1) *Section 4.5.5: Advance warning, buffer zones* of AS 1742.3–2002 provides that where advance warning of a temporary roadworks speed zone is required, it should be provided by means of a buffer zone. An intermediate speed zone before reaching the speed zone through the work area is called a buffer zone.

(2) Buffer zones should be used where the change in speed limit from the prevailing speed limit to the worksite speed limit is more than 30 km/h. However, a change from 80 km/h to 40 km/h is acceptable on low-volume roads when reducing from a prevailing speed limit of 100 km/h.

(3) AS 1742.3–2002 provides that, in general, a buffer zone may not be required if the approach speed to the temporary speed zone is not more than 20 km/h higher than the temporary speed limit. It is noted that Victoria does not use the AHEAD supplementary plate as referred to in AS 1742.3–2002.

(4) Guidance on the sequence of speed zones is listed below. The number in 'bold' is the speed limit through the worksite. Numbers in 'italics' represent the buffer zones.

60 – **40** – 60
80 – **60** – 80
80 – *60* – **40** – 80
100 – **80** – 100
100 – *80* – **60** – 100
100 – *70* – **40** – 100
100 – *80* – *60* – **40** – 100
100 – *80* – **40** – 100 (only on low volume roads)
110 – **80** – 110
110 – *80* – **60** – 110

(5) The length of 80 km/h and 70 km/h buffer zones should be between 300 metres and 500 metres. The length of 60 km/h buffer zones should be between 150 metres and 250 metres in advance of a 40 km/h zone. (Refer *Table 4.2: Guide to the Selection of Speed Limit at Roadworks* of AS 1742.3-2002).

74. Repeater Signs

Section 4.5.7: Repeater signs of AS 1742.3–2002 provides that, where used, repeater speed restriction signs "shall be placed on the left side of the roadway at a maximum spacing of 500 metres". For multi-lane roads or divided roads, repeater signs should be placed on each side of the road or carriageway where practicable.

75. End Speed Restriction

(1) At the end of the worksite, or termination area, where the traffic conditions can be returned to normal, signs should be erected to return the road to its original, or prevailing, speed limit. Signs indicating the end of the roadworks (eg. an "End Roadwork" sign), if used, should also be erected at this location. In returning traffic to the prevailing speed limit, a buffer zone is not required.

(2) It is a legal requirement that a roadworks speed zone be terminated either by another regulatory speed control sign (or end restriction sign), or other means as specified in Road Rules – Victoria. It is important that any sign terminating a roadworks speed zone is placed facing traffic exiting the work area.

(3) If a series of speed restrictions is in place on a particular road, and the distance between the ends of the lower speed zones would be less than 1000 metres in rural areas, or less than 500 metres in urban areas, then the lower speed limit should be continued between those zones.

76. Speed Zone Signing

Regulatory speed limit signs used at worksites should be consistent with AS 1742.3–2002 and associated Standards Australia Field Guides. Where a regulatory speed limit sign is to be used in a multi-message sign, then it should be used in accordance with Appendix D: Guidelines for the use of Multi-Message Signs of this Code.

77. Traffic Controllers

Where traffic controllers are in operation, the approach speed to the worksite should be controlled to a maximum speed limit of 60 km/h by means of the most appropriate traffic control measures having regard to the conditions of the worksite and approach road (eg. sight distance). This may include the imposition of a 60 km/h speed zone.

78. Protection of Workers Through the Worksite

(1) Where manual tasks are being undertaken close to traffic within a 40 km/h speed zone (eg. string lining, asphalt screeding) workers should, wherever practicable, face the oncoming traffic when performing such tasks.

(2) A temporary worksite speed limit should be removed when the need no longer exists.

Division 3 – Use of Traffic Control Signs

79. Use of Traffic Control Signs

(1) The use of any traffic control signs on worksites in accordance with a traffic management plan should meet at least the requirements of AS 1742.3–2002.

(2) Worksite speed zones should be removed or covered immediately the need no longer exists. This is particularly important when workers and/or roadworks plant and equipment, justifying the speed zone, are not present (eg. at night or on days when there is no work).

(3) Minor variations to a sign or device specified in AS 1742.3–2002 (eg. a sign reduced in size to enable its use in a standard multi-message sign mounting – refer Appendix D of this Code) can be tolerated provided that such a modified sign or device still represents a reasonable likeness of that sign or device as specified in AS 1742.3–2002.

(4) AS 1742.3–2002 provides that all roadworks signs should be at least Class 1 retroreflective material. A transition period exists utilising existing signs (generally Class 2 material) until 1 July 2005 when all signs used at worksites should then comply with AS 1742.3–2002.

Division 4 – Use of Portable Traffic Signals

80. General

(1) The use of portable traffic signals (refer Figure 16) should be in accordance with *Section 4.7: Portable Traffic Signals* of AS 1742.3–2002.

(2) In addition to the requirements of AS 1742.3–2002, the requirements as set out in clauses 81 to 84 of this Code should also apply to the use of portable traffic signals, other than for temporary fixed traffic signals (eg. fixed temporary signals installed for periods in excess of one to two weeks and connected to mains electricity). The design and installation of temporary fixed traffic signals should comply with the relevant requirements of *AS 1742.14–1996: Manual of Uniform Traffic Control Devices, Part 14 – Traffic Signals*.

(3) *Section 4.7.2: Operation* of AS 1742.3–2002 provides guidelines for the three modes of operation of portable traffic signals, being (i) vehicle actuated operation; (ii) fixed-time operation; and (iii) manual operation.

81. Authorisation or Consent

(1) Where traffic signals (whether portable or fixed) are proposed to be used at a worksite, their installation and operation is subject to compliance with the requirements of any relevant Regulations (including the written authorisation or consent of VicRoads) as set out in clause 16 of this Code.

(2) Persons operating portable traffic signals do not have authority to direct vehicles to proceed through red signals.

(3) Persons operating portable traffic signals should, as a minimum, have been trained as a Traffic Controller (refer clause 15 of this Code).

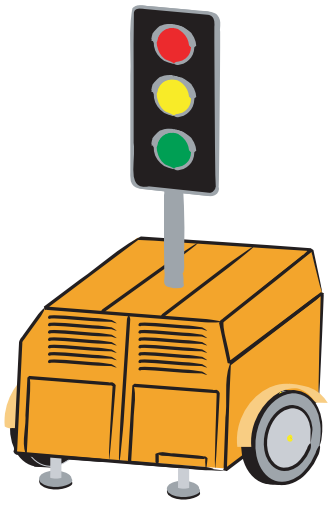


Figure 16: Portable Traffic Signal

82. Stop Here On Red Signal Sign

The STOP HERE ON RED SIGNAL (R6–6) sign should be used in conjunction with the portable traffic signals to indicate where traffic must stop, even if a stop line is provided. This sign should be erected 6 metres in advance of the portable traffic signals.

Figure 17: Stop Here On Red Signal Sign

83. Operation

(1) Shuttle Operation –

(a) shuttle operation is where a portion of the roadway is closed so that a single lane has to be used alternately by traffic in opposite directions.

(b) the length of a single-lane operation under reversible flow should not be greater than the values shown in *Table 4.7: Desirable Maximum Length of Single-Lane Operation under Reversible Flow* of AS 1742.3–2002.

