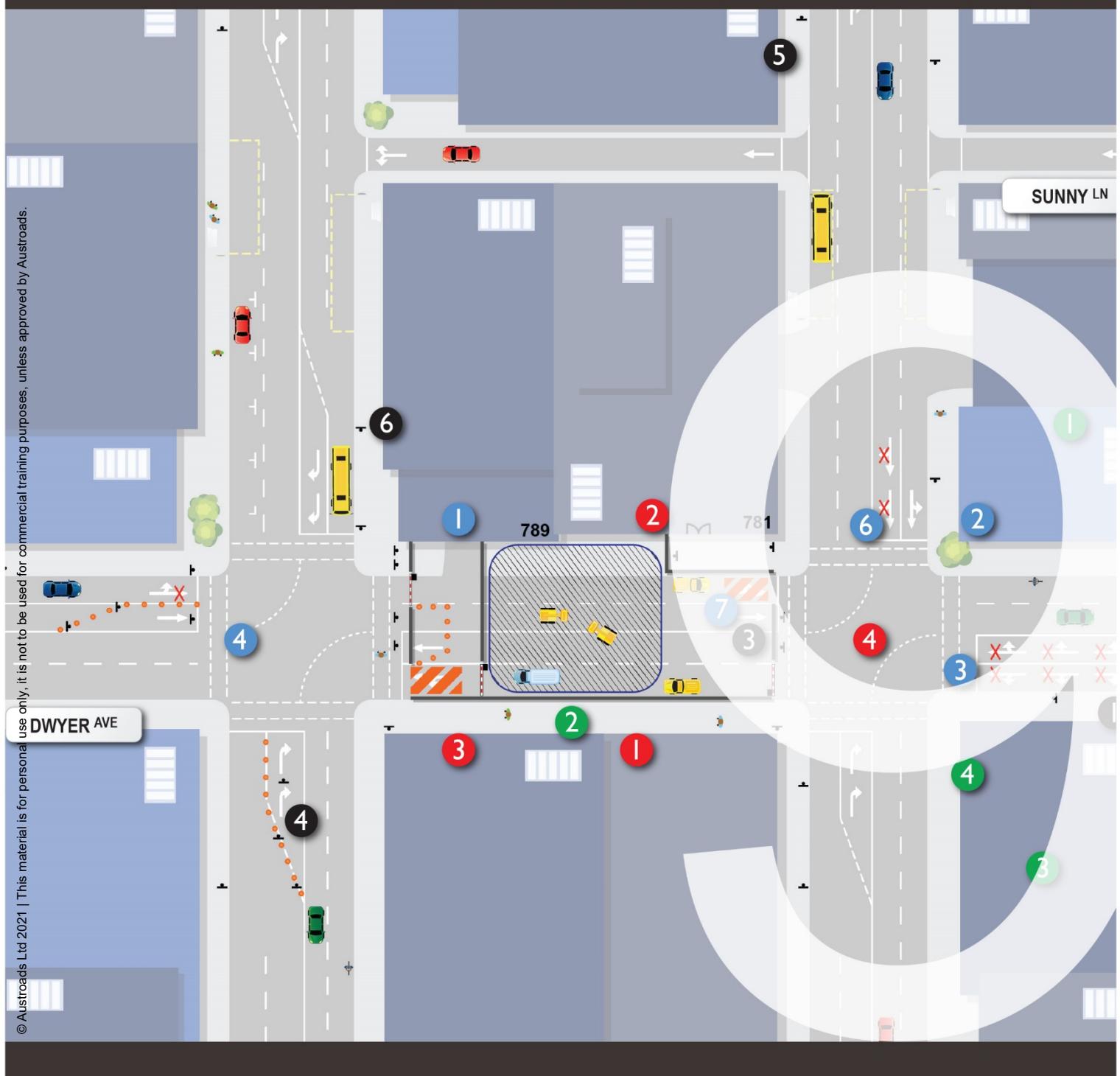


Guide to Temporary Traffic Management Part 9

Sample Layouts



Guide to Temporary Traffic Management

Part 9: Sample Layouts



Sydney 2021

Guide to Temporary Traffic Management Part 9: Sample Layouts

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Abstract <p>Austroads' Guide to Temporary Traffic Management (AGTTM) details contemporary temporary traffic management practice for application in Australia and New Zealand. It provides guidance for the planning, design and implementation of safe, economical and efficient temporary traffic management designs. This Guide recognises the level of variability of the road environments for which guidance is provided. The guidance provided in AGTTM is intended to encourage a consistent level of planning that supports the streamlined safe progress of work. It applies to all works on roads and near roads, in addition to off road development and other activities that interact with and impact on the road environment.</p> <p>AGTTM has been developed based on best practice temporary traffic management practice in Australia and New Zealand, to assist road authorities to meet their existing legislative responsibilities for workplace and public safety.</p> <p>Part 9 provides illustrative and educational sample layouts to support the other parts of AGTTM and to assist Traffic Management Designers in the interpretation of the various requirements of this AGTTM.</p>	About Austroads <p>Austroads is the peak organisation of Australasian road transport and traffic agencies. Austroads' purpose is to support our member organisations to deliver an improved Australasian road transport network. To succeed in this task, we undertake leading-edge road and transport research which underpins our input to policy development and published guidance on the design, construction and management of the road network and its associated infrastructure.</p> <p>Austroads provides a collective approach that delivers value for money, encourages shared knowledge and drives consistency for road users.</p> <p>Austroads is governed by a Board consisting of senior executive representatives from each of its eleven member organisations:</p> <ul style="list-style-type: none">• Transport for NSW• Department of Transport Victoria• Queensland Department of Transport and Main Roads• Main Roads Western Australia• Department for Infrastructure and Transport South Australia• Department of State Growth Tasmania• Department of Infrastructure, Planning and Logistics Northern Territory• Transport Canberra and City Services Directorate, Australian Capital Territory• The Department of Infrastructure, Transport, Cities and Regional Development• Australian Local Government Association• New Zealand Transport Agency.
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1. Introduction

1.1 Purpose

Managing the risks associated with providing an optimal level of safety for persons working in or near traffic and the impact of road work on road users, road congestion and the general community, is a significant issue for road agencies and industry. Road agencies and industry have a legislative requirement as an employer of construction, operational and maintenance services to provide a safe work environment and to manage the risks of working in or near traffic through current jurisdictional Work Health and Safety (WHS) requirements, regulation, training and roadwork planning.

The Austroads Guide to Temporary Traffic Management (AGTTM) details the contemporary temporary traffic management practice of member organisations. In doing so, it provides guidance to designers in the production of safe, economical and efficient temporary traffic management designs. This Guide recognises the level of variability of the road environments for which guidance is provided. The guidance provided in AGTTM is intended to encourage the consistent planning, design and implementation of temporary traffic management across Australia and New Zealand while also supporting the streamlined safe progress of work. It applies to all works on roads and near roads, in addition to off road development and other activities that interact with and impact on the road environment.

The purpose of the AGTTM is to provide guidance and supporting material that:

- supports the ability of road agencies and industry to meet their WHS requirements and lead to improved safety outcomes at road worksites
- improves the standard of temporary traffic management in Australia and New Zealand through consistency of application which assists road users to recognise and understand temporary traffic management, thereby improving their behaviour and safety
- aims to reduce the rate of incidents occurring at worksites
- improves the ability of road authorities and industry to manage the increasing frequency and variety of activities that are being undertaken on and near the road
- allows continuous industry review to maintain best practice.

This purpose is achieved through:

- providing direction for all matters relating to the planning, design and implementation of temporary traffic management
- facilitating improved adaptation to changes in technology and practices through being reactive to changes and being able to readily include new innovations
- providing guidance focused on the users of this Guide
- providing road agencies and industry with uniform practices whilst carrying out works on or near roads.

The benefits associated with uniform guidance broadly accepted by jurisdictions and industry include:

- guidance and training that appropriately develop designers with the skills necessary to develop and deliver safe traffic management at road worksites
- reduced impost on industry working across jurisdictional borders
- improved harmonisation of road worksites across jurisdictions providing improved consistency for road users, including vulnerable road users such as pedestrians and cyclists. This is targeted at improving road user behaviour, safety of road worksites and reducing impact on road congestion and the general community.

1.2 Structure of AGTTM

The structure and content of the Austroads Guide to Temporary Traffic Management is discussed in AGTTM Part 1: Introduction to Temporary Traffic Management Practice. Within the AGTTM, the terminology that applies is detailed in Table 1.1.

Table 1.1: Guidance terminology

Guide	The description for the complete Austroads Guide to Temporary Traffic Management including all 10 Parts.
Part	The description for the individual documents within the Guide. This document is Part 9 of the Austroads Guide to Temporary Traffic Management.
Section	The description for a numbered section within each Part of the Guide. This is Table 1.1 placed within Section 1.2 of Part 9 of the Austroads Guide to Temporary Traffic Management.

Within this Guide, reference may be made to other parts of the Austroads range of publications such as the *Guide to Road Design* and the *Guide to Traffic Management*.

In the context of the other guides within the Austroads range of publications, this Guide is restricted to matters relating to temporary traffic management practice and refers only briefly to issues more appropriately addressed in other Austroads Guides. It is recognised it is difficult, if not impossible, to discuss many aspects of temporary traffic management practice without reference to traffic management, road design and/or safety issues. The view is taken that within the AGTTM, any such advice should be brief and be supported by references to other Guides for the appropriate guidance as required.

The scope of the AGTTM is broad, addressing requirements and recommendations for protecting road workers and all road users, including vulnerable road users, from hazards, road traffic and other impacts of road works across a range of situations that may include:

- urban and rural environments
- motorways, major arterial roads, local roads, roads in built-up areas, roads in open road areas and unsealed roads
- all variations of road use by cars, heavy vehicles, public transport, motorcycles, cyclists and pedestrians
- day and night works
- changing road and weather conditions.

The structure of the AGTTM is described in Figure 1.1 and in Table 1.2.

Figure 1.1: Structure of the Austroads Guide to Temporary Traffic Management

Overview	Part 1: Introduction		
Planning	Part 2: Traffic Management Planning		
Design	Part 3: Static Worksites	Part 4: Mobile Works	Part 5: Short Term Low Impact Worksites
Field	Part 6: Field Staff – Implementation and Operation		Part 7: Traffic Controllers
Support	Part 8: Processes and Procedures	Part 9: Sample Layouts	Part 10: Supporting Guidance

Table 1.2: Austroads Guide to Temporary Traffic Management

Part	Title	Content
Part 1	Introduction	<ul style="list-style-type: none"> • Introduction to the discipline of TTM practices • Breadth of the subject and the relationship between the various Parts of the Guide • Legislative relationships • Links to related jurisdictional documentation • Definitions
Part 2	Traffic Management Planning	<ul style="list-style-type: none"> • Broad strategies and objectives to provide effective TTM to ensure the safety for all road users is maintained • Guidance on the safety of workers and other road users • Examples and key considerations for planning of TTM at road worksites • Process for planning and documenting TTM
Part 3	Static Worksites	<ul style="list-style-type: none"> • Guidance on the design of temporary traffic guidance schemes at static worksites • Process to decide what static worksite set up is appropriate to implement (including devices used)
Part 4	Mobile Works	<ul style="list-style-type: none"> • Guidance on the design of temporary traffic guidance schemes at mobile works • Process to decide what mobile works set up is appropriate to implement (including devices used)
Part 5	Short Term Low Impact Worksites	<ul style="list-style-type: none"> • Guidance on the design of temporary traffic guidance schemes at short term low impact worksites • Process to decide what short term low impact worksite set up is appropriate to implement (including devices used)
Part 6	Field Staff – Implementation and Operation	<ul style="list-style-type: none"> • On site risk assessment • Installation and removal of TTM schemes • Operation and monitoring of TTM schemes • Record keeping
Part 7	Traffic Controllers	<ul style="list-style-type: none"> • Training competencies • Instructions on practices • Control devices that can be used
Part 8	Processes and Procedures	<ul style="list-style-type: none"> • Road network classification • Powers, roles and responsibilities • Forms and procedures • Model contract specification • Training competencies
Part 9	Sample Layouts	<ul style="list-style-type: none"> • Example layouts of static worksite conditions • Example layouts of mobile works conditions • Example layouts of short term, low impact conditions • Example layouts for staging plans • Worked example for a multi-stage project
Part 10	Supporting Guidance	<ul style="list-style-type: none"> • Risk management processes • Review, inspection and road safety audit of worksites • Events • Emergency works

1.3 Scope

The Austroads *Guide to Temporary Traffic Management Part 9: Sample Layouts* (AGTTM Part 9) provides supporting sample guidance to designers of TTM at road worksites in the application of AGTTM Parts 2, 3, 4, 5 and 7. When planning site specific traffic management solution options and developing the need for stakeholder notification requirements refer to AGTTM Part 2 and 8.

1.4 Application of Part 9 to New Zealand

Readers in New Zealand should note the following in application of Part 9 of this Guide:

- the layouts described in this section and in the accompanying figures are based on layouts applied within the Australian context. For layouts applied within New Zealand, refer to the New Zealand Code of Practice for Temporary Traffic Management.

1.5 Definitions

Refer to AGTTM Part 1 for a full list of definitions which apply to this Part.

2. Sample Layouts

2.1 Objectives

The overall objectives of AGTTM Part 9 are to provide:

- visual guidance demonstrating the practical application of other parts of AGTTM
- educational guidance to traffic management designers that helps the industry improve the design standard for site specific traffic guidance schemes to achieve safe and effective outcomes
- sample layouts in a style that is illustrative, educational and non-standard to avoid the perception that examples are “standard diagrams”.

To achieve these objectives Part 9 provides:

- sample layouts that are illustrative and educational
- detailed AGTTM clause references to guide designers through the specific details and decisions they need to make
- guidance on additional site-specific constraints that designers may need to account for within their design development
- guidance on the typical risks related to each type for setup designers should consider within their design development and risk assessments
- implementation guidance that traffic management designers should consider when developing their designs and possible inclusion within the instructions to the implementors.

2.2 Sample Layout Content and Structure

The sample layouts provided in the Appendices to Part 9 are intended only to assist Traffic Management Designers (TMDs) with the practical application of the guidance provided in other parts of the AGTTM. They are not intended to be generic traffic guidance schemes that can be customised by designers or implementers for use on site.

Appendix A to Appendix H provide sample layouts representing a 'real world' birds eye view of a given scenario which has been developed based on AGTTM Parts 2, 3, 4, 5 and 7. These examples do not provide specific signage or dimensioning for layout of traffic control devices. Rather, the samples are specifically presented to support the TMD in the use of the AGTTM in the design and decision-making process and provide real world context for the types of users, issues and risks that may need to be considered. Each scenario is presented in one of the following environments: Rural, Urban, Residential, Metro. These environments influence the surrounding land uses and road users that a TMD will need to consider.

Ideally, the sample layouts are intended to be read and reviewed holistically as a supporting information. TMDs should not consult one specific example in isolation.

Within Appendices A – H, reflecting the objectives outlined in Section 2.1 colour coded notes are provided in the following four categories:

- **Reference Notes** (black): provide specific reference to other AGTTM clauses that the TMD would need to interpret to decide relevant details.
- **Designer Considerations** (blue): provide the TMD with examples of site-specific issues they may encounter in real world conditions and provide guidance on how to address these issues.
- **Risk Considerations (red)**: provides the TMD with examples of the types of risks that may be encountered for the scenario presented within the environment.

- **Implementer Considerations (green):** provides the TMD with examples of the types of instructions and considerations that may need to be included on a traffic guidance scheme (or within planning and implementation) so that implementors are appropriately informed about specific processes and issues that they are expected to be responsible for during implementation, operation and removal of a worksite. The numbered implementor considerations are not an indication of the installation order.

The notes on each sample layout include a range of considerations a TMD may need to address, however they are not a complete or exhaustive list. The TMD should always consider all the site-specific needs and constraints of their traffic management solutions.

Within Appendix I, a series of documents are provided to represent the development of multiple traffic guidance schemes for a single site requiring staged works. These provide TMDs with guidance on the development of 'real world' documentation for traffic management and includes:

- issues to consider when preparing a title block and other supporting documentation for a traffic guidance scheme
- documentation of site-specific issues during the planning stage of the project which can be used to inform stakeholders, implementors and other designers of the issues that have been considered
- development of staging plans to accommodate multiple worksites and progression of project works within a corridor
- development of a detailed traffic guidance scheme to illustrate the level of information that a TMD should provide and key issues that a TMD should consider when producing traffic guidance schemes using the AGTTM Parts.

3. Summary of Scenarios

3.1 Static Worksites (AGTTM Part 3)

3.1.1 Around worksites

Design for TTM ‘around’ the worksite involves methods of hazard elimination, when the entire work area (including all vehicles and plant) is located 6 m or more from the nearest clear edge of a traffic lane or separated with a permanent road safety barrier. These sample ‘around’ worksite layouts were generated in compliance with AGTTM Part 3, Section 3 and AGTTM Part 7, Section 2. For assistance when guiding traffic flow ‘around’ worksites, refer to Table 3.1 and Appendix A.

Table 3.1: Around worksites

Layout number	Description
1	Full closure of direction with detour, including an oversize vehicle detour
2	Two-way sidetrack
3	Median crossing sidetrack
4	Highway off-ramp closure
5	Highway closure
6	Full closure of carriageway with detour
7	Contraflow through signalised intersections (Part 1)
8	Contraflow through signalised intersections (Part 2)

3.1.2 Through worksites

Design for TTM ‘through’ the worksite involves methods of hazard separation, where the passage of traffic through a worksite is permitted during pauses in work activity. These sample ‘through’ worksite layouts were generated in compliance with AGTTM Part 3, Section 4 and AGTTM Part 7, Section 2. For assistance when guiding traffic flow ‘through’ worksites, refer to Table 3.2 and Appendix B.

Table 3.2: Through worksites

Layout number	Description
9	Traffic through work area (rural)
10	Traffic through work area (urban, multi-lane)

3.1.3 Past worksites

Design for TTM ‘past’ the worksite involves methods of hazard separation, when the entire work area (including all vehicles and plant) is located within 6 m from the nearest edge of a traffic lane. Due to the closeness of works and traffic, road users require more complex traffic controls to ensure both their safety and that of road workers. This is achieved through a combination of lateral separation, clear warning and delineation. These sample ‘past’ worksite layouts were generated in compliance with AGTTM Part 3, Section 5 and AGTTM Part 7, Section 2. For assistance when guiding traffic flow ‘past’ worksites, refer to Table 3.3 and Appendix C.

Table 3.3: Past worksites

Layout number	Description
11	Lane closure (two-way flow, residential, >1.2m to nearest traffic lane)
12	Lane closure on multi-lane carriageway.
13	Partial lane closure (existing flow), including pedestrian diversion
14	Multi-lane closure on multi-lane, divided carriageways
15	Lane closure on multi-lane, undivided roads with multiple merges and lateral shifts
16	Lane closure on multi-lane, undivided roads with merges and lateral shifts
17	Single lane shuttle flow (under traffic control)
18	Single lane shuttle flow (PTSS)
19	Single lane shuttle flow at intersections using portable boom gates
20	Traffic control through intersections (unsignalised)
21	Traffic control through intersections (signalised) – slip lane
22	Multi-merge tapers at a single location
23	Traffic control through intersections (signalised) - median
24a & 24b	Typical treatment of cycle lanes
25a & 25b	Typical treatment of pedestrian pathways
26	Temporary speed management devices

3.1.4 Worksites at roundabouts

Design for TTM ‘past’ the worksite involves methods of hazard separation specifically at existing roundabouts, when the entire work area (including all vehicles and plant) is located within 6 m from the nearest edge of a traffic lane. Due to the closeness of works and traffic, road users require more complex traffic controls to ensure both their safety and that of road workers. This is achieved through a combination of lateral separation, clear warning and delineation. These sample ‘past’ worksite layouts were generated in compliance with AGTTM Part 3, Section 5 and AGTTM Part 7, Section 2. For assistance when guiding traffic flow ‘past’ worksites at roundabouts, refer to Table 3.4 and Appendix D.

Table 3.4: Worksites at roundabouts

Layout number	Description
27	Minor roundabout
28	Major roundabout (multi-lane)

3.2 Mobile Works (AGTTM Part 4)

3.2.1 Mobile works

Mobile works involve vehicles moving progressively along the roadway at speeds lower than that of general traffic. This may be on the road or on the shoulder. Activities that interrupt traffic flow for up to one hour at one location are accepted under mobile works. These sample mobile works layouts were generated in compliance with AGTTM Part 4, Section 3 and in accordance to the three (3) classes of mobile works activities detailed in AGTTM Part 4 Section 3.2. For assistance when dealing with mobile works situations, refer to Table 3.5 and Appendix E.

Table 3.5: Mobile Works

Layout number	Description
29	Mobile works (Class 2 – 100km/h)
30	Mobile works (Class 2 – 80km/h)
31	Mobile works (Class 3 – 100km/h)
32	Mobile works (Class 3 – 60km/h)

3.2.2 Works on unsealed roads

Unsealed roads are usually characterised as Category 1 roads. A detailed description of road categories can be found in AGTTM Part 8: Processes and Procedures. Further detail of practices for static works are outlined in Part 3: Static Worksites. These sample unsealed road layouts were generated in compliance with AGTTM Part 4, Section 3. For assistance when guiding traffic flow on unsealed roads, refer to Table 3.6 and Appendix F.

Table 3.6: Works on unsealed roads

Layout number	Description
33	Grading of unsealed roads

3.3 Short Term or Low Impact Work Sites (AGTTM Part 5)

3.3.1 Works on road

These sample short term, low impact works on-road layouts were generated in compliance with AGTTM Part 5, Section 4. For assistance when managing safety for workers with short term low impact measures on road, refer to Table 3.7 and Appendix G.

Table 3.7: Works on road

Layout number	Description
34	Works within gaps in traffic
35	Short term works (within traffic)
36	Frequently changing sites (within traffic)

3.3.2 Works outside of traffic lane

These sample short term, low impact works off-road layouts were generated in compliance with AGTTM Part 5, Section 4. For assistance when managing safety for workers with short term low impact measures where works being conducted outside of the traffic lane, Table 3.8 and Appendix H.

Table 3.8: Works outside of traffic lane

Layout number	Description
37	Frequently changing sites (within shoulder)
38	Works in shoulder (workers on foot or small plant)
39	Works in shoulder (large plant)

3.4 Worked Examples

The Sample Layouts provided in Appendix A to Appendix H are intended to guide the user in the interpretation and application of AGTTM guidance material and provide progressive learning experiences through the presentation of a wide variety of scenarios that the TMD may encounter. In contrast, Sample Layouts in Appendix I are intended to provide practical guidance on the documentation of TGS design and also guide the user through a fictional worked example. These Sample Layouts assist AGTTM users to consider the variety of styles and formats for the relevant documentation that a TMD may need to prepare when developing traffic management solutions. Sample Layouts 40 - 42 provide practical guidance and tips (not included elsewhere in AGTTM material) on issues such as preparing a title block, information, instructions and details that should be documented in a TGS, types of signage, and visual application of AGTTM Part 3 Figure 5.1 to planning a worksite on a multi-lane road. Sample Layouts 43 – 50 represent a fictional project example and guide users through a range of issues including planning a multi-stage project, site inspection and data collection, preparing staging plans, and TGS presentation and layout, and the detailed application of AGTTM to prepare a ‘real world’ traffic guidance scheme.