(c) if the timing of the signals is pre-set, the red and green times should be realistic, to ensure the safety of road users and workers at the worksite, and to ensure that road users are not kept waiting for an "excessive" period against a red signal.

(2) Signals for Works Vehicle Crossings –

When signals are used to allow works vehicles to cross a road, manual activation of the signals should be applied, unless VicRoads has approved a detection system to allow the works vehicles to automatically activate the signals.

(3) Yellow Times –

The yellow time should comply with yellow settings at fixed traffic signals in Victoria, as set out in Table 8 below.

Approach Speed (km/h)	Yellow Time (seconds)
40	3.0
50	3.5
60	4.0
70	4.5
80	4.5

Table 8: Traffic Signal Yellow Times

(4) Flashing Yellow –

(a) the equipment should automatically switch to "flashing yellow" when any hazardous or incompatible conditions occur in its operation.

(b) under the law in Victoria, flashing yellow signals only have legal effect at an intersection or pedestrian crossing. Flashing yellow should not be used as a regular mode of operating traffic signals, even under light traffic conditions.

(5) "Signal Not In Use" Signs –

When traffic signals at worksites are not in use, the lamp assembly mast should be lowered or turned and directed away from all traffic flow to avoid distracting road users who may expect the signal to illuminate. If the masts are not lowered, the faces of inoperative lanterns should be covered with an approved metal 'NOT IN USE' sign.

(6) Use of Traffic Signals When No Workers Are Present –

(a) if portable traffic signals are operated when no works supervisors are present, advice should be provided to the VicRoads Traffic Management Centre (TMC) at 60 Denmark Street, Kew (Telephone 13 11 70). The TMC will contact the operator should they receive advice from the public regarding any problems with the signals.

(b) the TMC should also be advised when portable traffic signals are no longer in use.

(7) Approach Speeds –

When portable traffic signals are used for shuttle operation, the 85th percentile speed of approaching traffic should preferably be no more than 60 km/h and certainly no more than 70 km/h. Approach speeds to portable traffic signals used for works vehicle crossings should be no more than 80 km/h, depending on a risk assessment. Approach speeds may be reduced through speed limit signs. These requirements are in addition to *Clause 4.7.3: Approach conditions and speed* of AS 1742.3–2002.

84. Site Arrangements

(1) General Layout –

(a) approaches to portable traffic signals would normally be single lane. On multi-lane roads, reduction to a single lane should be completed a distance of 150 metres in advance of the traffic signals.

(b) traffic signal units should not be located on the travel path or be used as a barrier to slow traffic. The unit should be between one and two metres from the left edge of the travelled path with the beam aligned towards approaching vehicles about 200 metres from the signals. The lights should be in the vertical position to ensure maximum beam intensity.

(c) care should be taken that there is no background interference from other lights of the same colour (eg. advertising signs). Similarly, lighting in advance of traffic signals may reduce their effectiveness (eg. the use of an illuminated flashing arrow sign tends to reduce the effectiveness of other devices).

(2) Sight and Stopping Distance –

(a) it is important to locate signals to give them maximum visibility to approaching traffic and hence provide time for the vehicle to stop on a red signal. The minimum sight distance to the signal lantern required for stopping depends mainly on vehicle type and approach speed. Worksite conditions such as pavement surface also affect the required stopping sight distance.

(b) AS 1742.3–2002 requires that "sight distance on the approach to traffic signals shall be a minimum of 150 metres to the primary signal face." Where this sight distance is difficult to achieve, consideration should be given to locating additional traffic control signals on the right side of the travelled path. Where the view to the traffic control signals on the left side of the travelled path may be obscured by traffic ahead, additional signals should be placed on the right side.

(c) it may be necessary to repeat the symbolic "Traffic Signals Ahead" warning signs where the traffic signals cannot be seen or where traffic queues back beyond the signs.

Division 5 – Use of Electronic Variable Message Signs

85. General

(1) An electronic variable message sign (VMS) is a traffic control device which displays one or more messages providing road users with necessary information about construction operations, maintenance, accidents, traffic congestion, and roadway conditions.

(2) When used efficiently, a VMS can convey information that is critical in nature (ie. that requires road users to alter their driving in some manner and take specific action as a result), or that assists in the protection of workers at worksites or inspection sites.

(3) An electronic VMS can comprise either of the following –

(a) Mobile VMS – a mobile VMS may be trailer mounted or truck mounted and can be readily moved to a location as required, thus enabling the information to be given at the point of maximum impact; or

(b) Fixed VMS – a limited number of fixed VMS have been erected beside or above high volume multi-lane roads for traffic control purposes. These can be used as warning devices provided that the worksite is nearby.

86. Application

(1) A VMS is used to provide added advance warning to road users on high speed and/or high volume roads where work activities may cause delays, or may require stopping, slowing, merging, or other manoeuvres that require a specific reaction.

(2) Examples of worksite applications where a VMS can be effective include –

(a) construction and maintenance activities to provide advance warning on high-speed freeways and arterial roads where workers are exposed to traffic, and to notify of delays and future activities.

(b) temporary traffic conditions for all parts of the road reserve including closures, detours and restrictions on vehicle dimensions.

(c) traffic conditions including changes in alignment, surface conditions, road width, lane drops, traffic delays, congestion and expected decrease of traffic speed.

(3) Other applications where a VMS can be used are –

(a) combined with radar-speed readout, to encourage speed reduction prior to work activities. Due to unit reset/response time, they should only be used on roadways with low to moderate traffic volumes.

(b) to provide information on work schedules, alternate routes, anticipated delays, and other time-related information.

87. Restrictions on VMS Usage

A VMS should NOT be used to –

(a) replace static signs at a worksite.

(b) replace flashing light arrow boards.

(c) advise road users of something they already know.

(d) provide information that is so specific it gives road users a false sense of security (eg. Roadwork Ends 1.002km).

(e) display unnecessary information such as "Please Be Careful", "Drive Safely", unless this is a default message.

88. Message Screens

(1) In order to ensure that the message is readable and understandable, and to maximise road safety, messages should be kept to a maximum of two screens in all speed zones where practicable. This enables road users to read and understand the entire message. Messages should not scroll horizontally or vertically.

(2) If a message is displayed in one screen, the top line should refer to the problem, the centre line should advise of the location, and the bottom line should indicate the road user action required.

ROADWORKS
2KM
SLOW DOWN

(3) Single screen messages should be displayed continuously.

(4) For messages that require two screens the following format should be used –

(a) Screen 1 – problem/distance

(b) Screen 2 – action

Example: 1st Screen:

MONASH FWY
NIGHT WORKS
16–17 DEC

2nd Screen:

SEEK ALT
ROUTE

(5) Message update rates should be set as follows –

(a) Each message screen: 1.2 – 2 seconds

(b) Pause between screens: 0.5 – 1 seconds

(6) Where the message cannot be condensed to fit on two screens, an additional VMS should be located 300 metres downstream of the first sign. In this situation, only one of the VMS's should display a multiple screen message at any given time.

(7) Symbols should only be used when the VMS has sufficient clarity for these symbols to be clearly defined by the pixels in the sign.

89. Message Structure

(1) VMS messages should answer the questions of what, where and when, in a short and concise manner. They should only be displayed when either a response is needed or to inform road users of future events. As a minimum, road users need to know what they should do and a good reason for doing it.