Sample Layouts included in Appendix I are listed in Table 3.9

Table 3.9: Fictional project worked examples

Layout number	Description
Practical guidance on TGS design	
40	Title block, notes and certification
41	Resource and signage presentation examples
42	Application of AGTTM Part 3 Figure 5.1
Fictional project worked examples	
43	Pre-planning and site observations
44	Staging Sketch – Stage 1
45	Staging Sketch – Stage 2
46	Staging Sketch – Stage 3
47	Traffic Guidance Scheme – Stage 1
48	Traffic Guidance Scheme – Stage 2
49	Traffic Guidance Scheme – Stage 3
50	Traffic Guidance Scheme – Aftercare

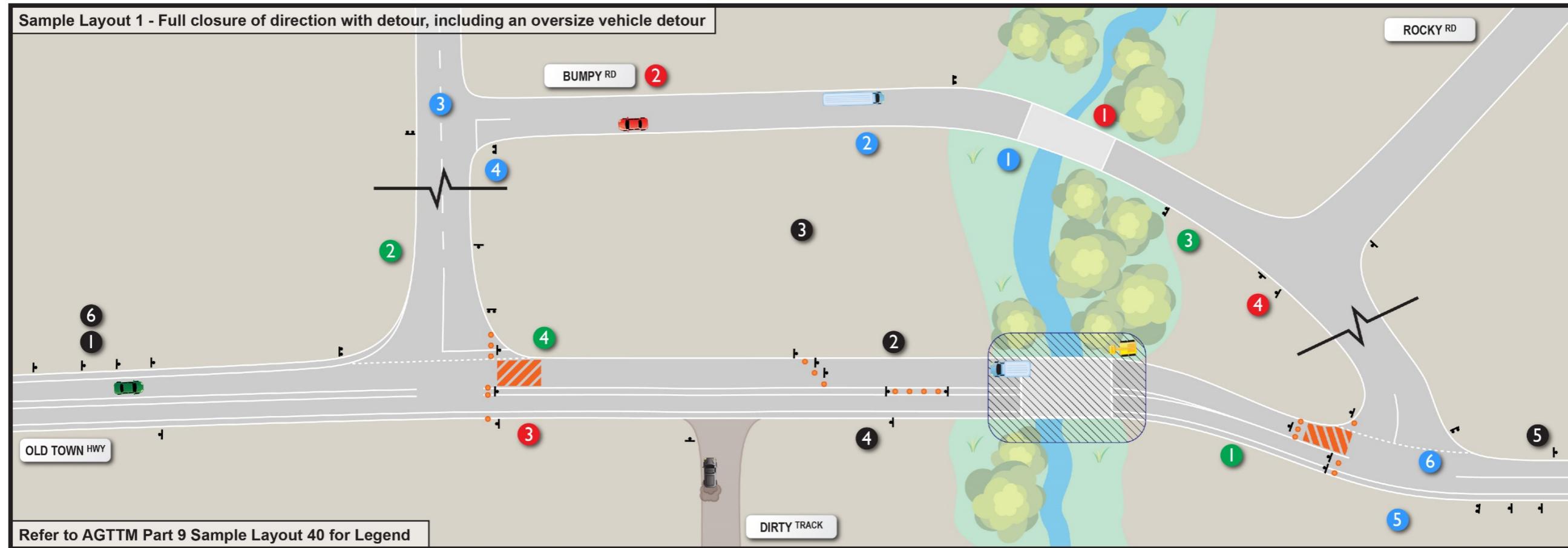
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Appendix A Sample Layouts (Around Worksites)

Application for New Zealand

Note that the layouts described in this section and in the accompanying figures are based on layouts applied within the Australian context. For layouts applied within New Zealand, refer to the New Zealand Code of Practice for Temporary Traffic Management.



Scenario

Department of State Roads has contracted XYZ Operations Ltd to replace an old rural bridge. Works will result in a full closure of the Old Town Highway for several months. A detour around the work zone is available via Bumpy Road, which has another older and smaller bridge. Access needs to be maintained to several farms located on Dirty Track.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'around' work zone treatments are covered in AGTTM Part 3, Sections 3.6 and 3.7 respectively.
- 3 Further information regarding planning for detours is discussed in AGTTM Part 3, Section 3.8.1.
- 4 AGTTM Part 3, Section 3.4 provides information and considerations regarding road closures.
- 5 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.
- 6 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.

Risk Considerations

- 1 The detour requires the use of an older smaller bridge. The risk of detouring heavy vehicles on this bridge will require careful assessment and may need engineering advice.
- 2 When detouring onto unsealed roads, the designer should consider the risk of adverse weather conditions on the performance of the detour.
- 3 While Old Town Highway is to be fully closed, the need to maintain access to Dirty Track as well as the construction site may introduce risks of vehicles following farm traffic into the closed highway.
- 4 Lighting standards and hazard guidance on the detour route may be of a much lower quality. Designers should consider the risks involved with a lower standard of road environment.

Disclaimer

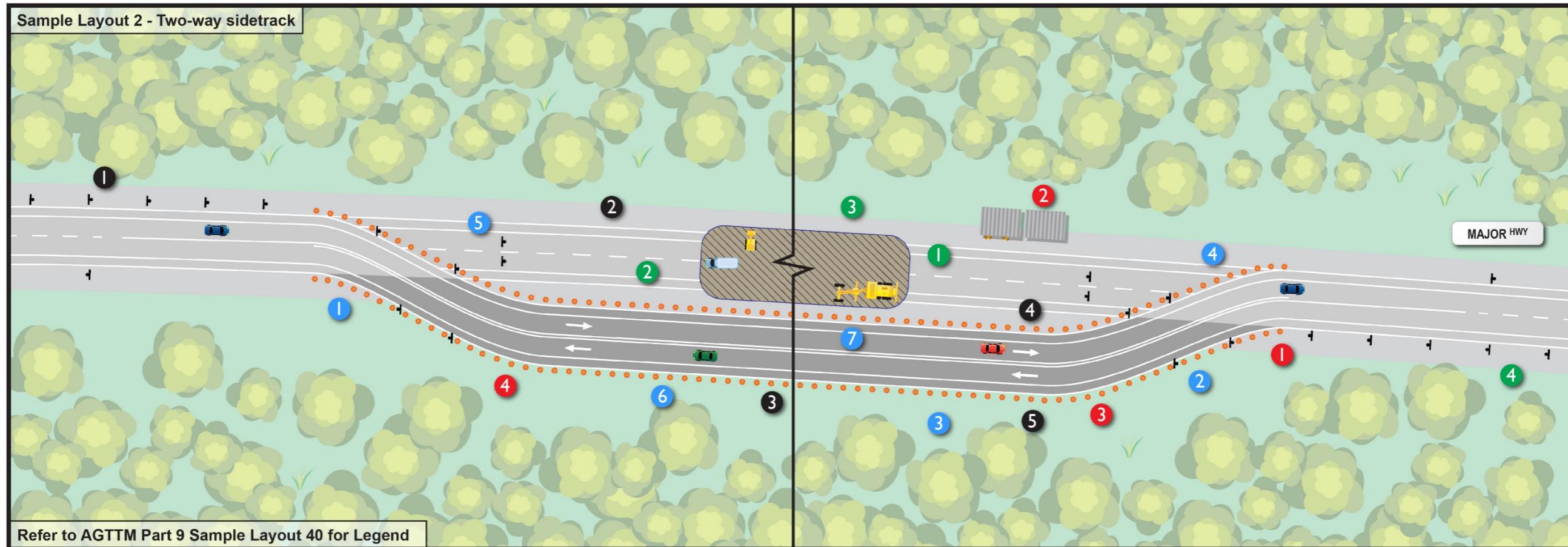
This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 When detouring traffic, consider physical limitations of detours (such as the bridge in this scenario). Does the bridge have a limited load capacity and what is the likelihood of it being exceeded? Is there an alternate (but perhaps longer) route for vehicles over this load limit?
- 2 Will the detour be capable of servicing the volume of traffic (including pedestrians and cyclists) required for this route?
- 3 Oversized vehicles may require a longer detour. For complex detour geometry, swept path analysis and engineering advice may be required.
- 4 Traffic on the detour route will need to obey two existing stop signs, which may result in long and unnecessary queuing. Depending on the duration of the works it may be necessary to re-linemark the intersections to avoid unnecessary queuing.
- 5 Wayfinding signage is often provided on approach to major intersections on rural routes and is relied on by long distance tourists for navigation. A long-term detour may require temporary wayfinding signs to be provided.
- 6 Designers should consider the existing linemarking and ensure traffic management devices and detours do not require the user to perform illegal manoeuvres.

Implementer Considerations

- 1 Clear instructions should be provided to implementers regarding installing all relevant signage prior to closure of the roadway.
- 2 Designers should advise implementers to observe whether traffic is successfully following the detour immediately after implementation and prior to establishing the work zone.
- 3 Dusty roads and dry conditions may result in signage becoming illegible. Implementers may require guidance on an inspection and cleaning schedule for temporary signage.
- 4 Short-term TGS will need to be developed for the purpose implementing and removing a long-term road closure.



Scenario

Cement Co is contracted to replace the pavement for a one kilometre section of two-lane two-way, undivided rural highway. Works are expected to take several months to complete and no detour is available. Due to the high volume of traffic, lanes need to be maintained in both directions at all times and therefore Cement Co needs to construct a temporary two-way sidetrack arrangement.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 3 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 4 For further information and considerations regarding road closures, refer to AGTTM Part 3, Section 3.4.
- 5 When designing the delineation of sidetracks, refer to AGTTM Part 3, Table 3.1.
- 2 For information regarding safety buffers and advanced warning areas for 'around' work zones, refer to AGTTM Part 3, Sections 3.6 and 3.7 respectively.

Risk Considerations

- 1 Is visibility of the site and change in alignment clear on each approach?
- 3 Depending on the season, side track delineation and pavement marking may need to be sufficient to withstand heavy winds and be visible in rain and fog.
- 4 For sites that require variable speed limits (during works and out of hours), the design of the road geometry for the sidetrack should always be for the higher speed limit.
- 2 Depending on the duration of the works, consider the need for on-site storage or office facilities. Carefully consider the placement of these facilities as well as storage of plant during non-working hours as these may be hazardous to errant vehicles.

Disclaimer

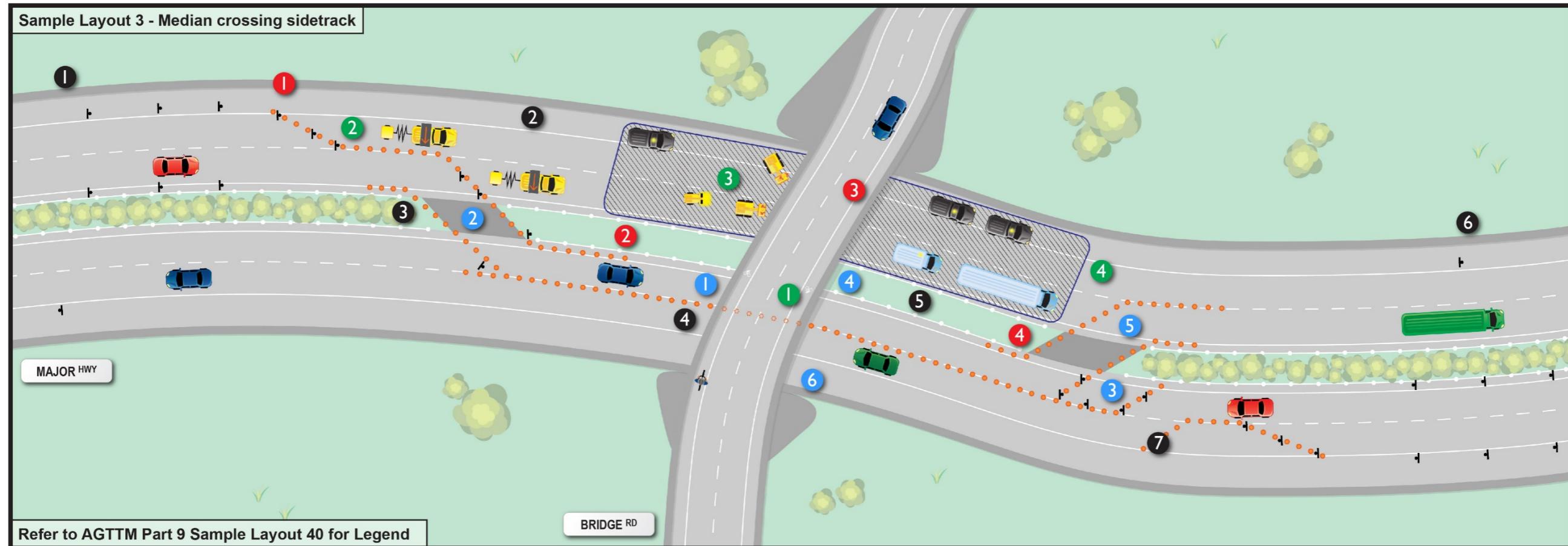
This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 Is the radius of the curve entering and exiting the sidetrack appropriate for the workzone? Will large or heavy vehicles be able to navigate the route with ease? For complex detour geometry, engineering advice may be required.
- 4 Does each end of the diverted roadway require safety barriers to arrest errant vehicles and protect the work zone? Can buffer zones be provided as an alternative?
- 5 How will construction vehicles enter and exit the work zone safely? Accesses should be clearly signed and managed to prevent public traffic following construction traffic into a work zone.
- 2 Temporary side track pavements may need to be constructed to withstand heavy vehicles and seasonal weather conditions. Engineering advice on temporary pavement designs may be required.
- 6 Depending on the length of the detour, overtaking within the sidetrack is generally undesirable and should be prevented through linemarking and signage.
- 3 Are the verges adjacent to the roadway obstructed by structures or trees? Is there sufficient room to provide a two-way sidetrack?
- 7 The designer should consider existing lighting standards and seek engineering advice to ensure appropriate lighting levels are maintained on the sidetrack.

Implementer Considerations

- 1 Designers should provide instructions to implementers on the sequencing of events for the initial switch over of traffic to the sidetrack.
- 3 In rural areas, designers should provide guidance on the need for regular maintenance inspections of the setup, especially over long weekend shutdowns.
- 2 Short and long-term TGSs will need to be developed for the construction of the sidetrack and tie-ins into the existing alignment.
- 4 Designers should provide clear guidance on the need to cover or alter any speed/worker symbolic signs out of hours.



Scenario

Oz Bridge Ltd is required to perform maintenance works on the bridge bearings of a highway overpass. The works are expected to take two weeks over several nights and require a significant amount of machinery. Highway crossovers have been constructed by the road authority (for legacy purposes) in the median, allowing traffic to be diverted onto the opposing carriageway.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 For information regarding safety buffers and advanced warning areas for 'around' work zones, refer to AGTTM Part 3, Sections 3.6 and 3.7 respectively.
- 3 For necessary taper lengths and required spacing between successive tapers based on the posted speed limit, refer to AGTTM Part 3, Tables 5.6 and 5.7 respectively.
- 4 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 5 For further information regarding detours and sidetracks, refer to AGTTM Part 3, Section 3.8.1.
- 6 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.
- 7 A temporary chicane may be used to limit speed and prevent right-to-left merging. Refer to AGTTM Part 3, Section 5.9.2 for further information.

Risk Considerations

- 1 Failure to reopen the road before peak traffic periods could result in excessive delays and increase the risk of crashes due to queuing and congestion.
- 2 Contingency plans should ensure the road can be reopened even if works are delayed. However, strategies should be considered to manage peak traffic periods if this is not possible.
- 3 Risks to traffic or pedestrians using the overpass could include traffic being distracted by over height construction equipment or dust and debris that may be dangerous to pedestrians.
- 4 During contraflow operation some barriers (modified or otherwise) may not include compliant end terminals.

Disclaimer

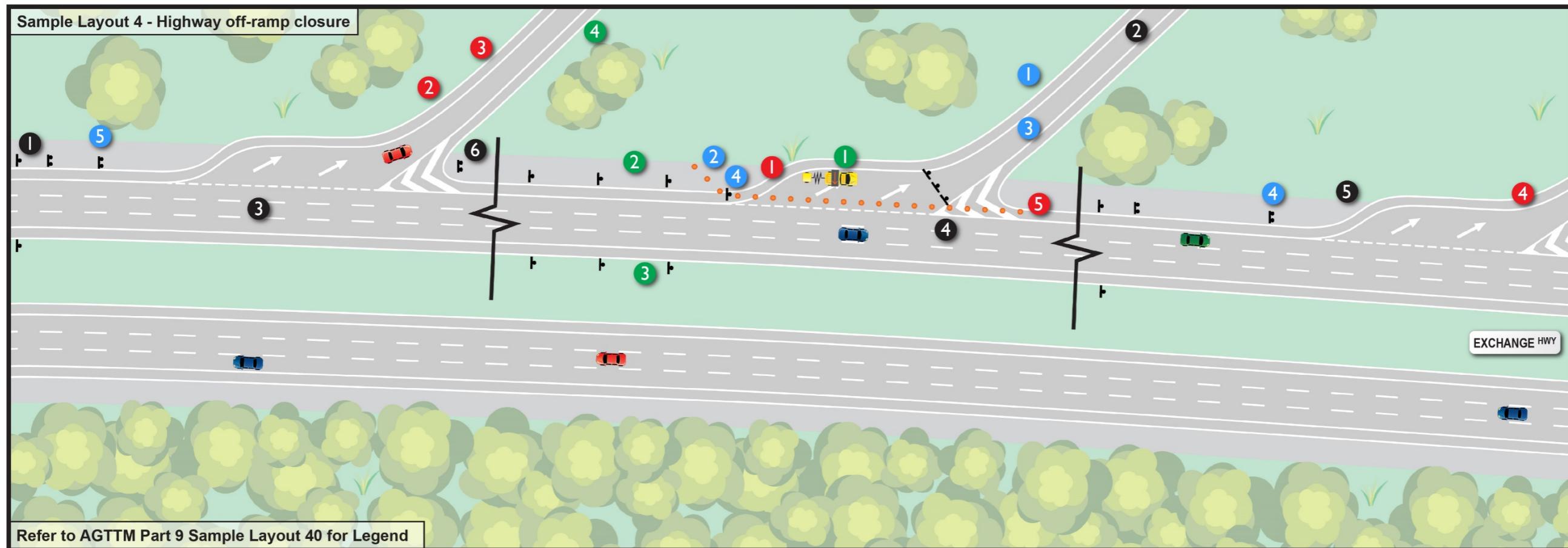
This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 Are there any height restrictions along the contraflow route that might differ from the original carriageway (the height restrictions between carriageways may vary)? Consider diverting high vehicles via an off-ramp prior to the work zone.
- 2 Does the median crossing have any load restrictions that might prevent heavy vehicles from utilising the site? Consider providing heavy vehicle detours via an off-ramp prior to the work zone.
- 3 Consider the need to manage headlight glare from opposing traffic flows.
- 4 Does the contraflow arrangement allow for oversize vehicles that may use the highway during off-peak periods?
- 5 Aftercare for the crossovers may need to be implemented, including temporary barrier systems. Temporary barriers should be designed and certified by an appropriately qualified engineer.
- 6 Separation between opposing traffic movements should be considered if a suitable shoulder and pavement is available.

Implementer Considerations

- 1 Detailed instructions need to be provided to implementers to understand how to safely implement the switch in traffic to the contraflow arrangement. For complex contraflow arrangements, a pre-switch traffic guidance scheme may be needed to allow implementers to safely establish the contraflow.
- 2 Consideration should be given to the use of a pilot vehicle to stop traffic while the final traffic cones and signage are installed.
- 3 Radio protocols should be provided to ensure that construction traffic or workers on foot do not enter the motorway work zone until the contraflow is completely established.
- 4 Designers should provide clear guidance on the works needed to be complete prior to opening of the carriageways, for example temporary barriers may need to be installed at the crossovers, which may require altered traffic management for access or temporary stoppage of traffic.



Scenario

'Run for Fun' is a major sporting event which requires a motorway off-ramp to be closed as event participants will occupy the roadway immediately following the exit. The event occurs during the early morning and requires off-ramp closure for up to 10 hours.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 For further information regarding road closures, refer to AGTTM Part 3, Section 3.4.
- 3 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 4 When spacing traffic cones at a work zone, refer to AGTTM Part 3, Table 5.3.
- 5 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.
- 6 Typical arrangements for signing detours are provided in AGTTM Part 3, Section 3.8.1.

Risk Considerations

- 1 Additional precautions should be considered to ensure that motorists do not ignore the closure and enter the closed off-ramp.
- 2 Closure of a motorway off-ramp for an extended period is likely to significantly increase the volume of traffic using the subsequent off-ramp creating risks of vehicles queuing onto the motorway at other locations.
- 3 When evaluating the feasibility of a detour route, designers should consider the potential for oversized and overheight vehicles and determine whether strategies can be used to mitigate these risks or if an alternative route is needed.
- 4 Extensive detours may increase and alter the traffic movements on the surrounding road network which can increase the risk of crashes (such as rear-end crashes where unexpected queuing occurs). Analysis of intersection operations may be required for detouring traffic during peak periods. The risks of additional traffic may be mitigated through temporary signage or altering the timing of signal phasing at locations where delays are expected.
- 5 Where cyclists are permitted, the designer should consider risks to cycle movements past the closure and ensure a clear pathway is provided.

Disclaimer

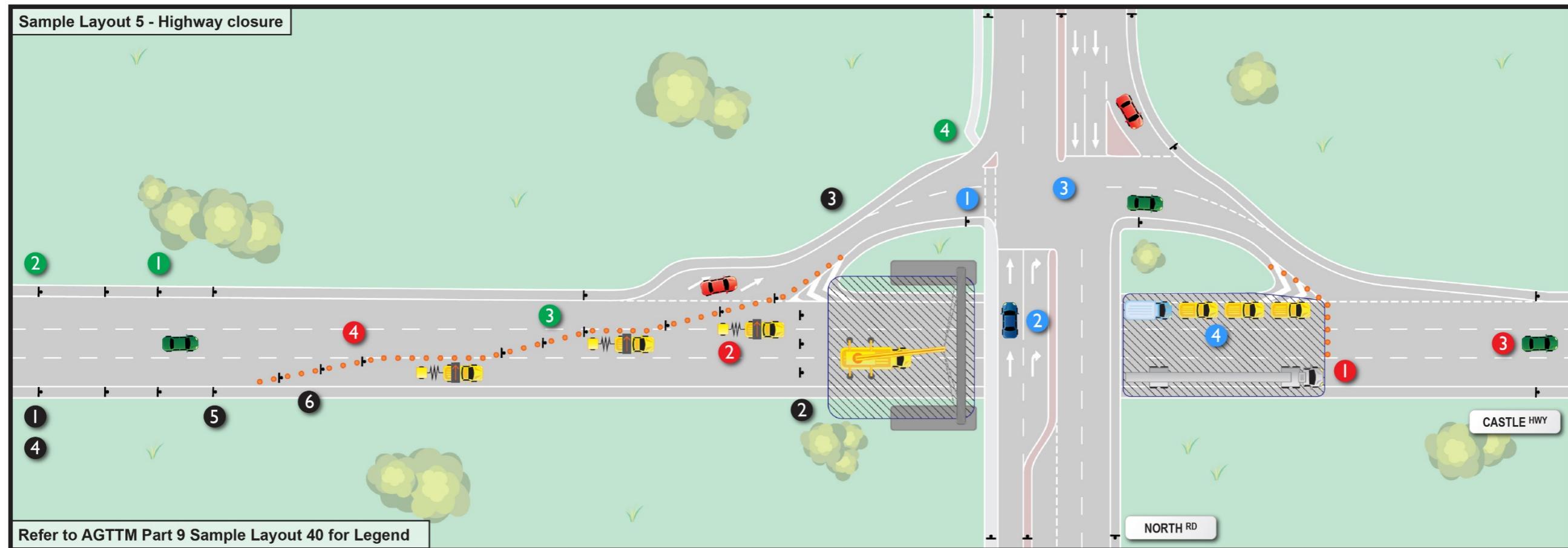
This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 Event participants may need to be safely contained using temporary fencing or similar devices to ensure they do not inadvertently enter the motorway.
- 2 Traffic analysis may be required to determine whether any intersections along the diversions will operate safely.
- 3 A highway off-ramp closure may lead to significant detours/delay for emergency services. Designer should consider communication with emergency service agencies regarding detours and possible delays.
- 4 Designers should consider the need to extend traffic cones into wide shoulders in advance of the off-ramp closure to prevent vehicles inadvertently (or deliberately) bypassing the closure.
- 5 Long-term off-ramp closure scenarios will require additional permanent advisory signage at both preceding and subsequent off-ramps. The advisory signage should be designed to provide specific road names/off-ramp numbers of alternative routes.

Implementer Considerations

- 1 For closure of motorways lanes or off-ramps for long periods, designers should consider providing implementers with instructions regarding staying within vehicles such as truck mounted attenuators (TMA). Policies on how to manage the risk to TMA drivers may vary between jurisdiction and organisations.
- 2 Implementers will need guidance on appropriate procedures for installing signage on a high speed motorway, and may need a separate mobile works traffic guidance scheme to safely implement the signage and closure.
- 3 Designer should advise which long-term signage is required to be in place prior to implementation. Installation of permanent long-term advisory signage will require additional static worksite traffic management.
- 4 Implementors will require guidance on the sequencing of implementation of the detour signage prior to implementing the off-ramp closure. This may include liaison with the relevant traffic signal authority on the timing of any adjustments to traffic signal timing.



Scenario

Trench Earthworks and Civil are engaged by the state road authority for the widening of the North Road Overpass. The overpass is situated along Castle Highway and includes on and off-ramps. The contractor needs to lift the bridge girders for the new structure over the highway and requires a full carriageway diversion onto the on and off ramps.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 For further information regarding road closures, refer to AGTTM Part 3, Section 3.4.
- 3 For further information regarding detours, refer to AGTTM Part 3, Section 3.8.1.
- 4 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 5 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 6 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.

Risk Considerations

- 1 The works require various heavy vehicles that will egress the site in the same direction as the diversion/on-ramp traffic. There is a significant risk of vehicle incidents due to differential speeds, and consideration needs to be made on how the designer manages heavy vehicle acceleration.
- 2 As the nature of the works is high risk, the designer should consider the risk of non-compliance with the highway closure.
- 3 Contingency plans should aim to ensure the road can be reopened even if works are delayed; however, strategies should be considered to manage peak traffic periods if this is not possible.
- 4 When designing multi-lane merges within high speed environments, the risks involved with implementing a chicane arrangement (to avoid right to left merging and improve speed compliance) also increases the exposure of implementors to high-speed traffic.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 When detouring traffic, consider the physical limitations of detours. Do the signalised intersections include mast arms that limit over height vehicles or do any bridge structures have a limited load capacity? Is there an alternate (but perhaps longer) route for oversized vehicles?
- 2 Traffic analysis may be required to determine the timing of the closure. The analysis should consider not only the impacts on the highway traffic but also the traffic volumes on North Road.
- 3 Will alterations to traffic signal timings be required for the affected intersections? Consultation with the traffic signal system operator will be needed. Alternatively, manual traffic control may need to be considered.
- 4 How will construction vehicles enter and exit the work zone safely? Accesses should be clearly signed and managed to prevent public traffic following construction traffic into a work zone.

Implementer Considerations

- 1 Implementers will need guidance on appropriate procedures for installing signage on a high speed motorway and may need a separate mobile works traffic guidance scheme to safely install and remove the signage and closure.
- 2 As this is a long-term worksite, the designer should advise which long-term signage is to be modified or incorporated into the traffic guidance scheme.
- 3 Consideration should be given to the use of a pilot vehicle to stop traffic while the final traffic cones and signage are installed.
- 4 The local authority controlling the signal timing should be contacted and advised of the works prior to the implementation of the short-term traffic management interventions.



Scenario

Micro-Tunnels R' Us have been engaged by Metro City to improve the capacity of the sewerage infrastructure. The contractor requires a tunnel launching site within North Avenue, between First and Second Avenues. The site will be operational for 3 months and requires a detour of local traffic and pedestrian access along the northern verge of North Avenue. There is a back-of-house driveway at 789 North Avenue that is to remain open for deliveries and pedestrian access to 781 North Avenue cannot be diverted.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the workzone, refer to AGTTM Part 3, Table 2.2.
- 2 Further information regarding planning for detours is discussed in AGTTM Part 3, Section 3.8.1.
- 3 For further information and considerations regarding road closures, refer to AGTTM Part 3, Section 3.4.
- 4 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 5 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.
- 6 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.

Risk Considerations

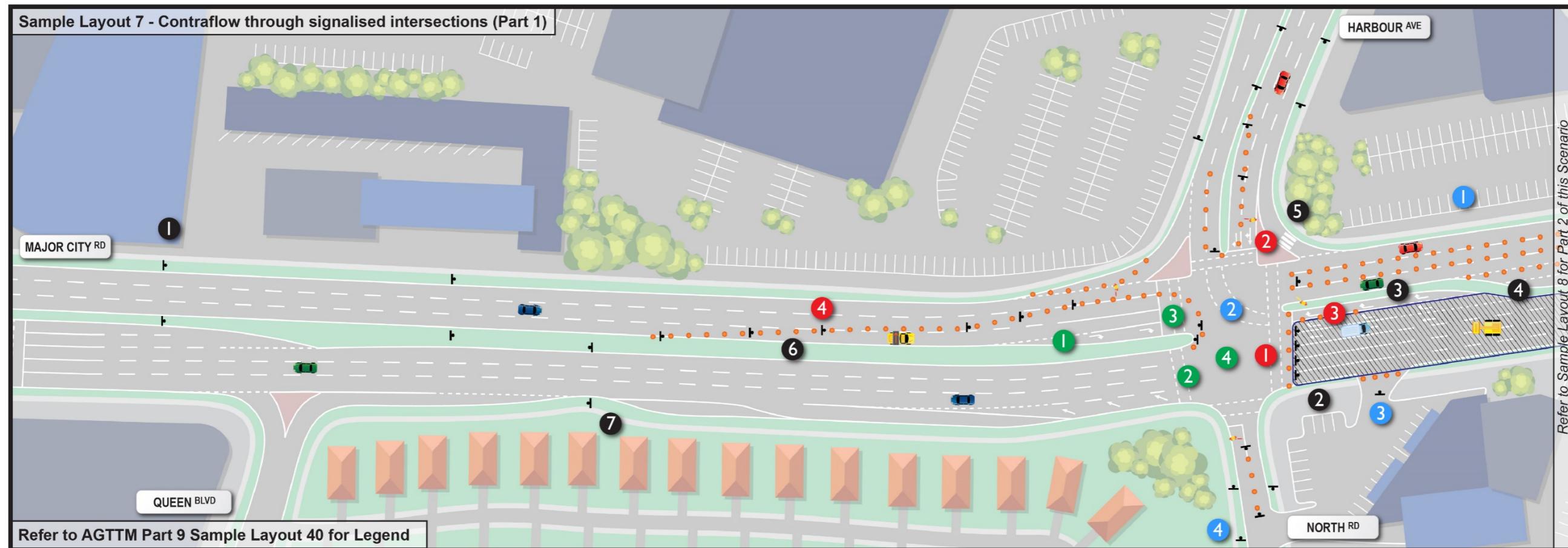
- 1 Will the footpath immediately adjacent to the work zone require closure? Pedestrian diversions will be required should this be necessary.
- 2 Are pedestrians needing to enter/exit buildings adjacent to the work zone able to do so without entering exclusion zones?
- 3 Rather than travelling along the recommended diversion some cyclists may consider travelling along the footpath, creating risks to pedestrians.
- 4 Initial implementation may cause significant delays and confusion. Consideration should be given to additional advanced warning signage and/or community notification via media.

Designer Considerations

- 1 Are there service driveways or loading bays located within the closed section of roadway that vehicles may require access to during periods of road closure?
- 2 Will alterations to traffic signal timings be required for the affected intersections? Consultation with the traffic signal system operator will be needed.
- 3 Are the existing linemarking and turn movements appropriate for the closure? There may be a need to alter the existing linemarking.
- 4 Designers should consider the existing linemarking and ensure traffic management devices and detours do not require users to perform illegal manoeuvres.
- 5 Lane closures are an alternative option to manage traffic away from the road closure. The impact onto network capacity at each intersection will need to be considered.
- 6 The alterations of linemarking and turning movements at signalised intersections may impact the signal operations and loop detector functionality. Engineering advice should be sought whenever existing arrangements are changed at signalised intersections.
- 7 The access and egress to and from a work zone should be designed to balance contractors needs with the safety of the intersection design and operational performance. Peak hour restrictions on use may be needed to limit impacts on the traffic network.

Implementer Considerations

- 1 Short-term TGS will need to be developed for the purpose of the implementation of a long-term road closure.
- 2 Where barriers are being installed adjacent to footpaths, it may be necessary to temporarily hold pedestrian traffic.
- 3 Designers should specify the appropriate sequencing to implement the closure, with consideration given to ensuring the safety of both the implementers and the general public.
- 4 The local authority controlling the signal timing should be contacted and advised of the works prior to the implementation of short and long-term traffic management interventions.



Scenario

A state agency maintenance contractor is required to resurface the asphalt on Major City Road between Row Boulevard and Harbour Avenue. To maximise productivity and safety for traffic, a contraflow arrangement is implemented between the two signalised arrangements, with works undertaken at night.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 For information regarding safety buffers and advanced warning areas for 'around' work zone, refer to AGTTM Part 3, sections 3.6 and 3.7 respectively.
- 3 When designing work zones, refer to AGTTM Part 3, Table 5.2 for required edge clearances of delineation devices.
- 4 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 5 When using manual traffic controllers to enforce traffic movements adjacent to a work zone, refer to AGTTM Part 3, Section 5.10 and AGTTM Part 7 for guidance.
- 6 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.

Risk Considerations

- 1 Failure to reopen the road before peak traffic periods could result in excessive delays and increase the risk of crashes due to queuing and congestion.
- 2 The risk of pedestrian and cyclist movements through contraflow arrangements and through work zones in closed carriageways should be considered and appropriate management strategies provided. This includes the need for pedestrians to be aware that traffic may be flowing in two directions on one carriageway, and that construction plant and equipment maybe be moving within an "empty" carriageway.
- 3 The designer should consider the escape path of all traffic controllers conducting the stop-slow operation. This may include the need to implement additional lane closures or exclusion areas within the work zone.
- 4 When designing multi-lane merges within high speed environments, the risks involved with implementing a chicane arrangement (to avoid right to left merging and improve speed compliance) also increases the exposure of implementors to high-speed traffic.

Disclaimer

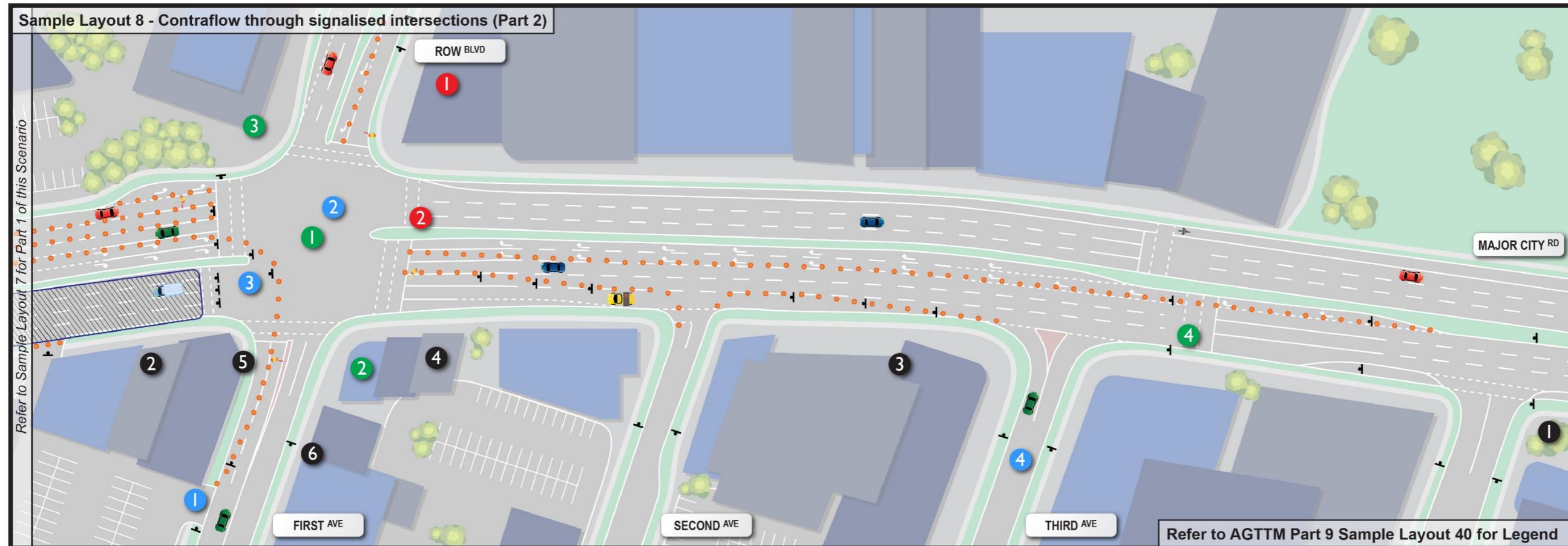
This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 The ability to reduce the existing carriageway to a single lane will be dependant on existing traffic volumes. Traffic analysis may be required to determine the timing of the closure.
- 2 When works are proposed at traffic signals (in particular works on the signals themselves), designers should confirm whether the works will require the signals to be turned off. If signals must be switched off, all movements of traffic and pedestrians will need to be appropriately managed.
- 3 Where the driveway for an adjacent property is located within a closed carriageway, ideally a detour is provided to an alternative access point. Where a property only has one access, negotiation with the property owner/resident would be required to ensure they are able to access their property. This should also consider the need for emergency services to gain access to the property if required.
- 4 Advanced warning signage should be positioned on all side streets where vehicles are expected to approach the work zone.

Implementer Considerations

- 1 Designers should specify the appropriate sequencing of implementation of the closure, with consideration given to ensuring the safety of both the implementers and the general public.
- 2 When working at signalised intersections, implementers should always be given contact details for the traffic signal system operator, and instructions regarding contacting the operator prior to establishing any worksite.
- 3 Where multiple traffic controllers or police officers are used to control the operation of a multi-leg intersection, clear protocols should be established for the hold and release of traffic, as well as consistent terminology for confirming directions.
- 4 Where traffic needs to be manually directed through a signalised intersection, the traffic signals should always be either turned off or set to flash.



Scenario

A state agency maintenance contractor is required to resurface the asphalt on Major City Road between Row Boulevard and Harbour Avenue. To maximise productivity and safety for traffic, a contraflow arrangement is implemented between the two signalised intersections, with works undertaken at night.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 For information regarding safety buffers and advanced warning areas for 'around' work zone, refer to AGTTM Part 3, sections 3.6 and 3.7 respectively.
- 3 When designing work zones, refer to AGTTM Part 3, Table 5.2 for required edge clearances of delineation devices.
- 4 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 5 When using manual traffic controllers to enforce traffic movements adjacent to a work zone, refer to AGTTM Part 3, Section 5.10 and AGTTM Part 7 for guidance.
- 6 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.

Risk Considerations

- 1 For a large, four-leg intersection, it may be difficult for drivers to follow changes in direction through the intersection (particularly when the alignment of the approach or departure lanes has been temporarily changed). There are high risks that drivers will be confused and may attempt to travel in the wrong direction. Wherever possible, temporary arrangements should simplify and restrict turning movements when traffic signals are turned off.
- 2 The risk of loss of radio communication should always be considered where a traffic controller does not have a direct line of sight or ability to communicate verbally. This is a particularly high risk where multiple traffic controllers are required to control traffic through a large intersection and works are likely to generate high noise levels.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 Merge tapers should be positioned so that they do not impact on access to driveways, as vehicles slowing to turn into driveways through the merge taper could result in rear-end collisions.
- 2 The ability to reduce the existing carriageway to a single lane will be dependant on existing traffic volumes. Traffic analysis may be required to determine the timing of the closure.
- 3 How will construction vehicles enter and exit the work zone safely? Accesses should be clearly signed and managed to prevent public traffic following construction traffic into a work zone.
- 4 Advanced warning signage should be positioned on all side streets where vehicles are expected to approach the work zone.

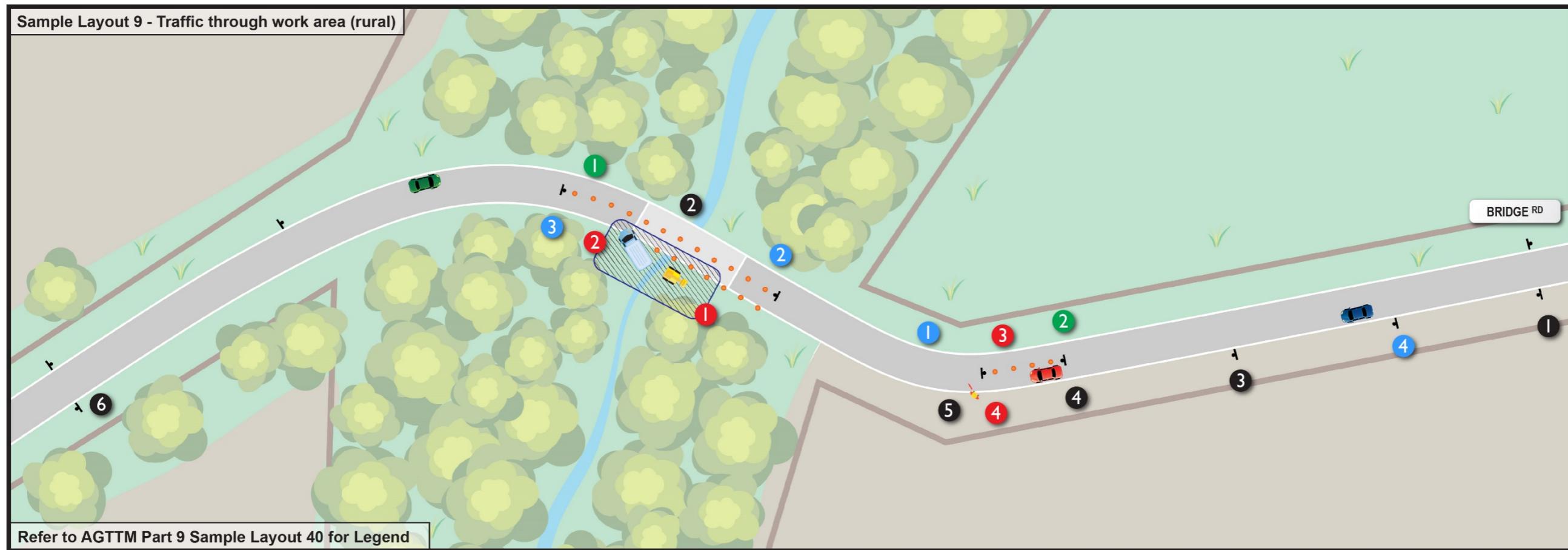
Implementer Considerations

- 1 Where traffic needs to be manually directed through a signalised intersection, the traffic signals should always be either turned off or set to flash.
- 2 Where multiple traffic controllers or police officers are used to control the operation of a multi-leg intersection, clear protocols should be established for the hold and release of traffic, as well as consistent terminology for confirming directions.
- 3 When working at signalised intersections, implementers should always be given contact details for the traffic signal system operator, and instructions regarding contacting the operator prior to establishing any worksite.
- 4 Where a lane closure crosses a signalised pedestrian crossing but does not impact its operation, traffic cones must be positioned to not obstruct the movement of pedestrians.

Appendix B Sample Layouts (Through Worksites)

Application for New Zealand

Note that the layouts described in this section and in the accompanying figures are based on layouts applied within the Australian context. For layouts applied within New Zealand, refer to the New Zealand Code of Practice for Temporary Traffic Management.



Scenario

Tunnel Inc (a civil contractor) is undertaking maintenance works to clear a culvert under a rural bridge. As a truck needs to be reversed into the worksite, short-term closure of one direction of traffic is required. Traffic may resume movement once this vehicle clears the area.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 When designing 'through' work zones, refer to AGTTM Part 3, Table 4.1 for the required edge clearances of delineation devices.
- 3 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 4 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 5 When using manual traffic controllers to enforce traffic movements adjacent to a work zone, refer to AGTTM Part 3, Section 5.10 and AGTTM Part 7 for guidance.
- 6 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.

Risk Considerations

- 1 Where workers are located below the level of traffic and may not be visible to passing vehicles, consideration should be given to the risk of debris, gravel or objects being thrown from vehicles.
- 2 When a construction activity requires access to an area outside the roadway, particularly steep embankments, the risk of vehicles becoming stuck or rolling over should be carefully considered.
- 3 The risk of loss of radio communication should always be considered where a traffic controller does not have a direct line of sight or ability to communicate verbally with workers.
- 4 When traffic is to be held under a 'STOP-SLOW' arrangement, the maximum duration of delay should consider the existing (and potentially detoured) traffic volumes to assess queuing risk and ensure the appropriate advance warning signage is provided.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 When determining the positioning of traffic controllers, designers should consider a range of factors including the approaching sight distance, means of communication with the work zone and the presence of an escape route for traffic controllers.
- 2 When assessing whether specific traffic management arrangements are necessary to control the movement of construction vehicles, consideration should be given to visibility of the access location, driver expectation of vehicle movements at that location, and the volume and speed of approaching traffic.
- 3 Designers can plan works to limit construction movements so that only a single direction of traffic is impacted, reducing the need for multiple traffic controllers as well as limiting disruption to traffic.
- 4 Depending on the nature of the works, existing signage may need to be removed or covered until all works are complete. The designer should consider the expected condition of the roadway upon the completion of the workshift and design an appropriate aftercare plan.