LANE CLOSED
1KM
MERGE RIGHT

(2) When used in conjunction with active work operations, the messages should convey the state of the roadway condition and any actions that road users will be required to take (eg. deviation, closure, lane closure).

90. Message Wording

(1) When choosing the text for the message, it is important to remember that the message should –

(a) be as brief as possible.

(b) be easily understood.

(c) be unambiguous.

(d) be accurate and timely.

(e) avoid sensational incident information.

(2) Research has shown that messages should be limited in length to eight words in three lines, with each line being centred. This enables road users to quickly read the message without being distracted from the road.

(3) Where words need to be abbreviated, they should be clear and unambiguous and should be used without a full stop. Unnecessary words and filler words (eg. ahead, caution, danger, hazardous, a, an, the) should be eliminated.

91. Placement and Operation of VMS Hardware

(1) Placement of the VMS (refer Figure 18 of this Code) is important to ensure that the sign is visible to the road user and provides ample time to take any necessary action.

(a) The basic principles of placement for a VMS are –

(i) placement should be in accordance with the traffic management plan prepared for the works.

(ii) where motor driven generators are used, the emitted noise of the equipment should comply with all regulations applicable to the control of environmental noise in the relevant area.

(iii) pedestrian traffic, other road signing and adjacent properties and businesses should not be adversely affected.

(iv) if it is practicable, a mobile VMS should be secured to an immovable object to prevent theft.

(b) Aiming Distance –

Wherever practicable, a mobile VMS should be aimed to the centre of the nearest lane for approaching traffic, using the aiming distance specified in Table 9 below, as shown in Figure 18. If the mobile VMS displays two screens, more distance is required for motorists to read and comprehend the sign.

Speed (km/h)	Aiming Distance (m)	
	One Screen	Two Screens
40 – 60	65	90
70 – 80	105	140
90 – 100	160	200
110	190	235

Table 9: Aiming Distance

(c) Longitudinal Placement –

(i) depending on the application of the VMS, there are a number of positions at which they could be placed. For messages that require an action, the VMS should be placed approximately 12 seconds of travel time upstream from the decision point. For freeways, they should be placed 300 metres in advance of a worksite. For advance notice messages, it is important to locate the VMS close to the area that will be affected so that road users can make a judgement as to whether it will affect them.

(ii) a VMS should generally be positioned well upstream of the advance warning signs for a mobile or frequently changing worksite. Up to two kilometres from the actual work activity is considered appropriate. However, depending on travel speeds and roadway conditions, this distance may vary so road users have sufficient time to make any necessary decisions. A truck mounted VMS may be used for slowly moving and mobile operations if available and if there is adequate shoulder width to permit the truck-mounted mobile VMS to be at least one kilometre behind the operation. Caution should be used to ensure that the mobile VMS is not so far from the worksite that the effect is diminished. Alternatively, a distance qualifier should be used to indicate when road users should expect the works.

(d) Lateral Placement –

(i) a VMS should be placed on the side of the roadway closest to the affected travel lane, being normally the left side of the roadway. Lateral positioning of a VMS should have regard to Figure 18 and the following –

- where there is a kerb, the mobile VMS should be positioned behind it.
- if there is no kerb, it should be placed on the verge outside of any shoulder or emergency lane.
- where practicable, the mobile VMS should be positioned behind semi-rigid or rigid protection (eg. guard fence, wire rope).
- for urban roads, the mobile VMS should be located behind the kerb, being sure not to interfere with pedestrians, cyclists and other footpath users.
- if placing a mobile VMS behind the kerb is not an option, a parking lane can be used although care should be taken in ensuring that it does not encroach into any traffic lanes and the lane is properly closed off to through traffic.

(e) Visibility –

(i) the VMS should be clearly visible and legible from all traffic lanes and remain legible for up to 30 metres from the VMS.

(ii) elevating the VMS increases the visibility of the sign to oncoming traffic so it can be viewed from behind other vehicles. Where the VMS is located in the vicinity of pedestrians, the bottom of the sign should be a minimum of 2.15 metres above the ground.

(iii) signs should not be placed in sags or just beyond crests and should not be obstructed from view by vegetation, parked vehicles, or other roadside visual obstructions.

(iv) on curved alignments, in order to meet the sight distance recommendations, the VMS should be located at the commencement of the curve, or if not practicable, in such a way as to maximise the sight distance of the sign.

(v) also to be taken into consideration are specular reflection, background conditions (including lighting), and oncoming headlights.

(f) Character Size –

Generally, the size of the characters on a VMS should be equivalent to those on the static signs, as set out in the relevant Australian Standards. Table 10 gives dimensions for various speed zones, although the type of road, volume of traffic and position of sign should be taken into consideration when determining appropriate character sizes as shown in Table 10.

Speed Zone (km/h)	Height (mm)	Size
40–60*	180	B
60–70	240	C
80–90	320	D
100–110	400	E

Note: * For use on urban roads only.

Table 10: Character Size

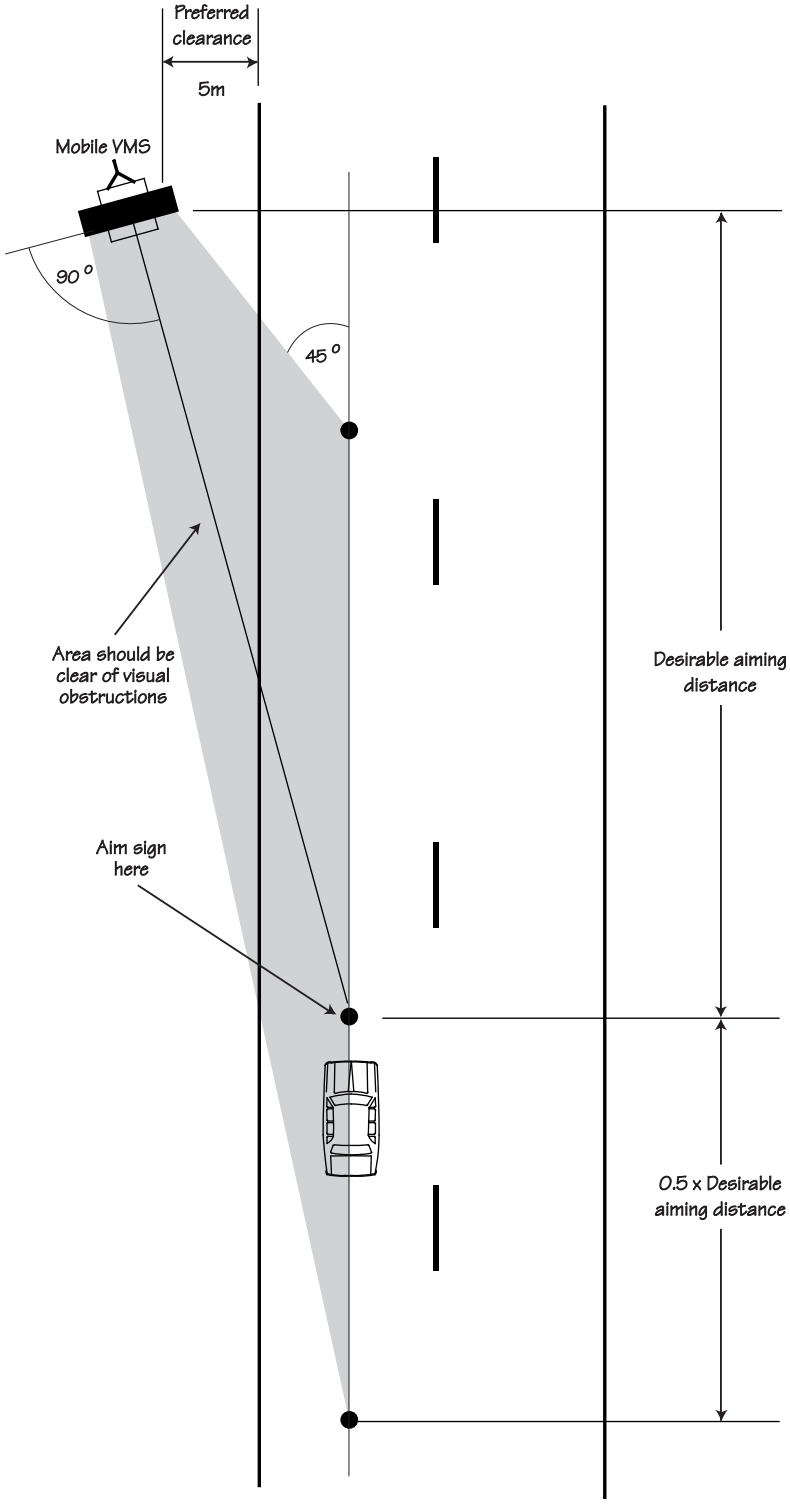


Figure 18: Mobile VMS Placement

Division 6 – Traffic Management and Roads With Electronic Signs

92. General

This section covers the use of electronic signs instead of certain static signs at a worksite as part of the overall arrangement of traffic control signs and devices to manage traffic.

93. Speed Limit Signs

(1) Where speed limit signs are to be used at a worksite, electronic speed limit signs may be used instead of static signs, provided –

(a) the electronic signs conform to the Road Rules – Victoria; and

(b) the electronic signs are located longitudinally along the road in accordance with the requirements of AS1742.3–2002; and

(c) appropriate buffer zones are signed where required; and

(d) there is no conflict between electronic and static speed limit signs.

(2) Such electronic speed limit signs may be located overhead or at the side of the road. They may have part of the red annulus of the sign flashing when the speed is reduced below the normal speed limit.

94. Roadwork Warning Signs

A permanently mounted VMS may be used instead of a static sign for temporary roadworks to display messages consisting of words only (eg. roadwork ahead or end roadwork). Such a VMS may also be used for symbolic advance warning messages, such as the symbolic lane closed messages or the symbolic worker signs, but only if the electronic sign has sufficient clarity for these symbols to be clearly defined by the pixels in the sign. These signs may have an illuminated legend on a black background, instead of the standard colours.

95. Lane Use Signs

(1) Overhead electronic lane use signs are used to indicate that a traffic lane is closed to traffic by displaying a red diagonal cross over the traffic lane. Where these signs are in place, they may be used at worksites to indicate that a traffic lane is closed.

(2) Where a traffic lane closure has been implemented using an overhead electronic lane use sign –

(a) static lane status signs may be omitted;

(b) the maximum spacing between traffic cones or temporary bollards adjacent to a closed traffic lane may be increased to 24 metres, or up to 60 metres if the lane closure is longer than 1 kilometre; and

(c) all other traffic control signs and devices used to delineate the traffic lane closure should comply with *Section 3.9: Devices for Delineating and Indicating the Travelled Path* and *Section 4.4: Approach Tapers* of AS 1742.3–2002.

APPENDIX A

DOCUMENTS REFERENCED IN THIS CODE

Acts and Regulations:

- **Occupational Health and Safety Act 1985**
- **Road Management Act 2004**
- **Road Safety Act 1986**
- **Interpretation of Legislation Act 1984**
- **Public Record Act 1973**
- **Road Safety (Road Rules) Regulations 1999**
- **Road Rules – Victoria**

Australian Standards:

- AS 1742.3-2002: Manual of Uniform Traffic Control Devices, Part 3: Traffic Control Devices for Works on Roads
- AS 1742.14-2002: Manual of Uniform Traffic Control Devices, Part 14: Traffic Signals
- Standards Australia Field Guides for Traffic Control at Works on Roads, HB 81.1 to HB 81.9 (9 volumes)
- AS/NZS 1906.1-1993: Retroreflective Materials and Devices for Road Traffic Control Purposes, Part 1: Retroreflective Materials
- AS/NZS 1906.4-1997: Retroreflective Materials and Devices for Road Traffic Control Purposes, Part 4: High Visibility Materials for Safety Garments
- AS/NZS 3845-1999: Road Safety Barrier Systems
- AS/NZS 4360-2004: Risk Management
- AS/NZS 4602-1999: High Visibility Safety Garments

Other:

- Austroads Road Safety Audit Guide 2002
- NCHRP Report 350: Recommended Procedures for the Safety Performance Evaluation of Highway Features
- VicTrack: Procedures for Working on Rail Track Property and Facilities
- WorkSafe Victoria: Framework for Undertaking Work Near Overhead and Underground Assets - Guide to the No Go Zones, July 2004

APPENDIX B

WORKSITE SAFETY - TRAFFIC MANAGEMENT CHECKLIST

	WORKSITE SAFETY - TRAFFIC MANAGEMENT CHECKLIST		
Date		**Time**	
Employer		**Worksite Manager**	
Health & Safety Representative			
Location of Worksite			
Activity Being Undertaken			

Estimated daily traffic volume (vehicles per day)	**vpd**	**Clearance between workers and traffic**	**metres**
'Normal' traffic speed through area	**km/h**	**Worksite traffic speed**	**km/h**
Risk rating			

	Issue	Yes	No	N/A
	PLANNING			
1.	Has a traffic management plan been selected or provided? (eg. Field Guide reference, traffic management plan)			
2.	Is the plan available for inspection?			
3.	Is the plan relevant for the work?			
4.	Are any required written authorisations or consents for speed limits in order?			
5.	Are documented changes (if any) to the plan available for inspection?			
6.	Have roadworks speed limits been determined correctly?			
	ADVANCE WARNING / SIGNAGE			
7.	Are all roadworks signs and devices installed according to the plan?			
8.	Have any contradictory, distracting or superfluous signs or markings been covered up or removed?			
9.	Are signs appropriate for current conditions? (eg. symbolic worker signs not displayed / not visible when no workers on site; road condition signs after worksite vacated.)			
10.	Is signage suitably placed, especially for vehicles approaching at high speed? (eg. check sight distance, advance warning sign distance, height of signs above ground, vehicle queue length not beyond signage.)			
11.	Are multi-message signs being used correctly?			
12.	Are the signs free from damage and defect? (eg. easy to read; check shadow & glare issues.)			
13.	Are sign mountings secure, stable and not a hazard to road users if struck?			
14.	Are signs in pairs where needed? (Note: recommended on high speed high volume roads and multi-lane roads.)			
15.	Are flashing arrows signs available and in use where required?			
16.	Are sign sizes correct?			
	WORKSITE			
17.	High visibility clothing appropriate for conditions and used correctly? (eg. day/night; meet AS4602-1999 and AS1906; clean; fastened; personnel visible.)			
	WORK ZONE SEPARATION			
18.	Are clearances between workers and adjacent traffic being maintained?			
19.	Have safety barriers (where used) been installed correctly? (eg. units connected; recommended length, proper end treatment installed; water filled where required, correct rating for speed zone, no go zones observed.)			
20.	Has containment fence been installed where required? (eg. workers/pedestrians/cyclists separation.)			
	OTHER ROAD USERS			
21.	Has possible traffic congestion been considered and steps taken to avoid it?			
22.	Have needs of other road users been provided for (eg. pedestrians, cyclists, wheelchairs)?			
23.	Has proper access to side roads and properties been provided?			
	NOTES			
	REFERENCES			
A.	AS 1742.3 – 2002 Manual of uniform traffic control devices, Part 3: Traffic control devices for works on roads, and associated Field Guides for Traffic Control at Works on Roads.			