Implementer Considerations

- 1 Where a TGS is designed to only allow construction movements in specific directions, designers should consider providing clear information (such as movement arrows or written instructions) to avoid implementers misinterpreting the intended access arrangements.
- 2 Setting up temporary traffic arrangements that do not change the direction or alignment of traffic lanes is generally suitable to be undertaken under gaps in traffic in low volume environments. Implementers should always be instructed when a spotter is appropriate, such as where horizontal curves limit the approaching sightlines.



Scenario

During the final stage of construction of Skyrise Towers in Metro City, a crane is required to load and unload materials from delivery vehicles on Downtown Street. The clear zone of the crane spans three of the four lanes of traffic on Downtown Street. Temporary closure of two of the four lanes is required for delivery vehicles and material loading, whilst periodic short-term closure of the remaining two lanes is needed during crane lifts.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 When designing 'through' work zones, refer to AGTTM Part 3, Table 4.1 for the required edge clearances to delineation devices.
- 3 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 4 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 5 When using manual traffic controllers to enforce traffic movements adjacent to a work zone, refer to AGTTM Part 3, Section 5.10 and AGTTM Part 7 for guidance.
- 6 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.

Risk Considerations

- 1 Where the movement of plant and equipment requires exclusion zones to be established, the risk of vehicles and pedestrians inadvertently entering the exclusion zone should be assessed, with careful attention to all potential points of access such as building entries and driveways.
- 2 When traffic is to be held under a 'STOP-SLOW' arrangement, the maximum duration of delay should consider the existing (and potentially detoured) traffic volumes to assess queuing risk and ensure the appropriate advance warning signage is provided.

Designer Considerations

- 1 Designers should consult with persons undertaking the works to ensure understanding of the physical space required for construction activities. Activities such as crane lifts may require extra space to secure loads or transfer materials from delivery vehicles into hoisting containers.
- 2 When determining the placement of advance warning signage, designers should consider all potential approaches to a work zone.
- 3 Where footpath closures are required in proximity to a signalised pedestrian crossing, advanced warning signage should be provided to encourage pedestrians to use the signalised crossing.
- 4 Physical barriers or temporary fencing may be necessary to close footpaths where an exclusion zone is required. These should always be placed as close as possible to locations where pedestrians can take an alternative route or cross the road safely.
- 5 When designing a merge taper that occurs after a signalised intersection, consideration should be given to ensuring adequate separation distance is provided after the traffic signals so that drivers have sufficient time to react.
- 6 Access and egress of delivery vehicles should be considered to ensure any conflicting movements with general traffic can be managed.

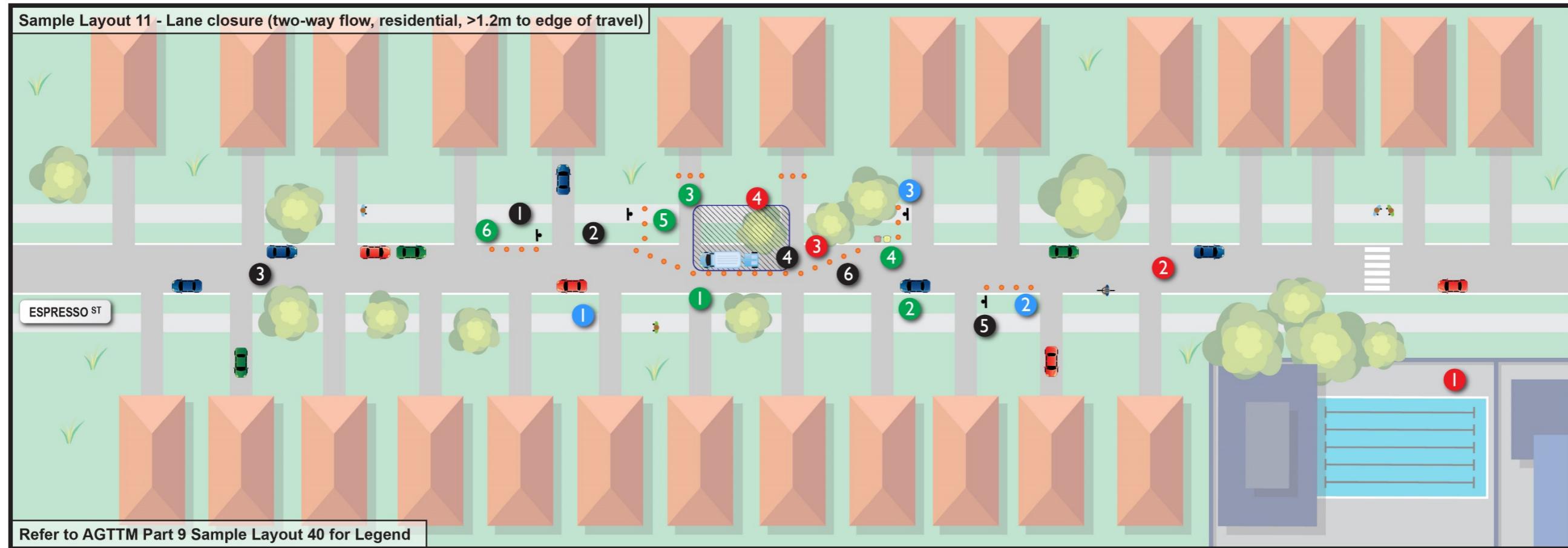
Implementer Considerations

- 1 Where works require traffic controllers to stop traffic for short periods, designers should advise implementers that unnecessary delays to public transport should be avoided where possible.
- 2 Where traffic controllers are used to provide a temporary exclusion zone for public safety, they need to be mindful of all road users, such as cyclists, who may attempt to pass stopped traffic.
- 3 Additional spotters may be required to observe low volume access points, such as driveways, and potential pedestrian access points such as building doorways or signalised crossings.
- 4 Where multiple traffic controllers are required to close several lanes of traffic, instructions should be provided for the sequence of stopping each lane separately.

Appendix C Sample Layouts (Past Worksites)

Application for New Zealand

Note that the layouts described in this section and in the accompanying figures are based on layouts applied within the Australian context. For layouts applied within New Zealand, refer to the New Zealand Code of Practice for Temporary Traffic Management.



Scenario

'ZL and Co' has been hired by the local council to conduct tree trimming and maintenance within a residential street. The works will occur between 3m to 6m from the live traffic lane and will occupy the footpath and the parking lane. The traffic volumes, work zone length and road width have been determined as suitable to use a two-way one lane 'give-way' arrangement without traffic controllers and pedestrians can be diverted across to the opposite footpath. As the residential street is low volume, it was assessed that crossing pedestrians twice is safer than managing tree pruning works over an active footpath.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 4 For delineation requirements of shuttle flow operations and the maximum allowable length of operation, refer to AGTTM Part 3, Section 5.4.4 and Table 5.4.
- 5 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 6 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.

Risk Considerations

- 1 When undertaking works near a school or sports facility, risk assessments should consider the suitability of pedestrian diversions with respect to small children as well as the potential for increased traffic volumes during school pick up and drop off times.
- 2 Where the road carriageway is less than 12m, and high parking demand exists on both sides of the road, use of a shuttle flow arrangement may result in long sections of the roadway being reduced to one lane.
- 3 While low volume, low-speed roads can safely operate under shuttle flow conditions without the use of traffic controllers, if works require equipment or plant to operate in close proximity or pass through the live traffic lane, use of traffic controllers may be necessary.
- 4 The risk of pedestrians not complying with footpath diversions should be considered when determining the need for containment fencing. This may be influenced by proximity to schools, recreational facilities and the volume of pedestrians expected.

Disclaimer

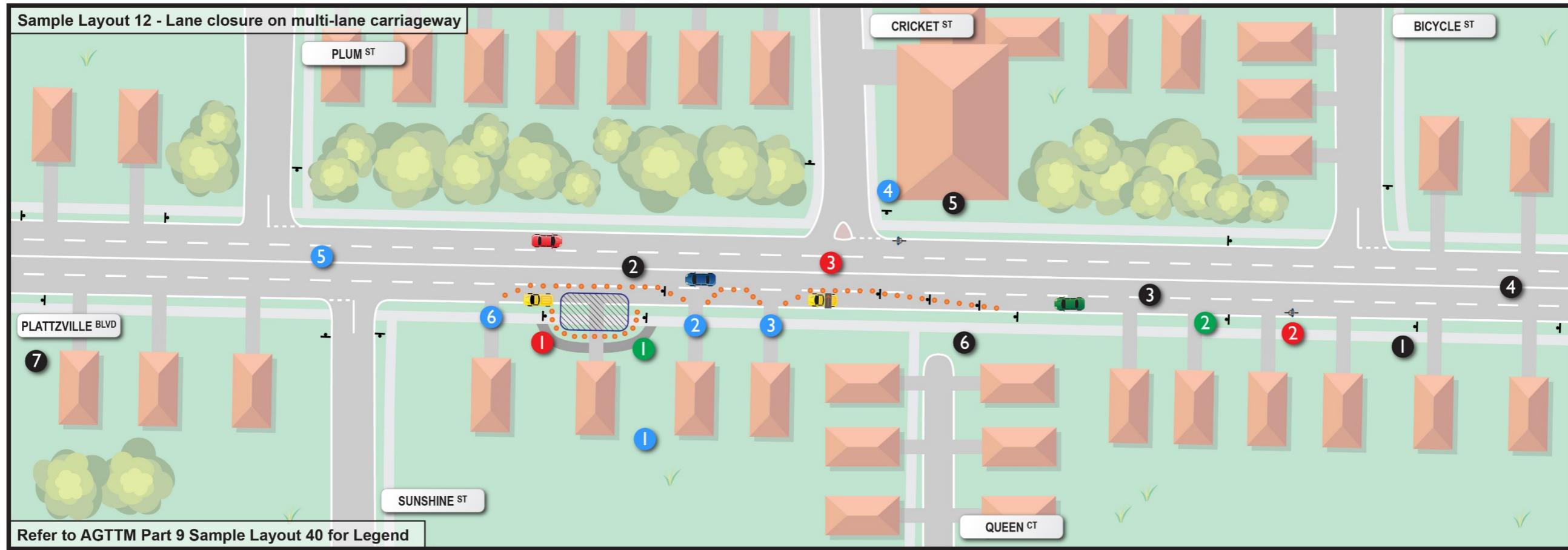
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Designer Considerations

- 1 When using a two-way, one lane arrangement, in addition to meeting the requirements of AGTTM Part 3, Table 5.4, designers should also consider the risk of persons attempting to park within the shuttle flow area.
- 2 Where it is likely that on-street parking has the potential to obstruct the visibility of signs, designers should consider using additional cones adjacent to the kerb.
- 3 When closing footpaths, consideration should be given to whether there is an equivalent standard of footpath on the other side of the road. Where a formal road crossing is available, additional signage should be considered in advance of the footpath closure.

Implementer Considerations

- 1 Designers should provide clear instructions on minimum road widths required to be maintained at all times.
- 2 Where works would be prevented by the presence of a parked vehicle adjacent to a work zone, designers may need to provide implementers with aftercare TGS that can be installed prior to and after work shifts to prohibit parking.
- 3 Consultation with residents is required when works will impact on driveway access. Implementers should be made aware of any specific arrangements that have been agreed in advance.
- 4 Where works impact on access for services such as refuse collection, implementers should be given instructions on providing alternative collection arrangements.
- 5 Where footpath closures are implemented using low impact devices such as signs and traffic cones, spotters should always be used when operating heavy machinery or undertaking works that may pose dangers to pedestrians (such as welding or cutting).
- 6 In areas with constant occupancy of on-street parking, the designer should consider the need to restrict the parking shoulders the day prior to works (for areas where it is critical to ensure signage visibility).



Scenario

Ezy Pour Pty Ltd is constructing a private driveway at 88 Plattville Boulevard (a four-lane undivided urban road). As it will take several days to prepare formwork and pour the concrete for the driveway, a temporary diversion of the footpath has been constructed. Workers require access to the live traffic lane during the day for delivery of material.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'around' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 When applying a temporary speed limit to one direction of traffic on an undivided road, refer to AGTTM Part 3, Section 5.5.1.
- 4 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 5 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 6 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 7 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.

Risk Considerations

- 1 When works will remove or occupy a footpath for an extended period of time, the risk of pedestrian detours should be carefully assessed. If the only alternative detours require crossing or walking along a busy multilane road, it may be necessary to construct a temporary footpath. The relevant road authority will need to be consulted before diversion of a public footpath as diversion through private property may not be acceptable.
- 2 Even where dedicated cycle lanes are not provided, designers should consider the risks of high volumes of cyclists and whether additional signage or controls are required to ensure that cyclists do not inadvertently ride into the work zone. This is particularly an issue where a lane closure is not occupied by construction vehicles.
- 3 Consider risk of rear end crashes due to right turn traffic volumes being high.

Disclaimer

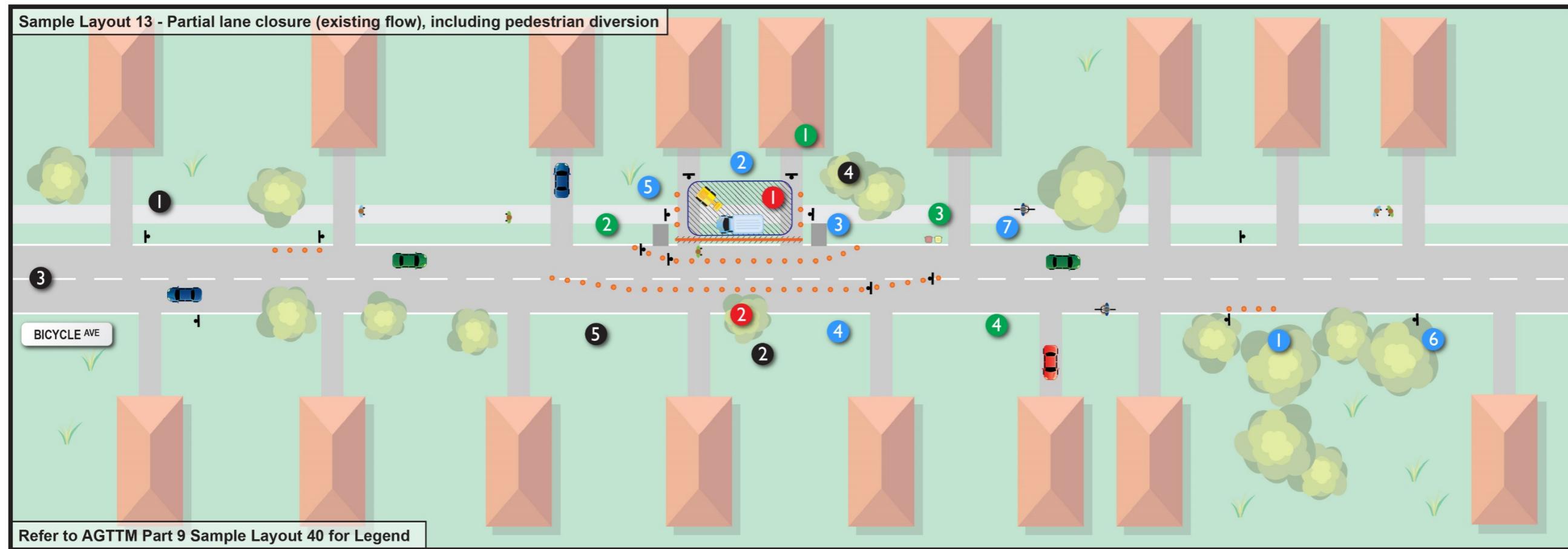
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Designer Considerations

- 1 When determining the length of a lane closure, designers should ensure they have an understanding of the size and quantity of construction vehicles required to occupy the area at any given time.
- 2 Advanced warning signage should be positioned on all side streets where vehicles are expected to approach the work zone.
- 3 Access to driveways should be delineated so that residents don't inadvertently drive into the work zone.
- 4 Merge tapers should be positioned so that they do not impact on access to driveways, as vehicles slowing to turn into driveways through the merge taper could result in rear-end collisions.
- 5 Traffic analysis may be required to determine the timing of the closure.
- 6 The placement of machinery and/or traffic control vehicles should be considered to ensure sightlines for vehicles exiting driveways are maintained.

Implementer Considerations

- 1 Where temporary works are required to be established in advance of a change in traffic arrangement (such as a temporary footpath), designers should indicate who is responsible for ensuring the temporary works are complete before commencing set up of a Traffic Guidance Scheme.
- 2 Implementers should be made aware of the need to install temporary signage clear of both the traffic lane and the footpath and provided with guidance on what to do when there is insufficient width between the edge of the roadway and the footpath.



Scenario

Sunshine Shire Council is repairing the footpath on Bicycle Avenue. Rather than divert pedestrians to cross the road, pedestrians have been diverted onto a delineated path on the roadway with temporary kerb ramps provided. The two lanes have been maintained using a lateral shift and lane narrowing using traffic cones.

Disclaimer

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AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 When reducing lane widths through or past a work zone, refer to AGTTM Part 3, Table 2.5.
- 3 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 4 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 5 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 6 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.

Risk Considerations

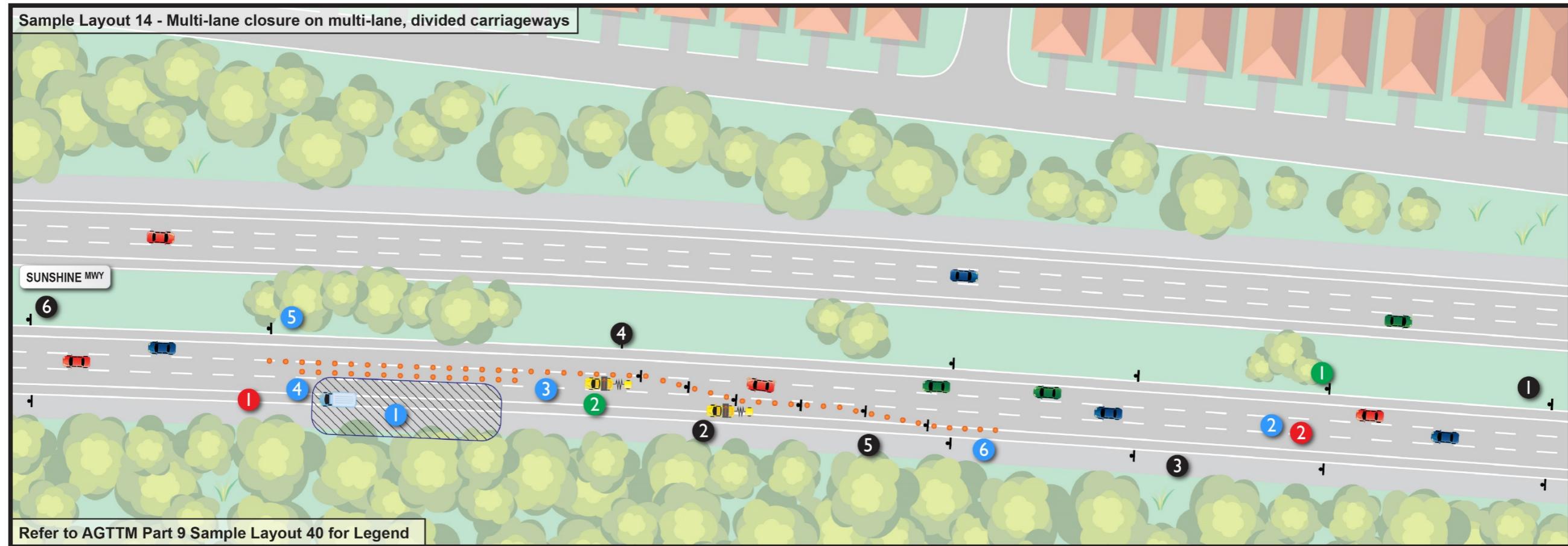
- 1 Where the movement of plant and equipment requires exclusion zones to be established, the risk of vehicles and pedestrians inadvertently entering the exclusion zone should be assessed, with careful attention to all potential points of access such as building entries and driveways.
- 2 Where traffic lanes are realigned towards the edge of the roadway, the risks of high vehicles striking overhead hazards such as trees, poles and building awnings should be considered carefully.

Designer Considerations

- 1 Where it is likely that on-street parking has the potential to obstruct the visibility of signs, designers should consider using additional cones adjacent to the kerb.
- 2 When closing footpaths, consideration should be given to whether there is an equivalent standard of footpath on the other side of the road. In low-speed environments where pedestrian and traffic volumes are very low, it may be suitable for pedestrians to use the roadway as a temporary detour route. Where a formal road crossing is available, additional signage should be considered in advance of the footpath closure.
- 3 When providing a footpath diversion onto the roadway, designers should consider the need for temporary kerb ramps, particularly where adjacent driveways are not available.
- 4 Designers should consult with persons undertaking the works to ensure understanding of the physical space required for construction activities.
- 5 Physical barriers or temporary fencing may be necessary to close footpaths where an exclusion zone is required. These should always be placed as close as possible to locations where pedestrians can take an alternative route or cross the road safely.
- 6 When a worksite is separated from general traffic by a pedestrian detour, the presence of pedestrians within an existing roadway need to be considered carefully when designing the temporary speed zones.
- 7 Whether cyclists are legally permitted to ride on the footpath varies between jurisdictions. The diversion may need to consider how cycling movements will be treated.

Implementer Considerations

- 1 Consultation is required with residents when works will impact on driveway access. Implementers should be made aware of any specific arrangements that have been agreed in advance.
- 2 Where footpath closures are implemented using low impact devices such as signs and traffic cones, spotters should always be used when operating heavy machinery or undertaking works that may pose dangers to pedestrians (such as welding or cutting).
- 3 Where works impact on access for services such as refuse collection, implementers should be given instructions on providing alternative collection arrangements.
- 4 Where works would be prevented by the presence of a parked vehicle adjacent to a work zone, designers may need to provide implementers with aftercare TGS that can be installed prior to and between work shifts to prohibit parking.



Scenario

Chop-A-Tree is contracted by Express Motorways Ltd to perform routine vegetation management in the verge of a six-lane, divided motorway. Removing large tree branches requires the closure of two lanes in one-direction. Works are undertaken at night with lanes closed using successive merge tapers with traffic passing the work zone in the right-hand lane.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 4 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 5 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 6 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.