APPENDIX C

AUTHORISATION/CONSENT FOR CERTAIN TRAFFIC CONTROL DEVICES AT WORKSITES

APPLICATION I/We apply for authorisation/consent to erect/use the traffic control device/s described below at the location/s listed in accordance with VicRoads' guidelines for same, agree to remove or alter as soon as no longer applicable, accurately record actual usage in a recoverable document (eg. diary), and reapply for authorisation/consent if use beyond the "Expiry (Removal) Date" is needed.	
NAME: **PHONE NO:**_____ **FAX NO:** _____ **OF:**	**SIGNATURE:** **DATE:**
DESCRIPTION **1. TYPE OF WORK:**	**CONTRACTOR:**
2. CONTROL DEVICE/S	
3. LOCATION – ROAD **AT:**	**MUNICIPALITY:** **MELWAY/COUNTRY DIRECTORY:**
4. EXPECTED ERECTION DATE	
5. EXPECTED DISPLAY TIMES	
6. EXPIRY (REMOVAL) DATE	
7. PERMANENT DEVICES TO BE CHANGED	
AUTHORISATION/CONSENT **As authorised by the Roads Corporation I authorise/consent to the above.** **NAME:** **REGION:**	**DATE:** **TITLE:** **SIGNATURE:**
Common traffic control devices for worksites: **Speed Restriction signs (inc. Value)** **Stop and Give Way signs** **Traffic Control Signals** **Stop Here on Red Signal sign**	**Authorised/Consented copies to:** **1. Applicant** **2. Police TMU@** **3. VicRoads file** **4. Project file**

APPENDIX D

GUIDELINES FOR MULTI-MESSAGE SIGNS

1. Introduction

(1) This section describes the permitted uses of multi-message signs at worksites on roads.

(2) Multi-message signs are an alternative to stand-alone signs. They are usually more conspicuous than stand-alone signs because of the striking colour combinations, and they make the task of signing easier and cheaper due to the lightweight compact sign materials.

2. Guidelines for Use

(1) The use of multi-message signs should comply with the following requirements -

(a) Should not be used on urban freeways, except where the worksite speed limit for traffic approaching the multi-message sign is 60 km/h or less and there are no more than two trafficable lanes for that direction of travel (refer also to sub-clause (c) below). Where multi-message signs are not permitted, standard stand-alone signs as per AS 1742.3-2002, or permanent overhead electronic signs (eg. where used in freeway tunnels), should be used.

(b) Individual message plates should comply with the requirements for the related stand-alone sign in *Section 3: Description and Use of Signs and Devices* of AS 1742.3-2002.

(c) When used on high-speed, high-volume roads, sign assemblies should, where practicable, be duplicated on both sides of the road, or carriageway of the road to which the signs apply.

(d) Flags should be displayed on the first multi-message sign a road user encounters, and any other that has a reduced speed limit within the sign assembly. Flags should not be required on a multi-message sign displaying the prevailing speed limit at the end of the works.

(e) When used, regulatory speed limit sign plates should be placed on the side of the multi-message frame closest to the traffic.

(f) All sections of the frame should be filled - a blank plate should be used within any unused sections of the sign assembly.

(g) Within one sign assembly, no more than two message plates consisting of words only should be used. If the 1200 x 600 mm space is filled with two separate 600 x 600 mm message plates, at least one of the 600 x 600 mm plates should be symbolic or blank.

(h) Messages should be logically linked and conflicting messages should not be used.

(i) Typical examples of the use of multi-message signs are shown in Figures D1, D2, D3 and D4 of this Appendix.

3. Frame for Multi-Message Signs

(1) The frame for multi-message signs should be capable of holding the following message plates –

(a) two 600 x 600 mm and one 1200 x 300 mm, or

one 1200 x 600 mm and one 1200 x 300 mm.

(b) The frame should be capable of holding back-to-back mounting of message plates.

(c) The frame should have a matt black finish.

(d) The frame should comply with the requirements of *Section 3.3.1: General* of AS 1742.3-2002.

4. Message Plates

(1) Approved VicRoads message sign plates are shown in Table D1. No other message plates should be used.

(2) Substrate material for the message plates should comply with the manufacturer's requirements for reflective sheeting. Where plastic flute board is used, the minimum thickness should be 6 mm.

(3) The sign face should be constructed of retroreflective material meeting or exceeding the performance standard for Class 1 material, as specified in *Australian Standard AS/NZS 1906.1-1993: Retroreflective Materials and Devices for Road Traffic Control Purposes, Part 1: Retroreflective Materials.*

(4) The sizes of symbols and words on message plates should generally accord with "A" size signs shown in AS 1742.3-2002, however, it is acceptable for the size of the legend to be reduced slightly if it is necessary to fit into the relevant plate size. This takes precedence over the requirements of *Section 3.3.2: Multiple sign displays* of AS 1742.3-2002.

5. Labelling Ownership of Message Plates

(1) The rear of message plates may be marked to identify the owner of the sign, subject to the following conditions -

(a) the rear marking may consist of a logo and/or lettering indicating the owner.

(b) the overall marking should be contained within a rectangle no larger than 200 square centimetres.

(c) the marking should be non-reflective.

(d) lettering should preferably be orientated at 45 degrees from the horizontal.

(2) These requirements are to avoid the marking on the rear of the sign being a distraction to road users if the rear of the sign is displayed to traffic.

(3) The front of message plates may be marked with a "watermark" to identify the owner of the sign, subject to the following conditions -

(a) watermarks may consist of a logo and/or lettering indicating the owner.

(b) they should have minimal impact on the retroreflective performance of the sign.

(c) typically, they should be applied using 1.4% black ink and 98.6% toner.

(d) each watermark should not exceed 50mm square.

(e) where used, watermarks should be placed in the corners or along the edge of a sign with a minimum spacing of 320mm. For example, on a 1200x300 panel, four watermarks may be placed along the top or bottom edge of the sign; and on a 600x600 panel, four watermarks may be placed in the four corners.

(4) Watermarks should only be applied to white, yellow and fluorescent red/orange materials, and not on screen-printed signs with red or blue backgrounds.