Disclaimer

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Designer Considerations

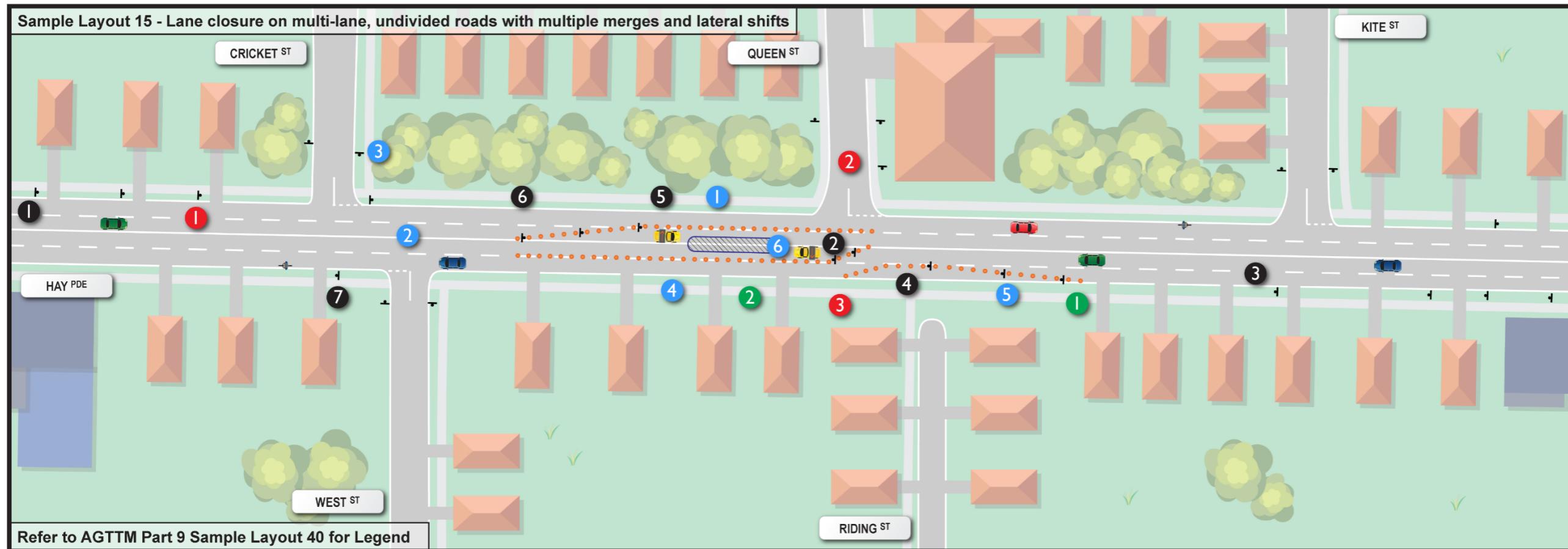
- 1 Designers should consult with persons undertaking the works to ensure understanding of the physical space required for construction activities.
- 2 Traffic analysis may be required to determine the timing of the closure. The analysis should consider the impacts on the highway and the queuing that the works may result in.
- 3 How will construction vehicles enter and exit the work zone safely? Accesses should be clearly signed and managed to prevent public traffic following construction traffic into a work zone.
- 4 Where work zone speed limits require a minimum separation distance from live traffic to the work area, the use of devices to delineate the separation 'no go' zone should be designed in consultation with the contractor.
- 5 When designing the work zone speed, the designer should consider compliance and evaluate the approach treatment (merges/chicanes).
- 6 Consider the need for lead in traffic cones in accordance with section 5.9 of AGTTM Part 3.

Risk Considerations

- 1 The works require various heavy vehicles that will egress the site in the same direction as the motorway traffic. There is a significant risk of vehicle incidents due to differential speeds. Consideration needs to be made on how the designer manages heavy vehicle acceleration.
- 2 Failure to reopen the road before peak traffic periods could result in excessive delays and increase the risk of crashes due to queuing and congestion.

Implementer Considerations

- 1 Implementers will need guidance on appropriate procedures for installing signage on a high-speed motorway, and may need a separate mobile works traffic guidance scheme to safely implement the signage and closure.
- 2 For closure of motorways lanes or off-ramps for long periods, designers should consider providing implementers with instructions regarding staying within vehicles such as truck mounted attenuators (TMA). Policies on how to manage the risk to TMA drivers may vary between jurisdiction and organisations.



Scenario

AZ Pot Holes is conducting minor remediation works on Hay Parade. The first stage of the works is in the centre of the four-lane undivided road requiring both fast lanes to be closed. Noticing that traffic speeds are higher in one direction due to the downhill grade, the designer has chosen to use a chicane arrangement, which is used to ensure traffic slows as they pass the work zone.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 4 For additional information regarding chicanes, refer to AGTTM Part 3, Section 5.9.2.
- 5 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 6 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 7 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.

Risk Considerations

- 1 Failure to reopen the road before peak traffic periods could result in excessive delays and increase the risk of crashes due to queuing and congestion.
- 2 Accommodating existing right turns out of side streets introduces a variety of risks. Drivers may inadvertently enter the workzone. Right turns should be banned where possible, but considerations for banning right turns should include the availability of a detour and the traffic volume that will be detoured.
- 3 Whenever possible, it is good practice to merge traffic from left to right and then provide a lateral shift. When merging traffic from right to left, consider whether this introduces additional risks compared to a left to right merge (e.g. in locations of unchannelised right turns). This arrangement introduces a longer traffic management setup and should only be considered if it does not add any additional risks or impacts on driveways, singulated intersections or side streets.

Disclaimer

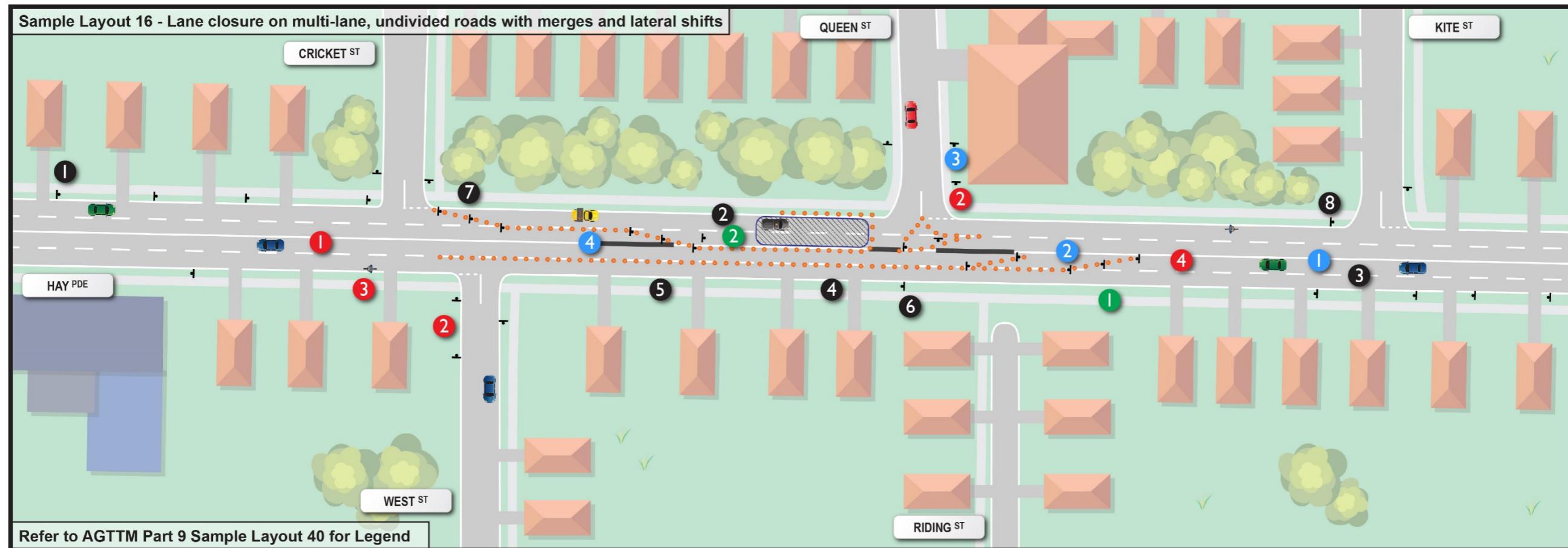
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Designer Considerations

- 1 When determining the length of a lane closure, designers should ensure they have an understanding of the size and quantity of construction vehicles required to occupy the area at any given time.
- 2 Traffic analysis may be required to determine the timing of the closure.
- 3 Advanced warning signage should be positioned on all side streets where vehicles are expected to approach the work zone.
- 4 How will construction vehicles enter and exit the work zone safely? Accesses should be clearly signed and managed to prevent public traffic following construction traffic into a work zone.
- 5 Merge tapers should be positioned so that they do not impact on access to driveways, as vehicles slowing to turn into driveways through the merge taper could result in rear-end collisions.
- 6 The designer should consider the positioning of traffic control vehicles. This is particularly important in arrangements where work zones are surrounded by live traffic.

Implementer Considerations

- 1 Designers should provide instructions to implementers on the sequencing of installation of traffic cones where multiple changes are made to the alignment of a traffic lane. In this instance, the merge taper in the left-hand lane should be installed prior to installing the subsequent lateral shift to create the chicane. Significant risks may be created if a short lateral shift is installed prior to merging the traffic to a single lane.
- 2 Where works are undertaken within a work zone that is surrounded by traffic lanes on both sides, implementers should be given instructions on how to manage access to the work zone for workers on foot, particularly on high-speed, high-volume roads.



Scenario

AZ Pot Holes Inc. is conducting minor remediation works on Hay Parade. The second stage of the works requires both lanes in one direction to be occupied. As the road is undivided, a contraflow arrangement can be installed to maintain traffic movement in each direction.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 4 When reducing lane widths through or past a work zone, refer to AGTTM Part 3, Table 2.5.
- 5 When attempting to maintain traffic flow 'past' a worksite using a contraflow arrangement, refer to AGTTM Part 3, Section 5.9.3.
- 6 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 7 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 8 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.

Designer Considerations

- 1 Traffic analysis may be required to determine the timing of the closure.
- 2 Merge tapers should be positioned so that they do not impact on intersections, as vehicles slowing to turn through the merge taper could result in rear-end collisions.
- 3 Advanced warning signage should be positioned on all side streets where vehicles are expected to approach the work zone.
- 4 Designer should consider the existing linemarking and ensure traffic management devices do not require the user to perform illegal manoeuvres. Temporary blackout tape provides one option for short-term changes in linemarking.

Disclaimer

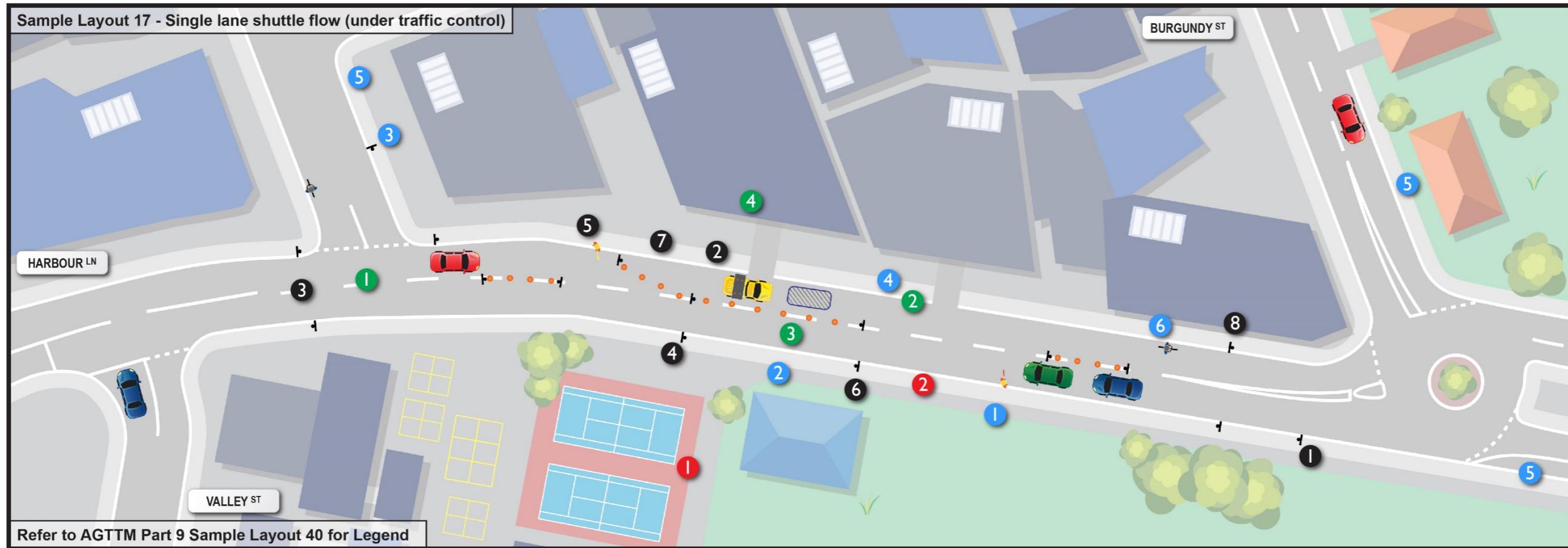
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Risk Considerations

- 1 Failure to reopen the road before peak traffic periods could result in excessive delays and increase the risk of crashes due to queuing and congestion.
- 2 Accommodating existing right turns out of side streets into a contraflow arrangement introduces a variety of risks. Drivers may inadvertently enter the contraflow in the wrong direction. Right turns should be banned where possible, but considerations for banning right turns should include the availability of a detour and the traffic volume that will be detoured.
- 3 Where cycle lanes are absent on a multi-lane road, the reduction of the number of lanes and lane widths prevents the ability for vehicles to safely overtake on-road cyclists. Risk assessments should consider the volume and profile of cycling activity, and consideration should be given to additional advisory signage, reduction in speeds, or provision of a cyclist detour.
- 4 The risks involved with implementing a chicane arrangement for speed compliance may also increase the risk to the implementor or introduce additional risks such as driveway or side street access.

Implementer Considerations

- 1 Designers should provide instructions to implementers on the sequencing of events for the initial switch over of traffic to the contraflow arrangement. Significant risks may be created if a contraflow is implemented at one end prior to the other end being ready.
- 2 Implementers should be given guidance on observing whether traffic is successfully observing the contraflow prior to establishing the work zone.



Scenario

Electric Co is working on Harbour Lane, a busy two-lane inner-city street, resulting in the closure of one lane and a temporary shuttle flow arrangement to control traffic past the work zone. Due to noise restrictions works must be undertaken in the day, and due to the volume of traffic either portable traffic control devices or traffic controllers are required at this location.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 4 For delineation requirements of shuttle flow operations and the maximum allowable length of operation, refer to AGTTM Part 3, Section 5.4.4 and Table 5.4.
- 5 When using manual traffic controllers to enforce traffic movements adjacent to a work zone, refer to AGTTM Part 3, Section 5.10 and AGTTM Part 7 for guidance.
- 6 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 7 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 8 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.

Risk Considerations

- 1 When undertaking works near a school or sports facility, risk assessments should consider the suitability of pedestrian diversions with respect to small children as well as the potential for increased traffic volumes during school pick up and drop off times.
- 2 The risk of vehicles continuing to travel on the wrong side of the road after passing the work zone needs to be considered. This risk could be treated with a reverse taper or a lateral shift, or alternatively 'keep left' or directional signage for departing traffic.

Disclaimer

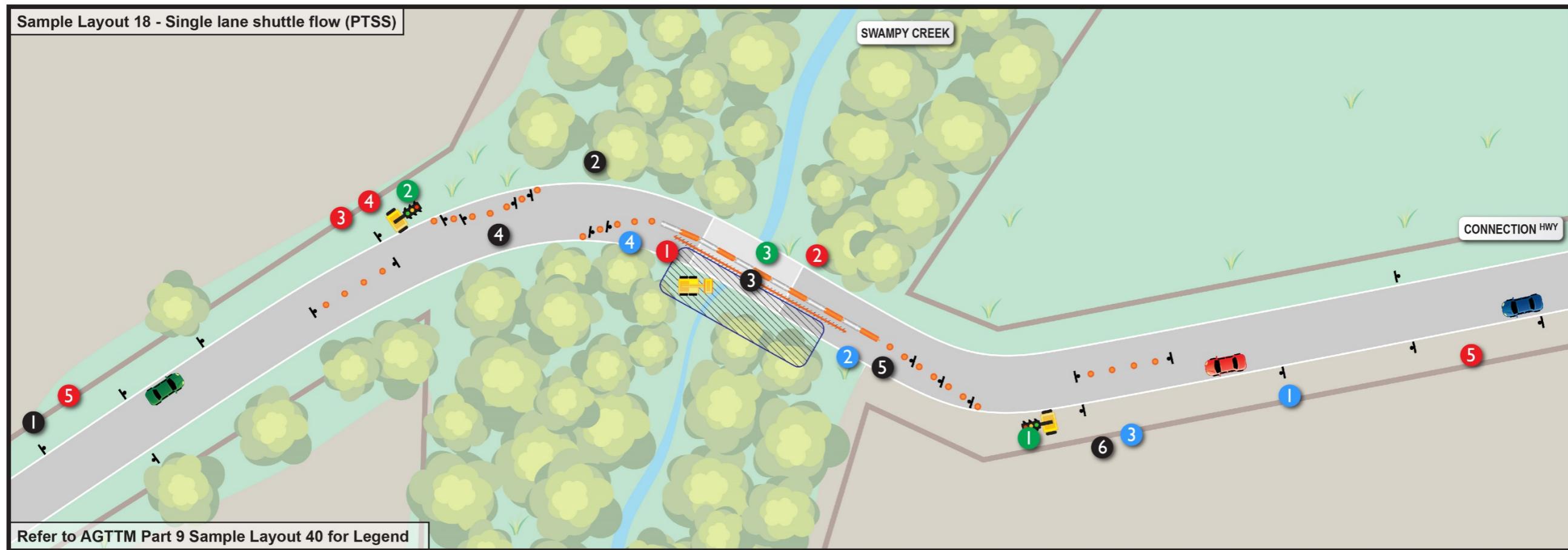
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Designer Considerations

- 1 When determining the positioning of traffic controllers or portable boom barriers or portable traffic signals or other devices, designers should consider a range of factors including the approaching sight distance, available queuing space between the controller and any intersections and the presence of an escape route for traffic controllers.
- 2 Traffic analysis may be required to determine the timing of the closure.
- 3 Advance warning signage should be positioned on all side streets where vehicles are expected to approach the work zone.
- 4 The placement of machinery and/or traffic control vehicles should be considered to ensure sightlines for vehicles exiting driveways are maintained.
- 5 Designers should consider the possibility of queuing occurring into the surrounding intersections and consider the need for advance warning signage to suit the risk.
- 6 On roads with a high cyclist presence, the designer should consider the need for cycling specific prepare-to-stop signage that may help with compliance.

Implementer Considerations

- 1 Line of sight and/or radio protocols should be provided to ensure that traffic controllers ensure that only one direction of traffic is released at a time.
- 2 Additional spotters may be required to observe low volume access points, such as driveways, and potential pedestrian access points such as building doorways or signalled crossings.
- 3 Designers should provide clear instructions on minimum road widths required to be maintained at all times.
- 4 Consultation is required with residents when works will impact on driveway access. Implementers should be made aware of any specific arrangements that have been agreed in advance.



Scenario

Clean-R-Joints is performing bridge deck maintenance on a Swampy Creek Bridge – located on a remote two-lane rural highway. As no detour is available, traffic is maintained using a shuttle flow arrangement. As the worksite will be established for several weeks, portable traffic signals are used to control traffic past the work zone 24 hours a day.

Implementer Considerations

- 1 When installing portable traffic signal systems, designers should provide guidance as to whether the shuttle flow arrangement is set up under manual traffic control or whether signalised control is sufficient. If using signals to control traffic while workers establish the worksite, this would be considered working in gaps in traffic and spotters would be needed.
- 2 In rural areas, designers should provide guidance on the need for regular maintenance inspections of the setup, especially over long weekend shutdowns.
- 3 Designers should provide clear instructions on minimum road widths required to be maintained at all times.

Risk Considerations

- 1 The risk of workers working in proximity to barriers needs to be carefully assessed, with designers needing to understand and communicate the limitations of barrier systems (such as the width of dynamic deflection zone that may be present, and areas that are not considered work zones such as the beginning and end of gating barriers). It is good practice to either delineate these areas on the plan or specify the methodology that such areas should be isolated (such as the use of fencing, tape or linemarking).
- 2 Where narrowing of the carriageway is proposed for bridges (or locations with limited shoulder width) in rural and remote areas, consideration should be given to the risk of oversize vehicles needing to pass.
- 3 Where portable signals are located on low volume, remote roads with long signal cycle times, there are increased risks of non-compliance by motorists. Methods to improve compliance with portable signals include the use of count-down timers or signage advising the maximum expected delay time.
- 4 Where portable traffic signals are used and are unattended, there are increased risks to motorists in the event of signal equipment failure (particularly for solar-powered devices). Systems should be designed to have a redundant power supply and be regularly monitored to ensure they are appropriately operating.
- 5 Designers should always consider the need for end of queue advance warning signage.

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Designer Considerations

- 1 When portable traffic signals are used to implement a shuttle flow arrangement, consideration should be given to the potential for queuing to occur that exceeds the location of advanced warning signs. Signage warning of the presence of queuing may be required, but where excessive queuing occurs the use of signalised shuttle flow should be reconsidered.
- 2 When determining whether a temporary road barrier system is appropriate, designers may need to consult with an appropriately trained person or seek engineering advice.
- 3 When positioning portable traffic signals, designers need to consider the operational requirements of the devices. If signals are remotely operated by a traffic controller, it may be necessary to position the controller in advance of the signals to ensure visibility of the signals and presence of queuing traffic. Automated signals may be solar powered and need to be positioned to receive maximum sunlight.
- 4 How will construction vehicles enter and exit the work zone safely? Accesses should be clearly signed and managed to prevent public traffic following construction traffic into a work zone.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 When implementing road safety barriers to separate work areas and live traffic lanes, refer to AGTTM Part 3, Section 5.3.
- 4 For additional information regarding chicanes, refer to AGTTM Part 3, Section 5.9.2.
- 5 For delineation requirements of shuttle flow operations and the maximum allowable length of operation, refer to AGTTM Part 3, Section 5.4.4 and Table 5.4.
- 6 When using portable traffic control devices to dictate traffic movements, refer to AGTTM Part 3, Section 5.10 and AGTTM Part 7.

**Scenario**

Repairs are being undertaken to replace the kerb and channel located on the corner of North Avenue and East Drive. Portable traffic control boom barriers (controlled by a single operator) are used on each leg of the intersection to ensure an orderly and safe shuttle flow arrangement through the intersection.

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AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 When using portable traffic control devices to control traffic movements, refer to AGTTM Part 3, Section 5.10 and AGTTM Part 7.
- 4 For delineation requirements of shuttle flow operations and the maximum allowable length of operation, refer to AGTTM Part 3, Section 5.4.4 and Table 5.4.
- 5 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 6 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.

Risk Considerations

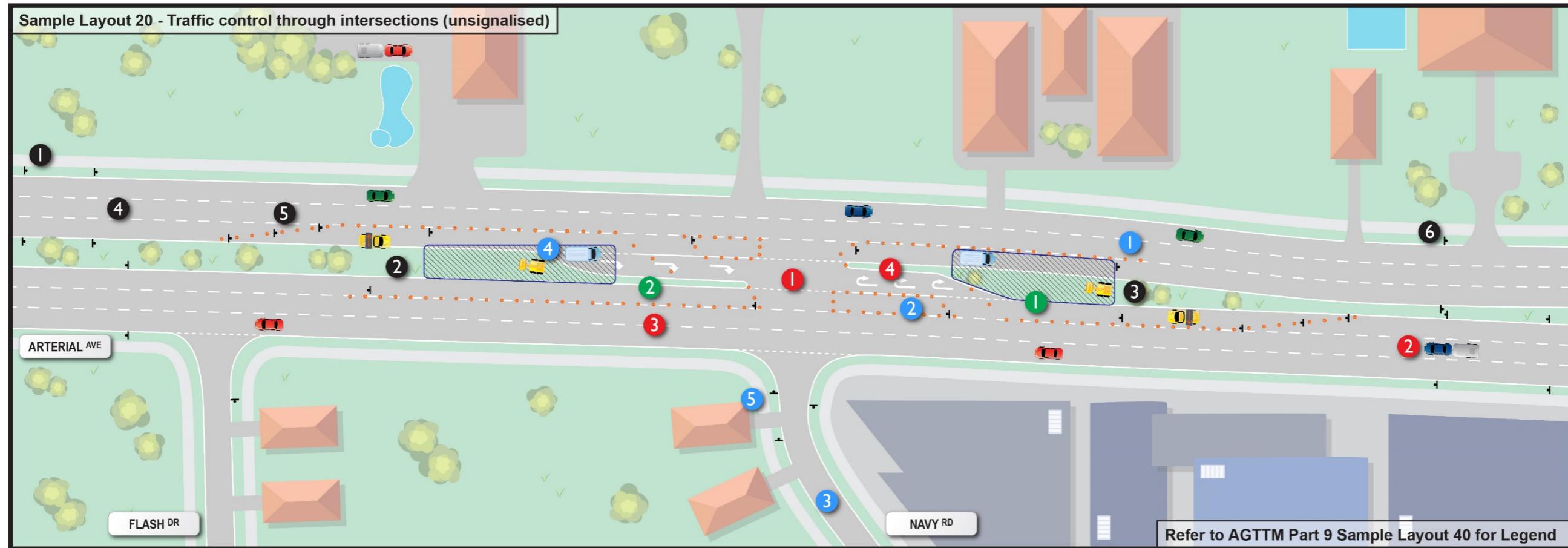
- 1 Where the movement of plant and equipment requires exclusion zones to be established, the risk of vehicles and pedestrians inadvertently entering the exclusion zone should be assessed with careful attention to all potential points of access such as building entries and driveways.
- 2 Will oversized vehicles (e.g. roadside/waste collection trucks) be able to navigate the work zone successfully? Frequent heavy vehicle movements may require a swept path assessment and engineering advice.

Designer Considerations

- 1 Designers should consult with persons undertaking the works to ensure understanding of the physical space required for construction activities.
- 2 When using portable boom barriers operated by a single traffic controller, the designer should ensure that all approaches can be observed from one location, or alternatively specify the use of more traffic controllers who may require radio communication.
- 3 How will construction vehicles enter and exit the work zone safely? Accesses should be clearly signed and managed to prevent public traffic following construction traffic into a work zone.
- 4 When determining the positioning of traffic controllers or portable boom barriers, designers should consider a range of factors including the approaching sight distance, available queuing space between the controller and any intersections and the presence of an escape route for traffic controllers.

Implementer Considerations

- 1 Where footpath closures are implemented using low impact devices such as signs and traffic cones, spotters should always be used when operating heavy machinery or undertaking works that may pose dangers to pedestrians (such as welding or cutting).
- 2 Consultation is required with residents when works will impact on driveway access. Implementers should be made aware of any specific arrangements that have been agreed in advance.



Scenario

Plant-A-Tree is contracted to re-landscape the median on Arterial Avenue in Big Country Town. As the works are during Spring Harvest Festival, there is a high likelihood of both tourists and oversize vehicles passing the work zone. Big Country Town Council has stipulated that only a single lane can be closed on Arterial Avenue and all existing movements on Navy Road and Flash Drive are to remain unimpeded.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 4 For appropriate sight distances to a work zone, refer to AGTTM Part 3, Table 2.3.
- 5 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 6 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.

Risk Considerations

- 1 Where multiple worksites are established in close proximity there are increased risks associated with the movement of workers and equipment between the sites.
- 2 Where works are scheduled during a peak season or event, the TGS designer should consider the risks associated with relevant road users, such as tourists (e.g. caravans) or oversize vehicles (e.g. harvest).
- 3 Will oversized vehicles (e.g. roadside/waste collection trucks) be able to navigate the work zone successfully? Frequent heavy vehicle movements may require a swept path assessment and engineering advice.
- 4 When works are undertaken in a median in proximity to unsignalised turns, machinery and/or traffic control vehicles should be positioned to ensure sightlines for all turning movements are maintained.

Disclaimer

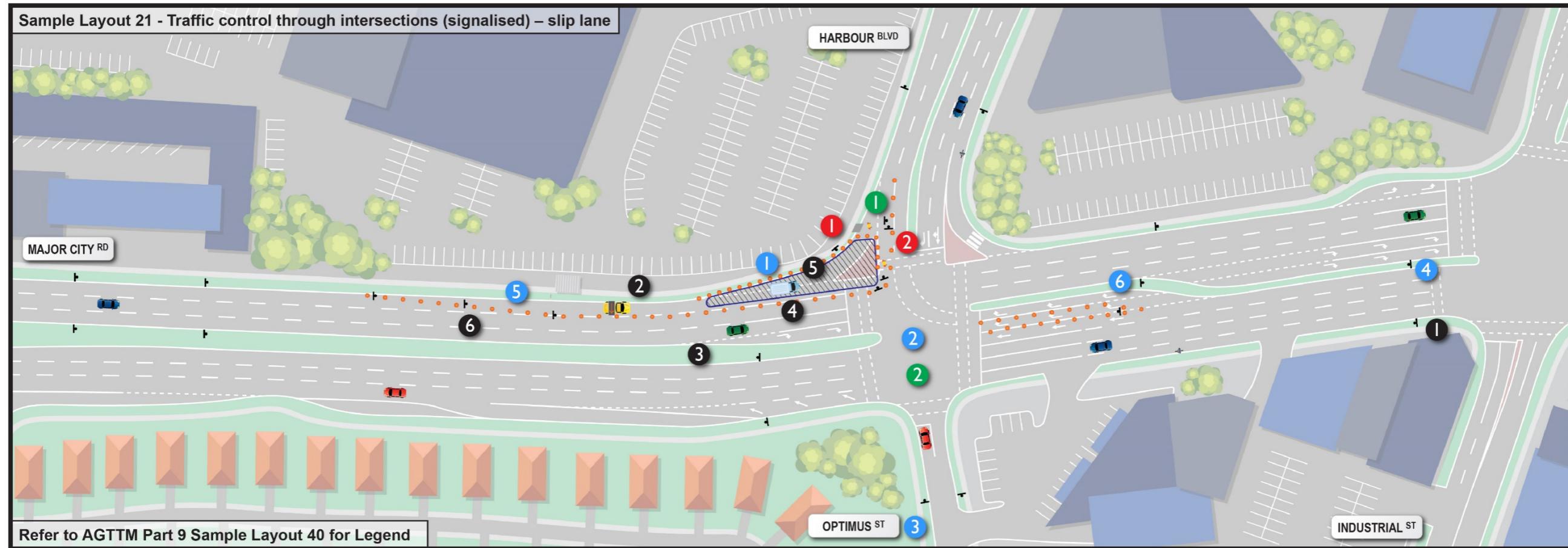
This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 When determining the length of a lane closure, designers should ensure they have an understanding of the extent of the work areas and quantity of construction vehicles required to occupy the area at any given time. This should also include whether movement of construction vehicles between closely located worksites is required.
- 2 Where multiple breaks in lane delineation are provided to accommodate turns at intersections with side streets and median breaks, designers should consider whether there is a need for short sections of delineation, which may create confusion in some instances.
- 3 While driveways are typically not treated as sidestreets, where an adjacent property generates substantial traffic volumes (such as a shopping centre or hotel) it may be necessary to provide advance warning signs at the exit to the carpark.
- 4 How will construction vehicles enter and exit the work zone safely? Accesses should be clearly signed and managed to prevent public traffic following construction traffic into a work zone.
- 5 Advanced warning signage should be positioned on all side streets where vehicles are expected to approach the work zone.

Implementer Considerations

- 1 Where works are undertaken within a work zone that is surrounded by traffic lanes on both sides, implementers should be given instructions on how to manage access to the work zone for workers on foot, particularly on high-speed, high-volume roads.
- 2 Designers should specify the appropriate sequencing of implementation of the closure, with consideration given to ensuring the safety of both the implementers and the general public.



Scenario

RYG Light Co is contracted by Major City Council to perform signal maintenance services. The pedestrian signal lanterns at the intersection of Major City Road and Harbour Boulevard have been reported as faulty, and inspections are being undertaken to determine the cause of the fault.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, sections 5.6 and 5.7 respectively.
- 3 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 4 When reducing lane widths through or past a work zone, refer to AGTTM Part 3, Table 2.5.
- 5 When designing work zones, refer to AGTTM Part 3, Table 5.2 for required edge clearances of delineation devices.
- 6 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.

Risk Considerations

- 1 Closure of slip lanes that experience high volumes of heavy vehicles (such as bus or trucking routes) may result in the need for long vehicles to make tight left turn movements. A swept path assessment and engineering advice may be required.
- 2 As an unsignalised slip lane will be shut down, left turning vehicles will be diverted into the intersection. This introduces a new risk as there will be a conflict with vehicles turning into a signalised pedestrian crossing. The design needs to consider this risk and develop an appropriate mitigation measure. This could include traffic controllers activating the crossing due to the restricted push button access.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 When determining the length of a lane closure, designers should ensure they have an understanding of the size and quantity of construction vehicles required to occupy the area at any given time.
- 2 When works are proposed at traffic signals (in particular works on the signals themselves), designers should confirm whether the works will require the signals to be turned off. If signals must be switched off, all movements of traffic and pedestrians will need to be appropriately managed.
- 3 Advanced warning signage should be positioned on all side streets where vehicles are expected to approach the work zone.
- 4 In the event when all works are within the verge or left-hand lane of a multi-lane roadway, the designer should consider whether there is any benefit to imposing a speed restriction on the opposing carriageway.
- 5 The designer should consider the bus operation times and provide the ability for buses to access the stop if required.
- 6 For the treatment of a double right turn into a work zone or pedestrian diversion, the designer should consider worker/pedestrian proximity to live traffic and the risk of guiding traffic turning right against the existing turn lines.

Implementer Considerations

- 1 Where signals remain operational but the works prevent pedestrians from accessing a pedestrian push button to cross at signalised crossings, spotters or traffic controllers should be used to assist and guide pedestrians around or through the worksite.
- 2 When working at signalised intersections, implementers should always be given contact details for the traffic signal system operator, and instructions regarding contacting the operator prior to establishing any worksite.



Scenario

Vac-U-Find is conducting utility locating services on Major City Road that will occupy the centre and right-hand lane. Due to the presence of an existing merge after the intersection with Row Boulevard, the designer has determined it will be safer to merge the right-hand lane prior to the signals.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 4 When reducing lane widths through or past a work zone, refer to AGTTM Part 3, Table 2.5.
- 5 When designing work zones, refer to AGTTM Part 3, Table 5.2 for required edge clearances of delineation devices.
- 6 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.

Risk Considerations

- 1 When closing or shortening turning lanes at signalised intersections, consideration should be given to the potential for queuing to occur that exceeds the shortened lane. This may result in increased risk of rear-end crashes.
- 2 In the event when works are undertaken within a right-hand lane or the median, the designer should consider the width of the median and proximity of the work to the opposing carriageway to determine whether there is any benefit to imposing a speed restriction on the opposing carriageway.

Disclaimer

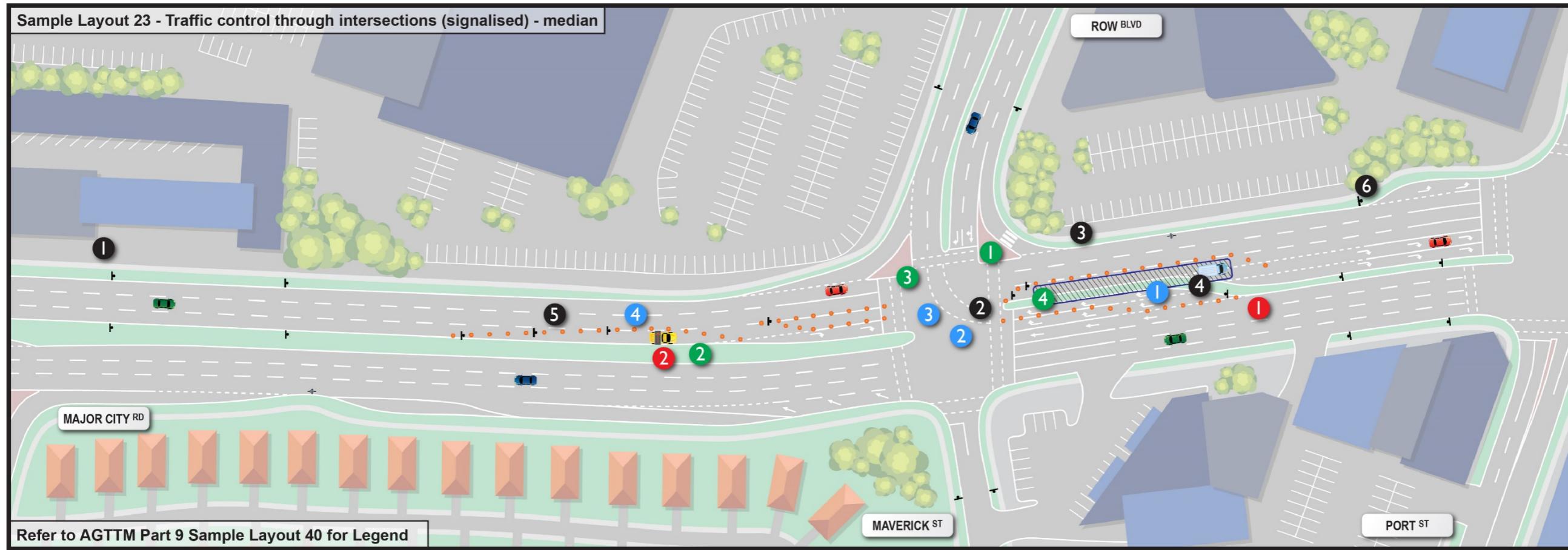
This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 When determining the length of a lane closure and location of merge tapers designers should consider the location of existing merges and follow the principle that only one lane should be merged at any given location. Conversely, where lane diverge tapers are used to provide access to turning lanes, these are ideally separated for the same reason.
- 2 While driveways are typically not treated as sidestreets, where an adjacent property generates substantial traffic volumes (such as a shopping centre or hotel) it may be necessary to provide advance warning signs at the exit to the carpark.
- 3 When closing a departure lane immediately after a signalised intersection, it is good practice to close any multilane approach on turning movements (for example, double right turns should be consolidated prior to turning into a closed lane).
- 4 When closing a right hand through lane adjacent to a right turn lane on a multi-lane roadway, designers should ensure that the merge taper is not placed in conflict with the right-hand turn diverge taper.
- 5 Traffic analysis may be required to determine the timing of the closure.

Implementer Considerations

- 1 Where works are undertaken within a work zone that is surrounded by traffic lanes on both sides, implementers should be given instructions on how to manage access to the work zone for workers on foot, particularly on high-speed, high-volume roads.
- 2 Designers should specify the appropriate sequencing of implementation of the closure, with consideration given to ensuring the safety of both the implementers and the general public.



Scenario

Vac-U-Find is conducting utility locating services on Major City Road that are located in the median before the signalised intersection with Row Boulevard. As the Vac-U-Find truck needs to be parked in the right-hand lane travelling east, the right-hand lane has been closed prior to the signals.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 4 When designing work zones, refer to AGTTM Part 3, Table 5.2 for the required edge clearances of delineation devices.
- 5 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 6 When placing termination signage following a work zone, refer to AGTTM Part 3, Table 5.8.

Designer Considerations

- 1 Designers should consult with persons undertaking the works to ensure understanding of the physical space required for construction activities.
- 2 When works are proposed at traffic signals (in particular works on the signals themselves), designers should confirm whether the works will require the signals to be turned off. If signals must be switched off, all movements of traffic and pedestrians will need to be appropriately managed.
- 3 Will alterations to traffic signal timings be required for the affected intersections? Consultation with the traffic signal system operator will be needed. Alternatively, manual traffic control may need to be considered.
- 4 When closing a right hand through lane adjacent to a right turn lane on a multi-lane roadway, designers should ensure that the merge taper is not placed in conflict with the right-hand turn diverge taper.

Disclaimer

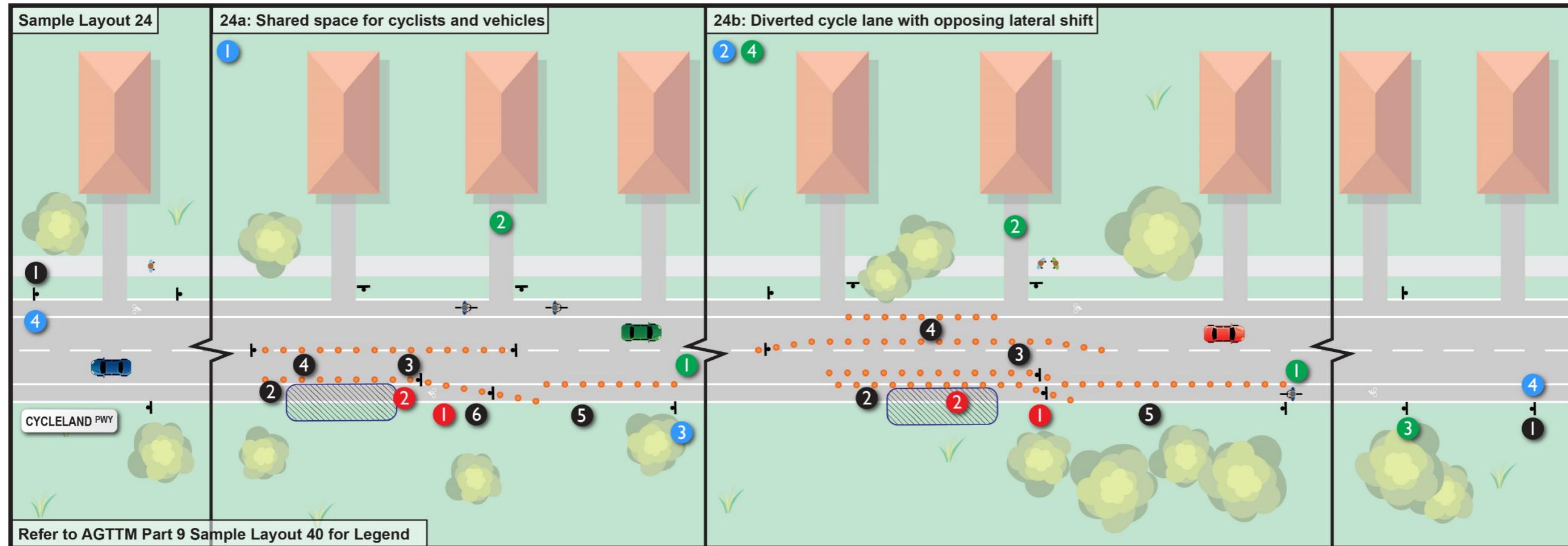
This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Risk Considerations

- 1 When closing or shortening turning lanes at signalised intersections, consideration should be given to the potential for queuing to occur that exceeds the shortened lane. This may result in increased risk of rear-end crashes.
- 2 Parking work vehicles on traffic signal loops can cause unnecessary signal phases to be activated, resulting in traffic delays. When specifying location of traffic management vehicles and the parking allocations for work vehicles, the designer should make it clear that parking over signal loops should be avoided (where these can be visually identified).

Implementer Considerations

- 1 Where works are undertaken within a work zone that is surrounded by traffic lanes on both sides, implementers should be given instructions on how to manage access to the work zone for workers on foot. At signalised intersections, it may be possible to access the work area via the signalised crossing, but workers may not have access to the pedestrian push button from the median.
- 2 Radio protocols should be provided to ensure that construction traffic or workers on foot do not enter the work zone until the traffic management setup is completely established.
- 3 When working at signalised intersections, implementers should always be given contact details for the traffic signal system operator, and instructions regarding contacting the operator prior to establishing any worksite.
- 4 Designers should specify the appropriate sequencing of implementation of the closure, with consideration given to ensuring the safety of both the implementers and the general public.



Scenario

Signs N Lines Ltd has been contracted to install new long term wayfinding signs for the bicycle route on Cyceland Parkway. As the signs are large, the workers may need to occupy the bicycle lane at times during installation of the sign face. As the width of the road varies, the designer has developed two different arrangements to manage cyclist safety when workers need to close the cycle lane.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 4 When reducing lane widths through or past a work zone, refer to AGTTM Part 3, Table 2.5.
- 5 When work zones encroach on cycle lanes, resulting in diversions of cycle lanes into the roadway, refer to AGTTM Part 3, Section 5.13 for safety considerations and guidance.
- 6 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.

Risk Considerations

- 1 Closely spaced traffic cones can assist to ensure realignment of cycle lanes are clearly delineated however as fallen traffic cones can also create a hazard for cyclists a balance between the two risks should be considered.
- 2 In comparison to motorised traffic, the noise made by approaching cyclists is minimal, and therefore there are increased risks to workers and cyclists when workers are not facing approaching cyclist movements. Consideration should be given to providing a dedicated spotter whenever workers are in proximity to a cycle lane.