TABLE D1

Message Sign Plates

(Minimum Standard of Class 1 Sheeting Material)

Sign	Size	Colour	Sign Number
Advance Series			
	600 x 600	Black on Yellow	TM1-V1-1
	1200 x 300	Black on Yellow	TM1-V1-2
	1200 x 600	Black on Yellow	TM1-V1-3
	600 x 600	Black on Yellow	TM1-V2-1
	600 x 600	Black on Yellow	TM1-V3
	600 x 600	Black on Yellow	TM1-V4
	600 x 600	Black on Fluorescent Red/Orange	TM1-V5
	1200 x 600	Black on Yellow	TM1-V6
	1200 x 600	Black on Yellow	TM1-V10
	1200 x 300	Black on Yellow	TM1-V11-1

Sign	Size	Colour	Sign Number
	1200 x 600	Black on Yellow	TM1-V11-2
	1200 x 300	White on Red	TM1-V18
	1200 x 300	Black on Yellow	TM1-V27
	600 x 600	Black on Yellow	TM1-V30
	600 x 600	Yellow	TM1-V100-1
	1200 x 300	Yellow	TM1-V100-2
	1200 x 600	Yellow	TM1-V100-3
	1200 x 300	White on Blue	TM1-V102
	1200 x 300	Black on Yellow	TM1-V103-1
	1200 x 600	Black on Yellow	TM1-V103-2
	1200 x 300	Black on Yellow	TM1-V104-1
	1200 x 600	Black on Yellow	TM1-V104-2

Sign	Size	Colour	Sign Number
	1200 x 300	Black on Yellow	TM1-V105
	600 x 600	Black on Yellow	TM1-V106
	1200 x 300	Black on White	TM1-V108
	1200 x 300	Black on Yellow	TM1-V109
Position Series			
	1200 x 300	Black on Yellow	TM2-V4-1
	1200 x 600	Black on Yellow	TM2-V4-2
	300 x 600	Black on Yellow	TM2-V6-1(LA)
	300 x 600	Black on Yellow	TM2-V6-1(LC)
	600 x 600	Black on Yellow	TM2-V6-2(L)
	600 x 600	Black on Yellow	TM2-V6-2(R)
	1200 x 600	Black on Yellow	TM2-V6-3(L)

Sign	Size	Colour	Sign Number
	1200 x 600	Black on Yellow	TM2-V6-3(R)
	600 x 600	Black on Yellow	TM2-V13
	600 x 600	Black on Yellow	TM2-V17
	1200 x 600	Black on Yellow	TM2-V23
	600 x 600	Black on Yellow	TM2-V24
	600 x 600	Black on Yellow	TM2-V100
	1200 x 300	Black on Yellow	TM2-V101(L)
	1200 x 300	Black on Yellow	TM2-V101(R)
Road Condition Series			
	600 x 600	Black on Yellow	TM3-V3
	600 x 600	Black on Yellow	TM3-V6
	600 x 600	Black on Yellow	TM3-V7

Sign	Size	Colour	Sign Number
	600 x 600	Black on Yellow	TM3-V9
	600 x 600	Black on Yellow	TM3-V13
	600 x 600	Black on Yellow	TM3-V14
	600 x 600	Black on Yellow	TM3-V100
	1200 x 300	Black on Yellow	TM3-V101
	1200 x 300	Black on Yellow	TM3-V102-1
	1200 x 600	Black on Yellow	TM3-V102-2
Special Hazard Series			
	1200 x 600	Black on Yellow	TM4-V100
	1200 x 600	Black on Yellow	TM4-V101
	1200 x 600	Black on Yellow	TM4-105

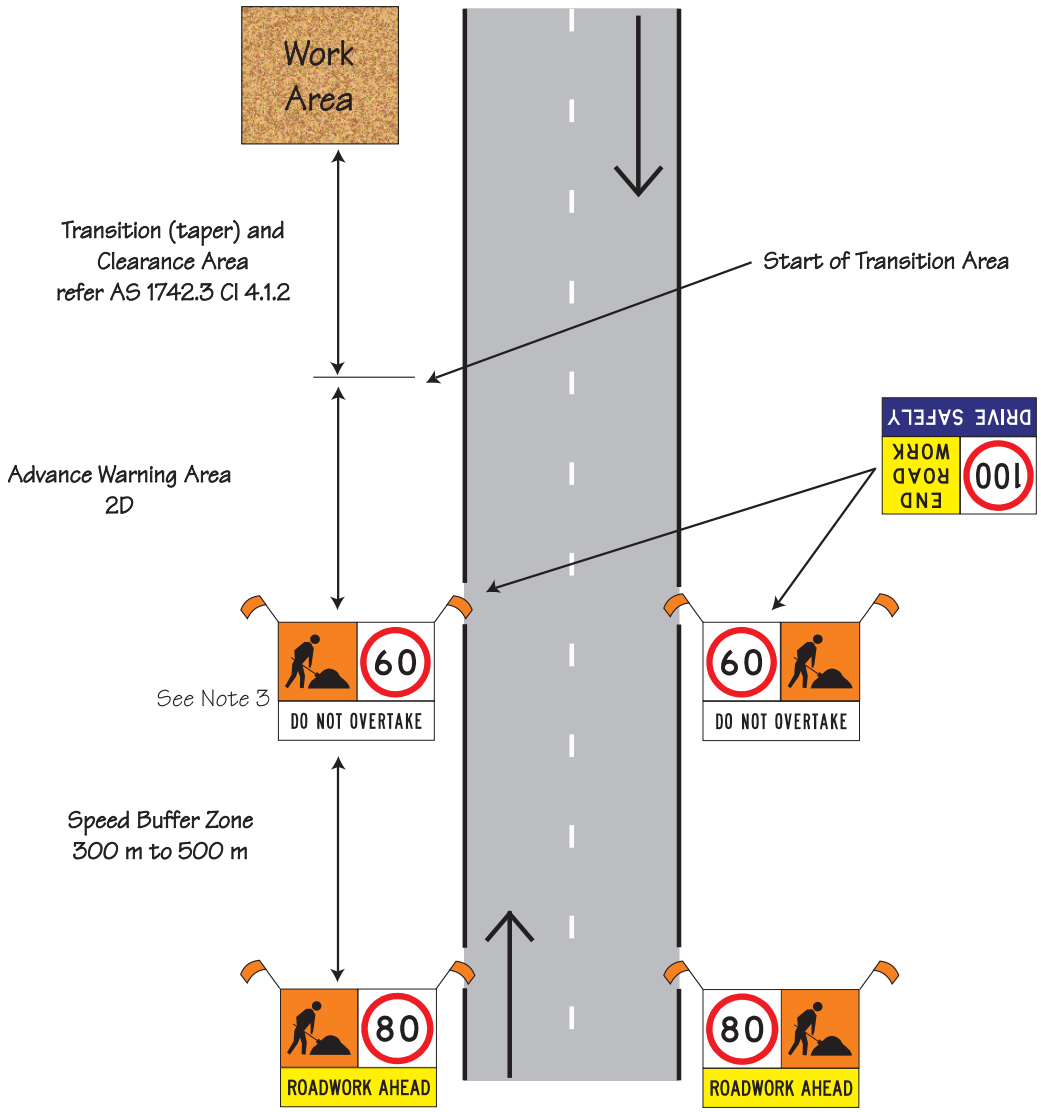
Sign	Size	Colour	Sign Number
Traffic Diversion Series			
	1200 x 300	Black on Yellow	TM5-V1(L)
	1200 x 300	Black on Yellow	TM5-V1(R)
	1200 x 300	Black on Yellow	TM5-V1(T)
	600 x 600	Black on Yellow	TM5-V5
	600 x 600	Black on Yellow	TM5-V6
	600 x 600	Black on Yellow	TM5-V100
	600 x 600	Black on Yellow	TM5-V101
Pedestrian Series			
	1200 x 300	Black on Yellow	TM8-V2(L)
	1200 x 300	Black on Yellow	TM8-V2(R)
	600 x 600	Black on Yellow	TM8-V3