Disclaimer

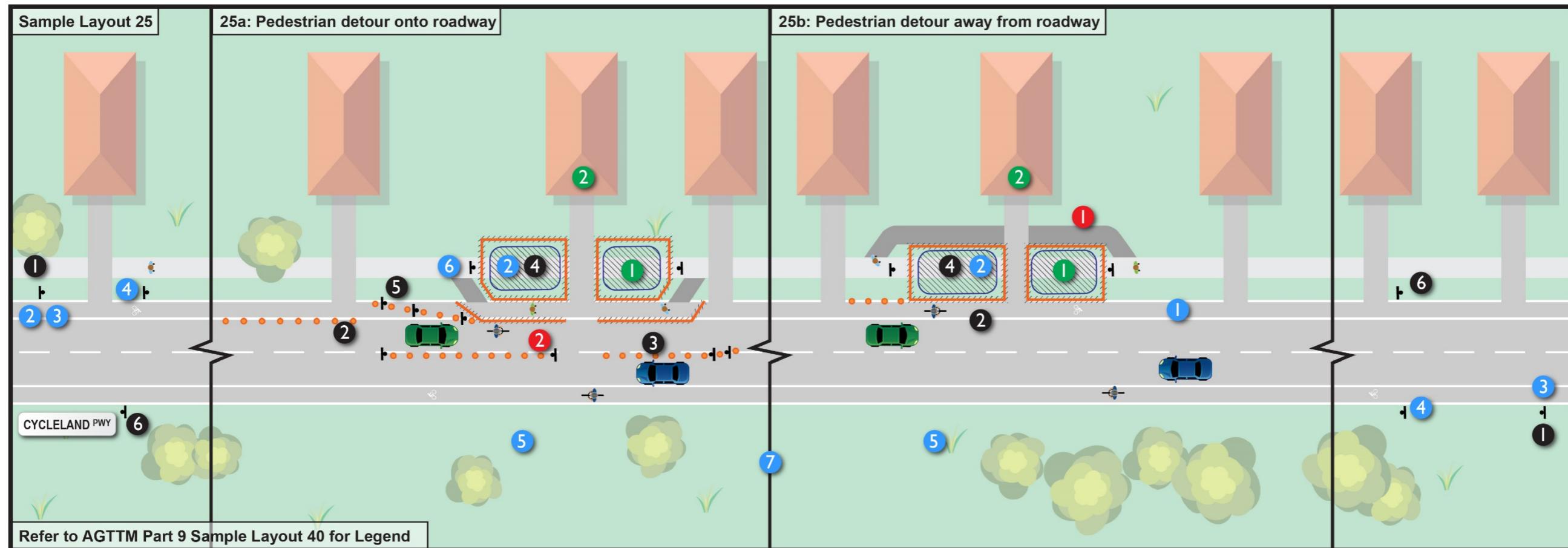
This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 24a: Wherever physically possible, cycle lanes should be maintained and separately delineated.
- 2 24b: Where there is insufficient width to maintain a cycle lane, consider a shared lane treatment with appropriate advanced warning signage and a possible speed restriction.
- 3 Where a cycle lane is terminated and cyclists are required to share the traffic lane, appropriate signage should be provided to warn both cyclists and motorists of the need to share the lane.
- 4 When a worksite is separated from general traffic by a cyclist detour, the presence of cyclists within an existing roadway need to be considered carefully when designing the temporary speed zones.

Implementer Considerations

- 1 Implementers should be instructed to ensure that traffic cones are placed on the traffic side of a cycle lane, and not unnecessarily reduce the width of a cycle lane.
- 2 Consultation is required with residents when works will impact on driveway access. Implementers should be made aware of any specific arrangements that have been agreed in advance.
- 3 Implementers should be guided to avoid placement of signage within a cycle lane as the legs and frames of temporary signage can easily become a clipping hazard for cyclists.
- 4 Designers should specify the appropriate sequencing of implementation of the closure, with consideration given to ensuring the safety of both the implementers and the general public.



Scenario

Path-A-Way have been engaged to repair the footpath on Cycleland Parkway in multiple locations. As there are many pedestrians and no suitable footpath on the other side of the road, the designer has developed two different arrangements to detour pedestrians around the worksites.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 3 When reducing lane widths through or past a work zone, refer to AGTTM Part 3, Table 2.5.
- 4 When work zones encroach on pedestrian footpaths, resulting in diversions of pedestrian into areas closer to or within the roadway, refer to AGTTM Part 3, Section 5.13 for safety considerations and guidance.
- 5 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 6 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.

Risk Considerations

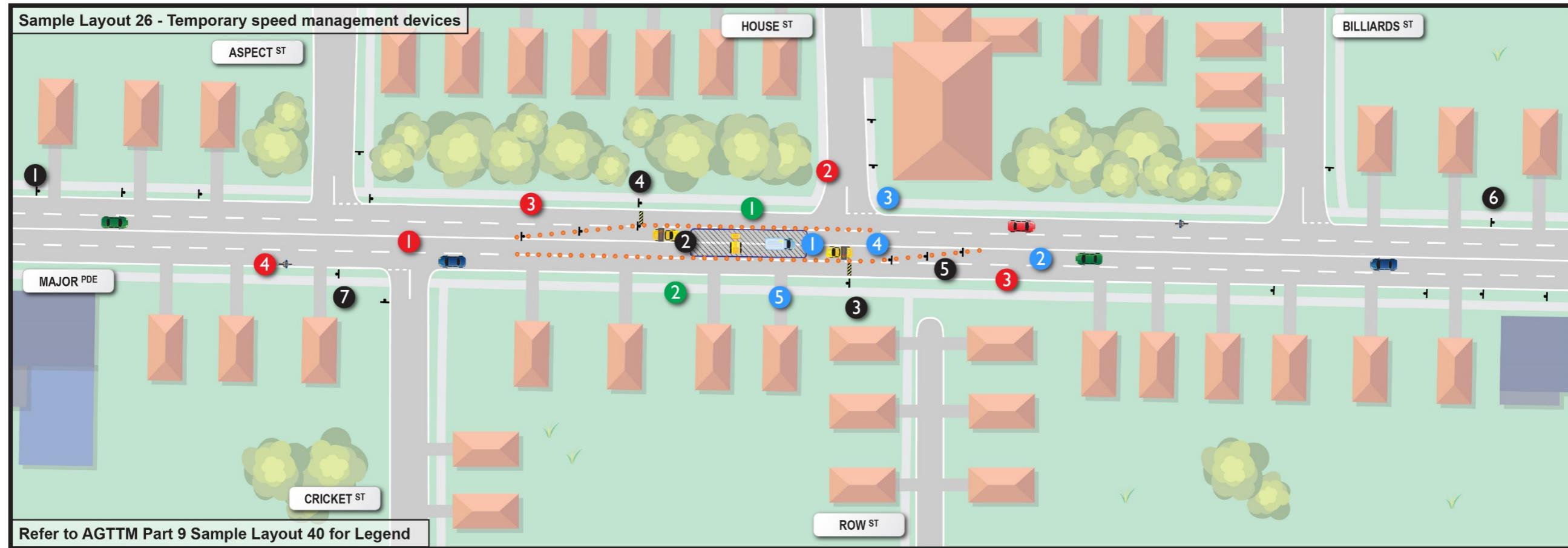
- 1 The relevant road authority will need to be consulted before diversion of a public footpath and diversion through private property may not be an acceptable risk to the road authority or property owner.
- 2 The designer should always consider the risks and impacts to vulnerable users such as cyclists when diverting pedestrian into the roadway and be cognisant that even though cycling facilities may not be present, a cycling demand can still exist.

Designer Considerations

- 1 Wherever physically possible, cycle lanes should be maintained and separately delineated. Pedestrians should not be diverted into a cycle lane unless the cycle lane has been closed to cyclists.
- 2 When a work zone is separated from general traffic by a pedestrian detour, the presence of pedestrians within an existing roadway need to be considered carefully when designing the temporary speed zones.
- 3 When the resulting pedestrian detour impacts a formalised cycle facility, the designer should consider the reduced width of the carriageway that results in the interaction between cyclists and vehicles when designing the advance warning signage and the speed restrictions.
- 4 Where it is likely that on-street parking has the potential to obstruct the visibility of signs, designers should consider using additional cones adjacent to the kerb.
- 5 When closing footpaths, consideration should be given to whether there is an equivalent standard of footpath on the other side of the road. In low-speed environments where pedestrian and traffic volumes are very low, it may be suitable for pedestrians to use the roadway as a temporary detour route. Where a formal road crossing is available, additional signage should be considered in advance of the footpath closure.
- 6 When providing a footpath diversion onto the roadway, designers should consider the need for temporary kerb ramps, particularly where adjacent driveways are not available.
- 7 When deciding the appropriate pedestrian treatment (25a, 25b or other), the designer should consider all the variables/constraints regarding the site and the works. These could include land availability, cyclist presence, nature of works, sight line restrictions, residential driveway access and aftercare needs.

Implementer Considerations

- 1 Where temporary works are required to be established in advance of a change in traffic arrangement (such as a temporary footpath), designers should indicate who is responsible for ensuring the temporary works are complete before commencing set up of a Traffic Guidance Scheme.
- 2 Consultation is required with residents when works will impact on driveway access. Implementers should be made aware of any specific arrangements that have been agreed in advance.



Scenario

AZ Pot Holes has been requested to redo the works on Major Parade (see Sample Layout 15). The designer has changed the arrangements to use temporary speed management devices (orange and black diagonal stripes) to ensure that traffic in both directions is travelling slowly as they pass the work zone.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 Safety buffers and advanced warning areas for 'past' work zone treatments are covered in AGTTM Part 3, Sections 5.6 and 5.7 respectively.
- 3 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 4 When including temporary speed management devices, refer to AGTTM Part 3, Section 5.5 for guidance.
- 5 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 6 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.
- 7 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.

Designer Considerations

- 1 When determining the length of a lane closure, designers should ensure they have an understanding of the size and quantity of construction vehicles required to occupy the area at any given time.
- 2 Traffic analysis may be required to determine the timing of the closure.
- 3 Advance warning signage should be positioned on all side streets where vehicles are expected to approach the work zone.
- 4 How will construction vehicles enter and exit the work zone safely? Accesses should be clearly signed and managed to prevent public traffic following construction traffic into a work zone.
- 5 Merge tapers should be positioned so that they do not impact on access to driveways, as vehicles slowing to turn into driveways through the merge taper could result in rear-end collisions.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Risk Considerations

- 1 Failure to reopen the road before peak traffic periods could result in excessive delays and increase the risk of crashes due to queuing and congestion.
- 2 Accommodating existing right turns out of side streets introduces a variety of risks. Drivers may inadvertently enter the workzone. Right turns should be banned where possible, but considerations for banning right turns should include the availability of a detour and the traffic volume that will be detoured.
- 3 When designing multi-lane merges within an urban environment, the risks involved with implementing a chicane arrangement for speed compliance may also introduce additional risks due to the need for side street and driveway management.
- 4 Where cycle lanes are absent on a multi-lane road, the reduction of lanes and lane widths prevents the ability for vehicles to safely overtake on-road cyclists. Risk assessments should consider the volume and profile of cycling activity, and consideration should be given to additional advisory signage, reduction in speeds, or provision of a cyclist detour.

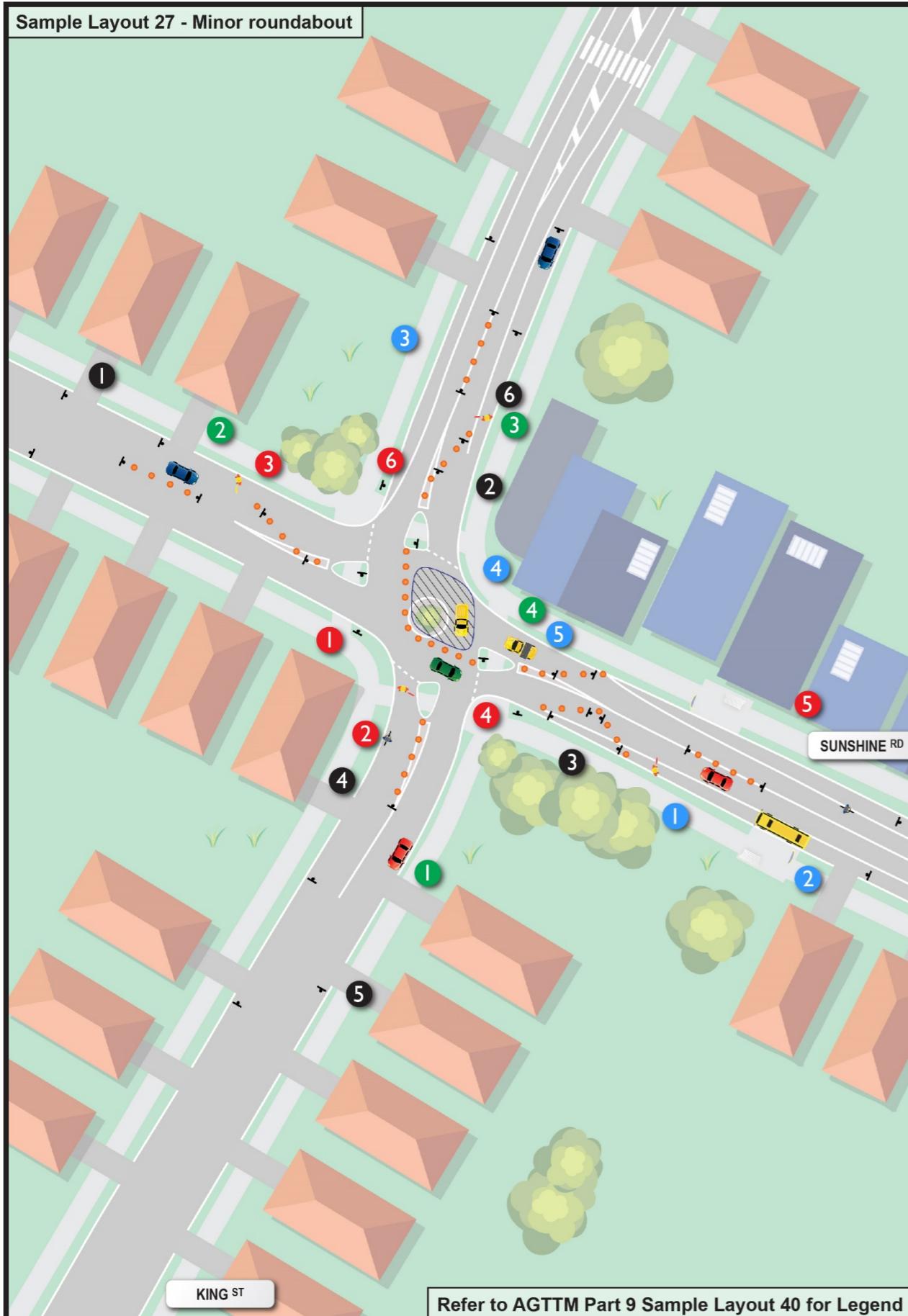
Implementer Considerations

- 1 Radio protocols should be provided to ensure that construction traffic or workers on foot do not enter the work zone until the traffic management setup is completely established.
- 2 Where works are undertaken within a work zone that is surrounded by traffic lanes on both sides, implementers should be given instructions on how to manage access to the work zone for workers on foot, particularly on high-speed, high-volume roads.

Appendix D Sample Layouts (Worksites at Roundabouts)

Application for New Zealand

Note that the layouts described in this section and in the accompanying figures are based on layouts applied within the Australian context. For layouts applied within New Zealand, refer to the New Zealand Code of Practice for Temporary Traffic Management.

**Scenario**

Maroon Shire Council is required to conduct maintenance and re-landscape a roundabout at the intersection of King Street and Sunshine Road. The intersection is a skewed roundabout within a residential catchment. Due to the limited space, one quadrant of the roundabout will be required to be closed to gain access for plant and equipment. Sunshine Road is a local school bus route with bus stops situated in close proximity to the intersection.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

AGTTM Reference

- 1 When placing and spacing advance warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 3 For additional information regarding chicanes, refer to AGTTM Part 3, Section 5.9.2.
- 4 When reducing lane widths through or past a work zone, refer to AGTTM Part 3, Table 2.5.
- 5 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.
- 6 For details regarding positioning traffic controllers prior to a taper, refer to AGTTM Part 3, Section 5.9.1 and Figure 5.11.

Risk Considerations

- 1 Vehicles travelling through the diversion may become confused and either enter the worksite or exit into oncoming traffic.
- 2 Volume of cyclists should be considered with regard to the risk of cycle non-compliance with traffic control.
- 3 Loss of communications between traffic controllers, or unclear instructions can result in conflicting head-on movements within the shuttle flow arrangement.
- 4 Will oversized vehicles (e.g. roadside/waste collection trucks) be able to navigate the work zone successfully? Frequent heavy vehicle movements may require a swept path assessment and engineering advice.
- 5 Consider the movement of children when assessing risk for works that coincide with school commuter hours.
- 6 Consider the need to provide pedestrian warning of two-way vehicular flow for the management of pedestrian crossings through contraflow arrangements.

Designer Considerations

- 1 The designer should consider the appropriate treatment for a four-way stop-slow (portable signals, portable barrier, traffic controllers).
- 2 Are there bus stops located around or within the work zone? If so, does their proximity to works warrant temporary relocation?
- 3 Designers should ensure visual clues and signage guides traffic onto the correct side of the road upon exiting a shuttle flow arrangement.
- 4 How and where will work vehicles access the work zone?
- 5 Traffic control vehicles should be positioned to help the general traffic navigate the diversion. These may also assist in ensuring vehicles do not re-enter a closed lane.

Implementer Considerations

- 1 There may be a need for early implementation or community notification to ensure the area required for shuttle flow is clear of parked vehicles.
- 2 In instances of prolonged obstruction of driveway accesses, consultation with residents may be required.
- 3 Traffic controllers should be given clear instructions on the communication protocols regarding the operation of the shuttle flow arrangement.
- 4 Designers should specify the appropriate sequencing of implementation of the closure, with consideration given to ensuring the safety of both the implementers and the general public.



Scenario

Kerb repairs are being finalised on a major, two-lane roundabout at the intersection of Industrial Road and Kingway Road. The intersection is situated in an urban environment with dual lane approaches on each leg and dual lane circulating carriageway through most of the intersection (the eastern side has a single circulating lane). Due to the heavily vegetated island, workers can only gain access to the work zone from the adjacent traffic lane, resulting in the closure of the inner lane.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

AGTTM Reference

- 1 When placing and spacing advanced warning signage prior to the work zone, refer to AGTTM Part 3, Table 2.2.
- 2 When spacing traffic cones at a work zone, refer to AGTTM Part 3, Table 5.3.
- 3 For recommended taper lengths based on posted speed limits, refer to AGTTM Part 3, Table 5.6.
- 4 When reducing lane widths through or past a work zone, refer to AGTTM Part 3, Table 2.5.
- 5 For requirements of temporary speed zones at work zones, refer to AGTTM Part 3, Section 5.5.1.
- 6 For termination signage placement following a work zone, refer to AGTTM Part 3, Table 5.8.

Risk Considerations

- 1 Adverse weather conditions may temporarily delay or postpone work. Will a contingency plan be required?
- 2 Will oversized vehicles (e.g. roadside/waste collection trucks) be able to navigate the work zone successfully? Frequent heavy vehicle movements may require a swept path assessment and engineering advice.
- 3 Traffic analysis may be required to assess the risk of increased queuing due to reduced intersection capacity.
- 4 Stopping traffic within a roundabout (such as for construction access) poses considerable risk of rear-end vehicle crashes.
- 5 Escape paths for all traffic controllers should be considered if using traffic controllers to guide or stop traffic.
- 6 On single lane approaches to any intersection which develops multiple turn lanes, the turn lanes should be fully closed prior to developing to avoid unnecessary merging, reducing the risk of sideswipe crashes.

Designer Considerations

- 1 How and where will work vehicles access the work zone? Will traffic controllers be necessary at any time to stop traffic?
- 2 Is the reduced roundabout capacity sufficient to handle the day-to-day traffic volumes at the site? Traffic analysis by a competent person may be required to determine the hours of operation.
- 3 Designer should consider the existing linemarking and ensure traffic management devices do not require the user to perform illegal manoeuvres.
- 4 Is there sufficient lane width within the single lane section to facilitate a partial lane closure and allow safe working space for workers?
- 5 Appropriate approach signage is provided to ensure traffic understands the allowable movements within a complex roundabout setup.
- 6 Traffic control vehicles should be positioned where devices (such as flashing arrows) may help the general traffic navigate the diversion. These may also assist in ensuring vehicles do not re-enter a closed lane.

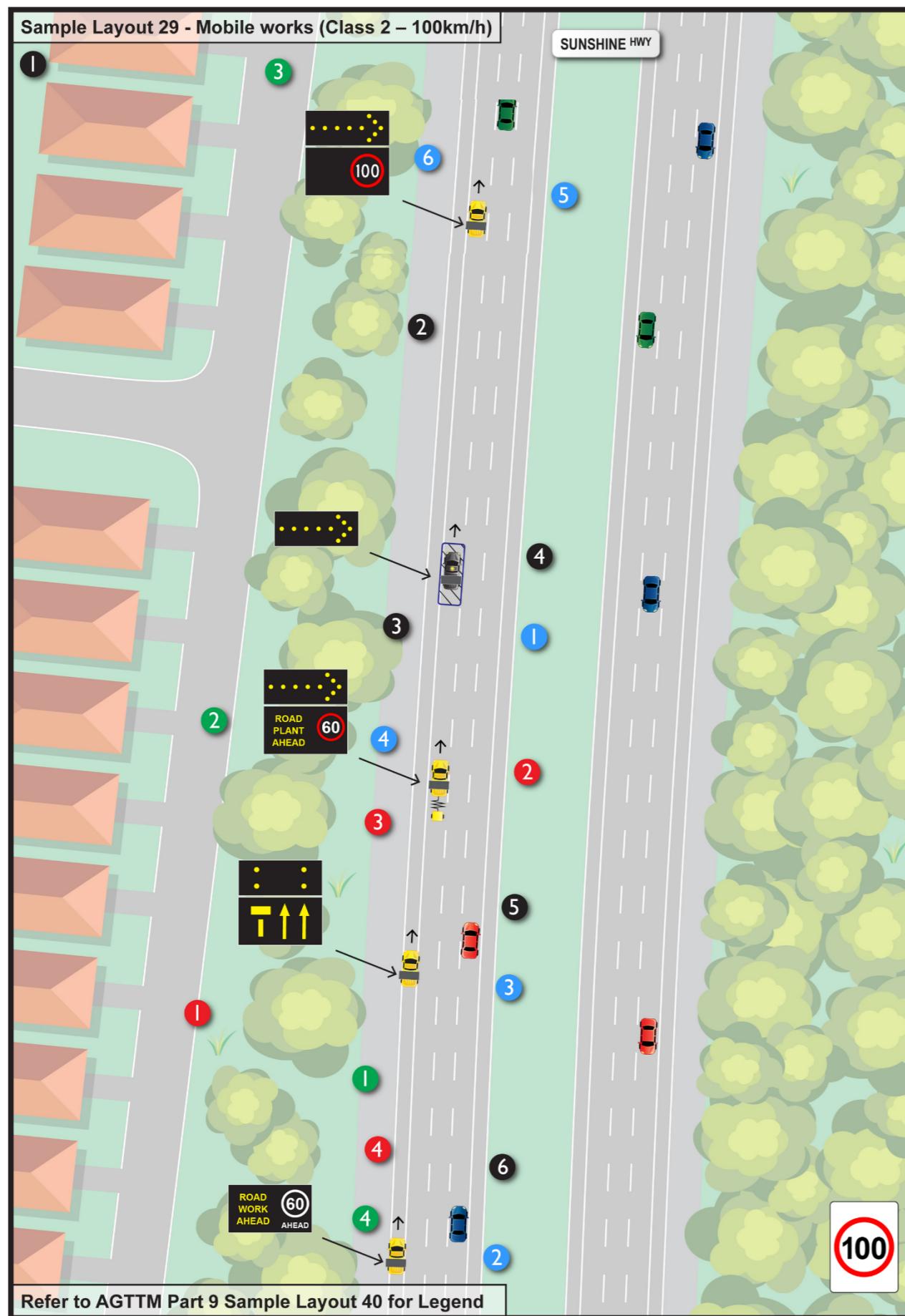
Implementer Considerations

- 1 Designers should provide guidance on the appropriate positioning of traffic control vehicles.
- 2 What warning devices/vehicles are required to ensure worker safety when setting up the work zone?
- 3 Designers should specify the appropriate sequencing of implementation of the closure, with consideration given to ensuring the safety of both the implementers and the general public.
- 4 Designers should provide guidance on the appropriate location of construction access and egress from site.