Sign	Size	Colour	Sign Number
	600 x 600	Black on Yellow	TM8-V100
Regulatory Series			
	600 x 600	Black/Red/White	RM2-V6(L)
	600 x 600	Black/Red/White	RM2-V6(R)
	600 x 600	Black/Red/White	RM4-V1-40
	600 x 600	Black/Red/White	RM4-V1-50
	600 x 600	Black/Red/White	RM4-V1-60
	600 x 600	Black/Red/White	RM4-V1-70
	600 x 600	Black/Red/White	RM4-V1-80
	600 x 600	Black/Red/White	RM4-V1-90
	600 x 600	Black/Red/White	RM4-V1-100
	600 x 600	Black/Red/White	RM4-V1-110

Sign	Size	Colour	Sign Number
 *	600 x 600	Black/White	RM4-V12-40
 *	600 x 600	Black/White	RM4-V12-60

* To be used only in accordance with clause 3.5.5(c) of AS1742.3.

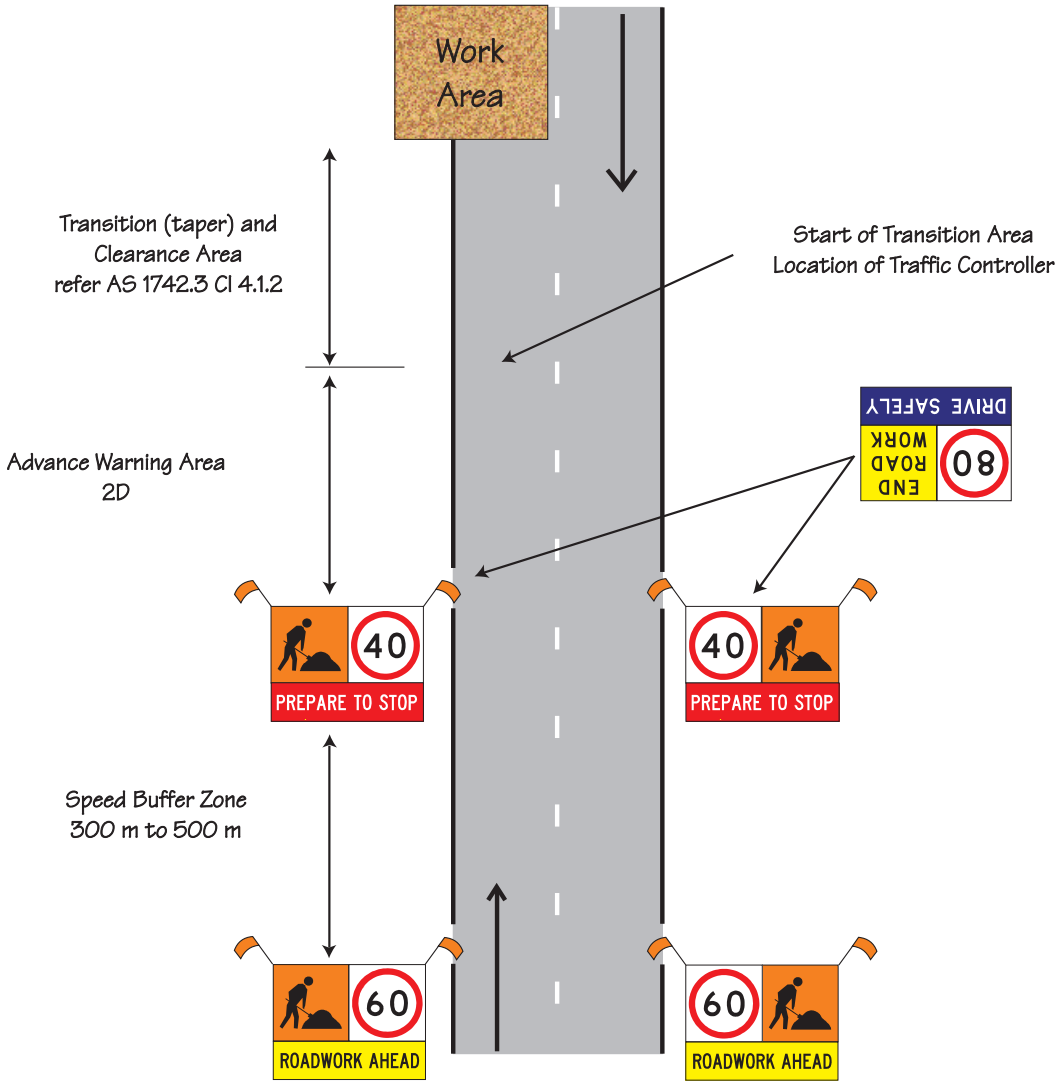
FIGURE D.1
MULTI-MESSAGE SIGNING FOR BASIC SPEED REDUCTION



Notes:

1. "D" is the distance expressed in metres, equal to the posted speed limit in km/h, or approach speed if significantly different from the speed limit.
2. Same signing arrangement is to be used on the opposite approach to the work area.
3. Replace "Do Not Overtake" panel with "Roadwork" panel if appropriate.

FIGURE D.2
MULTI-MESSAGE SIGNING FOR TRAFFIC CONTROLLER

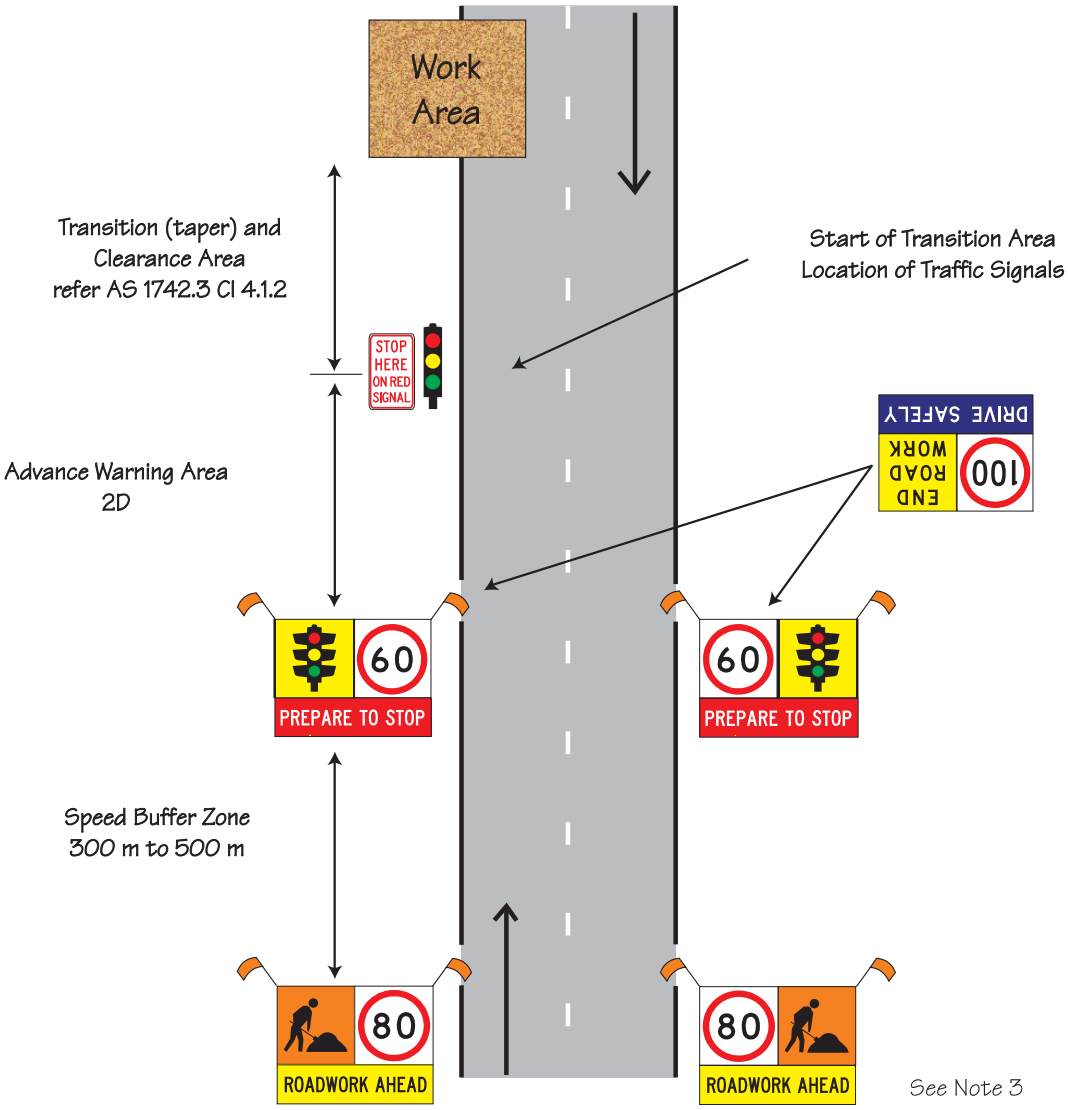


(Based on HB 81.1 Figure 9 and HB 81.2 Figure 9)

Notes:

1. "D" is the distance expressed in metres, equal to the posted speed limit in km/h, or approach speed if significantly different from the speed limit.
2. Same signing arrangement is to be used on the opposite approach to the work area.

FIGURE D.3
MULTI-MESSAGE SIGNING FOR TRAFFIC SIGNALS

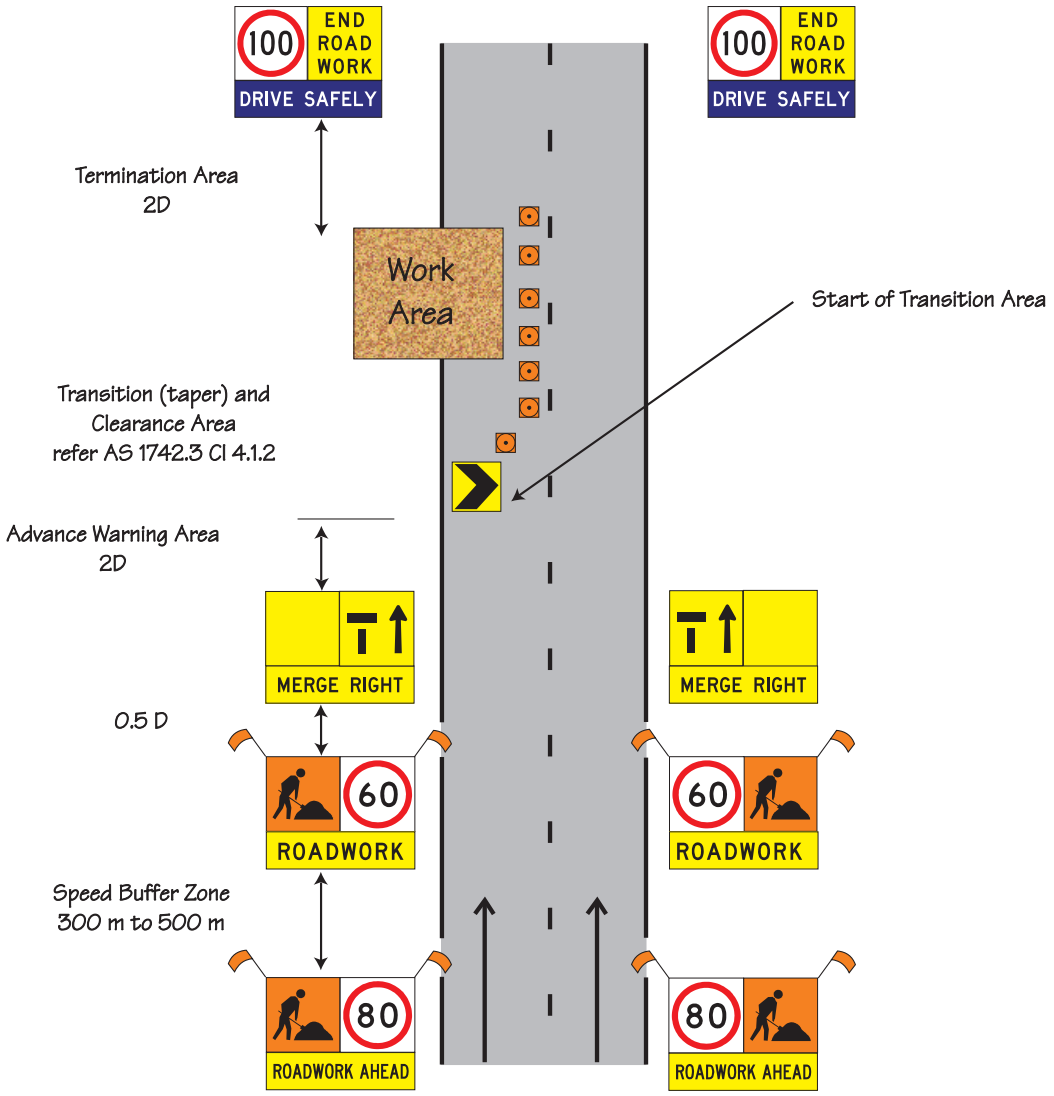


(Based on HB 81.1 Figure 10 and HB 81.2 Figure 6)

Notes:

1. "D" is the distance expressed in metres, equal to the posted speed limit in km/h, or approach speed if significantly different from the speed limit.
2. Same signing arrangement is to be used on the opposite approach to the work area.
3. Replace "Do Not Overtake" panel with "Roadwork" panel if appropriate.

FIGURE D.4
MULTI-MESSAGE SIGNING FOR LANE CLOSURE



(Based on HB 81.1 Figures 5 & 6 and HB 81.2 Figures 10 & 11)

Note:

1. "D" is the distance expressed in metres, equal to the posted speed limit in km/h, or approach speed if significantly different from the speed limit.

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