Appendix E Sample Layouts (Mobile Works)

Application for New Zealand

Note that the layouts described in this section and in the accompanying figures are based on layouts applied within the Australian context. For layouts applied within New Zealand, refer to the New Zealand Code of Practice for Temporary Traffic Management.



Scenario

Pavements-R-U's is preparing for a road widening project along Sunshine Highway. The project team has subcontracted Scans-R-U's to provide a Ground Penetrating Radar Vehicle to develop a public utilities location map for the project. These works can be done at approximately 50km/h and have been planned to utilise the mobile works methodology.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

AGTTM Reference

- 1 Mobile works are defined as per AGTTM Part 4, Section 3.3.
- 2 When designating a class of mobile works refer to AGTTM Part 4, Section 3.2.
- 3 When determining the requirements, responsibilities and positioning of vehicles within a work convoy refer to AGTTM Part 4, Section 3.5.

- 4 For required distances between work vehicles in a convoy based on posted speed limits, refer to AGTTM Part 4, Section 3.6.
- 5 For guidance on truck-mounted warning signage required by mobile works convoys, refer to AGTTM Part 4, Section 3.7.
- 6 For operational procedure and situational guidance for specific work zones refer to AGTTM Part 4, Section 3.8.

Risk Considerations

- 1 Based on a risk assessment, when the vehicle is stationary for greater than 10 minutes it is recommended the driver be removed from the cabin. For short periods (e.g. 2 minutes) there may be additional risk of the driver exiting and re-entering the cabin.
- 2 Use more than one shadow vehicle when there is low visibility on site and the required visibility between vehicles cannot be achieved.

- 3 TMAs are often used with shadow vehicles to protect the worksite and reduce the impact for the road user. They are a safety device designed to reduce the severity of collision from any errant vehicles causing harm to road workers. As such, the first vehicle on site when working in a live scenario is the vehicle fitted with a TMA.
- 4 Designer should consider the risk of convoy interaction with cyclists, both convoy overtaking cyclists and cyclists overtaking slow moving convoys.

Designer Considerations

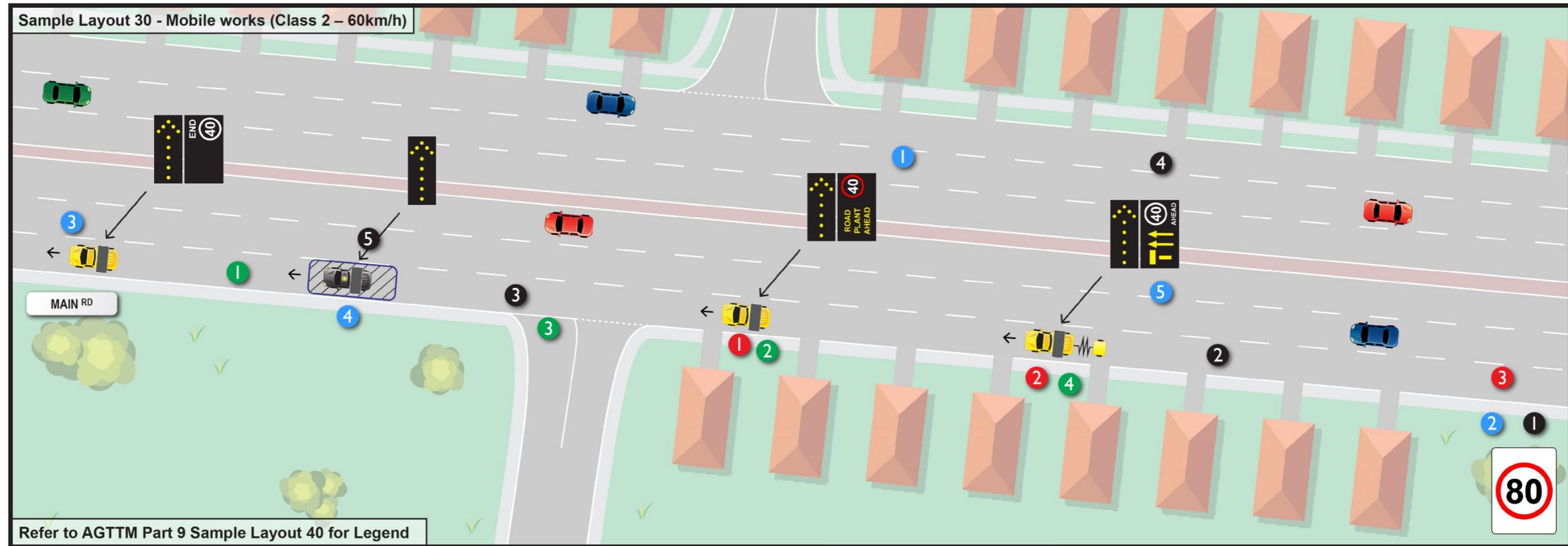
- 1 Class 2 mobile works involve vehicles undertaking works more than 20 km/h below the permanent speed limit (e.g. work vehicles travelling at 70 km/h or less in a 100 km/h speed zone or 40 km/h in a 70 km/h speed zone) (i.e. no workers on foot). Vehicles are required to be at least the size of a standard utility vehicle.
- 2 Is there clear sight distance to the vehicle-mounted warning device for approaching drivers (based on the permanent speed limit that includes speed limits displayed on ITS fixtures and devices displayed on motorways)?
- 3 Mobile works cannot be undertaken straddling the centreline on a multilane undivided road. If considering this road environment, refer to AGTTM Part 3: Static Worksites.

- 4 If a shadow vehicle is the first vehicle on site for a Category 2 or 3 (AGTTM Part 8) road with a posted speed limit of 80 km/h or greater than it is recommended the vehicle be fitted with a TMA.
- 5 The longitudinal spacing of the works convoy is important when ensuring the safety of road workers and road users. AGTTM Part 4 Section 3.6 provides guidance on determining convoy spacing between the shadow vehicle and advance warning vehicle, and the distance between the lead vehicle and work vehicle.
- 6 At the end of the mobile works zone, the displayed speed limit on the lead vehicle should be changed to match the permanent speed limit. When this is not practical, the END 40 or END 60 speed sign may be used.

Implementer Considerations

- 1 Is the vehicle-mounted warning device clearly visible (not obscured) to all road users?
- 2 The driver of the shadow vehicle must remain in the cab of the vehicle while part of a mobile operation. When the shadow vehicle is in a stationary position, it is recommended that the hand brake is applied and the vehicle engaged in low gear or in park.

- 3 Are all resources for the mobile works available (including a shadow vehicle)?
- 4 Where possible, based on the activities undertaken, position the advance warning vehicle as far to the left (or right if works are on the right side of the road) of the worksite as practicable. This can include positioning the advance warning vehicle on the shoulder and ensuring the advance warning vehicle is clear of traffic lanes where possible. This reduces disruption to road users.



Scenario

Spray-Away Services is engaged to conduct routing herbicide spraying throughout Major City. Works are conducted in a mobile convoy travelling between 20-30km/h with a temporary speed zone of 40km/h for general traffic passing the convoy.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

AGTTM Reference

- 1 When designating a class of mobile works refer to AGTTM Part 4, Section 3.2.
- 2 When determining the requirements, responsibilities and positioning of vehicles within a work convoy refer to AGTTM Part 4, Section 3.5.
- 3 For required distances between work vehicles in a convoy based on posted speed limits, refer to AGTTM Part 4, Section 3.6.
- 4 For guidance on truck-mounted warning signage required by mobile works convoys, refer to AGTTM Part 4, Section 3.7.
- 5 For operational procedure and situational guidance for specific work zones, refer to AGTTM Part 4, Section 3.8.

Risk Considerations

- 1 Based on a risk assessment, when the vehicle is stationary for greater than 10 minutes it is recommended the driver be removed from the cabin. For short periods (e.g. 2 minutes), there may be additional risk of the driver exiting and re-entering the cabin.
- 2 Use more than one shadow vehicle when there is low visibility on site and the required visibility between vehicles cannot be achieved.
- 3 Volume of cyclists should be considered with regard to the risk of cyclist non-compliance with mobile works convoys, as cyclists may attempt to pass on the inside of the convoy.

Designer Considerations

- 1 When designing the work convoy, consider placing rear-mounted signs on vehicles indicating the type of activities occurring. This provides advance warning to road users, enabling them to perceive and process the type of works taking place ahead.
- 2 Class 2 Mobile works involve vehicles undertaking works more than 20 km/h below the permanent speed limit (e.g. work vehicles travelling at 70 km/h or less in a 100 km/h speed zone or 40 km/h in a 70 km/h speed zone) (i.e. no workers on foot). Vehicles are required to be at least the size of a standard utility vehicle.
- 3 Ensure all vehicles are fitted with a vehicle-mounted warning device and their location is appropriate to the scope of works being undertaken. Where the permanent speed limit is less than 65 km/h works can also be carried out as short term low impact works outlined in AGTTM Part 5.
- 4 All vehicles within a mobile work zone are required to be task specific and must only undertake one task at a time (e.g. a work vehicle/s cannot act as an advance warning vehicle at the same time).
- 5 Advance warning signs (such as speed limits) can be illustrated on ITS fixtures and devices displayed on motorways with the approval from the relevant authorities.

Implementer Considerations

- 1 When a mobile operation contains more than one work vehicle (and there are no workers on foot), space each work vehicle 40 m apart as a maximum. If this is not practicable, treat each work vehicle as a separate mobile operation with their own work convoy.
- 2 For the protection of large plant items where no workers on foot or small plant are present, the shadow vehicle follows 40 m behind in the lane/shoulder to the left of the work lane. If this is not practicable, the shadow vehicle can follow in the work lane. When coming to an intersection, on/off ramp, or side road, move the shadow vehicle closer.
- 3 If mobile works come to an intersection, on/off ramp, or side road, move the shadow vehicle closer to compensate for turning traffic. Once the intersection, on/off ramp or side road has been passed, the shadow vehicle returns to its previous spacing distance.
- 4 An advance warning vehicle is responsible for providing advance warning to road users coming up behind mobile works and diverting traffic past the worksite. As such, provide a clear sight distance from approaching road users to the advance warning vehicle. An advance warning vehicle can also provide speed decrease increments and display the lane status to road users.

**Scenario**

Linemarking-R-U's is replacing the Raised Retroreflective Pavement Markers (RRPM) for Express Motorways. Workers need to remove and replace the RRPMs on foot, which only takes a few seconds for each operation, so they are able to undertake the works protected by a mobile convoy.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

AGTTM Reference

- 1 Mobile works are defined as per AGTTM Part 4, Section 3.3.
- 2 When designating a class of mobile works refer to AGTTM Part 4, Section 3.2.
- 3 When determining the requirements, responsibilities and positioning of vehicles within a work convoy refer to AGTTM Part 4, Section 3.5.
- 4 For required distances between work vehicles in a convoy based on posted speed limits, refer to AGTTM Part 4, Section 3.6.
- 5 For guidance on truck-mounted warning signage required by mobile works convoys, refer to AGTTM Part 4, Section 3.7.
- 6 For operational procedure and situational guidance for specific work zones refer to AGTTM Part 4, Section 3.8.

Risk Considerations

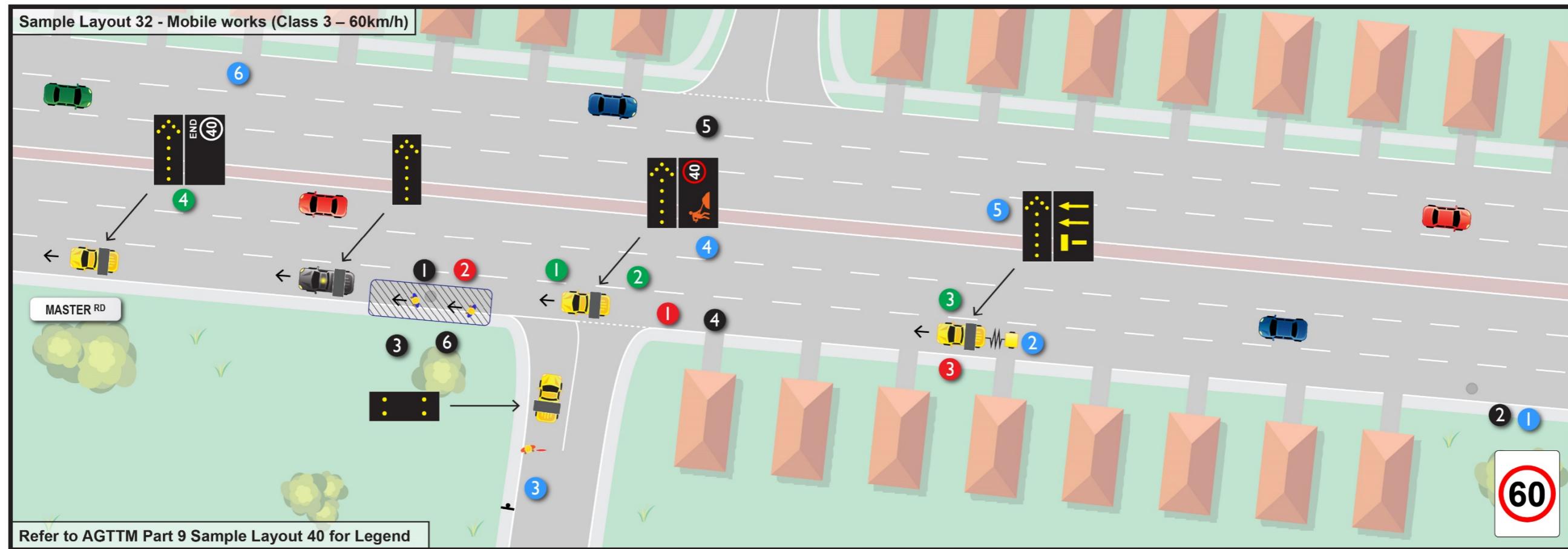
- 1 Use more than one shadow vehicle when there is low visibility on site and the required visibility between vehicles cannot be achieved.
- 2 If a shadow vehicle is too close to the work area and is hit from behind, the vehicle is in danger of entering the work area and impacting workers on foot. If the shadow vehicle is too far from the work area, the risk of road users entering the area between the shadow vehicle and work area is increased.
- 3 Adverse weather conditions may temporarily delay or postpone work. Will a contingency plan be required?
- 4 Miscommunication between the workers on foot and the mobile convoy could lead to workers being exposed to live traffic. Workers on foot should be instructed to have a functioning communication device that allows them to communicate with the mobile convoy, and protocols be in place for when devices fail.

Designer Considerations

- 1 A shadow vehicle is required for activities such as shoulder grading, pavement and edge patching, and other works where workers are required to be on foot. If a shadow vehicle is unavailable, implement a frequently changing work area (See AGTTM Part 5).
- 2 When there are workers on foot, work vehicles are required to reinstate the posted speed limit.
- 3 On Category 3 (AGTTM Part 8) roads two or more shadow vehicles with TMAs can be deployed depending on the location of works (e.g. multiple lane closure with multiple shadow vehicles).
- 4 Advance warning signs (such as speed limits) can be illustrated on ITS fixtures and devices displayed on motorways with the approval from the relevant authorities.

Implementer Considerations

- 1 A lead vehicle provides advanced warning for road users travelling in the opposite direction to a mobile operation, allowing them to react and slow or stop their vehicle before reaching the work vehicles or hazard if required.
- 2 For protection of workers on foot or small plant items, the shadow vehicle follows 40 m behind in the work lane. If the speed of traffic is above 60 km/h, apply a temporary speed limit to reduce speeds to 60 km/h or less (see AGTTM Part 3).
- 3 Ensure all vehicles are fitted with a vehicle-mounted warning device and their location is appropriate to the scope of works being undertaken.
- 4 Where the sight distance is poor, move the lead vehicle to a point where clear sight distance is achieved while keeping the advance warning vehicle stationary until the work vehicle has travelled ahead to a point where clear sight distance is achieved.



Scenario

Pit-Check is conducting inspections on sewer manholes throughout Major City. Workers on foot are required to lift and inspect each manhole, which takes several minutes.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Implementer Considerations

- 1 The shadow vehicle travels 40m behind the work vehicle (see Section 3.5.3) or workers, whichever is closer.
- 2 The driver of the shadow vehicle must remain in the cab of the vehicle while part of a mobile operation. When the shadow vehicle is in a stationary position, it is recommended that the hand brake is applied and the vehicle engaged in low gear or in park.
- 3 Ensure all vehicles are fitted with a vehicle-mounted warning device and their location is appropriate to the scope of works being undertaken.
- 4 Remove, cover, fold or deactivate signs and devices when they are not being used during works. This ensures that they are not visible to road users and do not cause any confusion to road users.

Risk Considerations

- 1 Use more than one shadow vehicle when there is low visibility on site and the required visibility between vehicles cannot be achieved.
- 2 Workers on foot should not enter or undertake activities in a traffic lane at any time during the installation, maintenance, or removal of equipment.
- 3 The risk of loss of radio communication should always be considered when mobile works are conducted with workers on foot. This is a particularly high risk where passing traffic or the machinery used for the works are likely to generate high noise levels.

Designer Considerations

- 1 Where the permanent speed limit is less than 65 km/h works can also be carried out as short term low impact works outlined in AGTTM Part 5.
- 2 Consider the use of multiple advance warning vehicles to decrease speed on Category 3 and Category 2 (AGTTM Part 8) roads. Advance warning vehicles are to be stopped along curved sections of road or where visibility is restricted to maintain sight distance. The driver of the advance warning vehicle is responsible for alerting road workers to any interruption, hazard or approaching danger, especially workers on foot.
- 3 On high volume side streets, consider the need for a traffic controller to manually hold traffic.
- 4 Signs will indicate the type of work being completed and provide additional warning of the presence of workers on foot when required. The use of multi-message signs on the vehicle is an acceptable practice.
- 5 All vehicles and items of plant in the mobile works convoy, other than minor items of plant protected by a works vehicle and shadow vehicle are to carry a vehicle-mounted warning device fitted with an illuminated flashing arrow sign.
- 6 At the end of the work zone, the lead vehicle is to display the end speed limit sign to notify drivers of the changed driving conditions. Common signs used in these situations include the END 40 and END 60 speed signs.

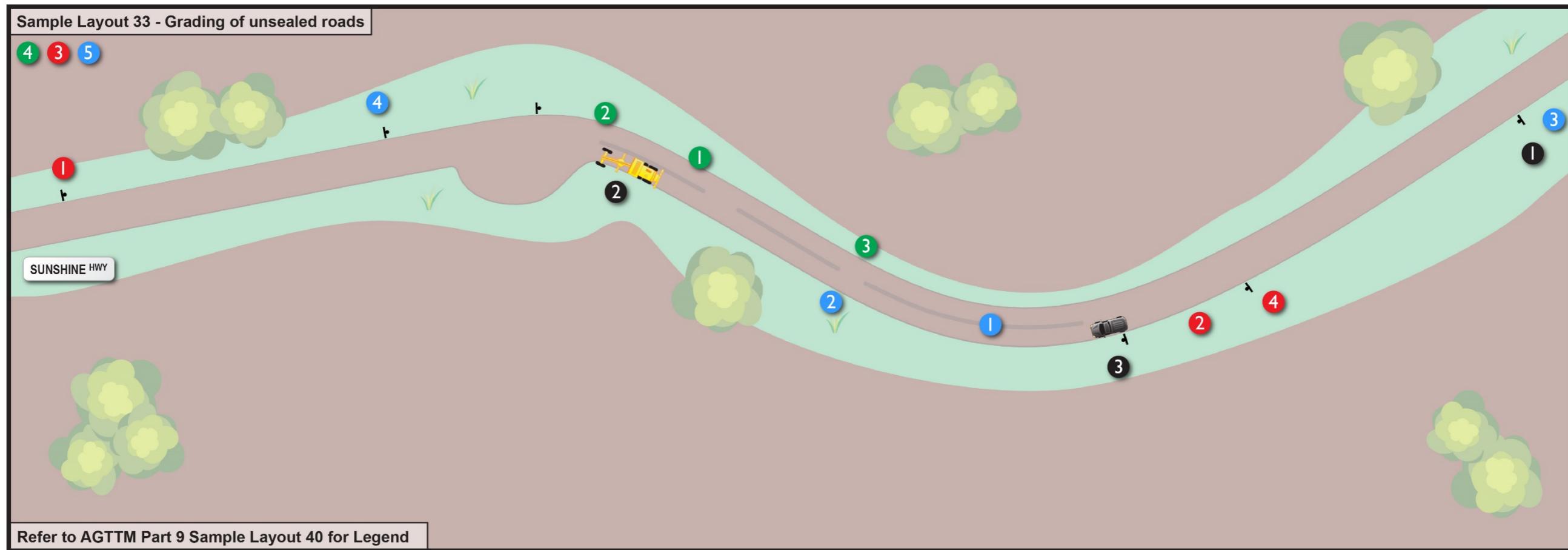
AGTTM Reference

- 1 Mobile works are defined as per AGTTM Part 4, Section 3.3.
- 2 When designating a class of mobile works refer to AGTTM Part 4, Section 3.2.
- 3 When determining the requirements, responsibilities and positioning of vehicles within a work convoy refer to AGTTM Part 4, Section 3.5.
- 4 For required distances between work vehicles in a convoy based on posted speed limits, refer to AGTTM Part 4, Section 3.6.
- 5 For guidance on truck-mounted warning signage required by mobile works convoys, refer to AGTTM Part 4, Section 3.7.
- 6 For operational procedure and situational guidance for specific work zones refer to AGTTM Part 4, Section 3.8.

Appendix F Sample Layouts (Work on Unsealed Roads)

Application for New Zealand

Note that the layouts described in this section and in the accompanying figures are based on layouts applied within the Australian context. For layouts applied within New Zealand, refer to the New Zealand Code of Practice for Temporary Traffic Management.



Scenario

Grade-N-Go is required to regrade a 5km section of an unsealed remote highway. The Big Desert Traditional Landowners Corporation has requested a site specific TGS to be developed due to the road geometry. The annual average daily traffic volume along the highway is 818vpd which includes 24% heavy vehicles.

Implementer Considerations

- 1 Wherever practicable, grading on the right side of the road against oncoming traffic should be avoided.
- 2 Implementers should be advised that the grader is always to operate while leaving room for opposing traffic to pass it without driving off the roadway.
- 3 Where graded or resheeted material cannot be travelled across or through by traffic, the grader is to be instructed to raise the blade as required and move forward a short distance to allow traffic to pass. Once traffic has passed, the grader can return to normal activities.
- 4 The designer should clearly identify the need for aftercare plans and cross reference to the appropriate TGS.

Risk Considerations

- 1 Dry unsealed roads produce dust plumes that impede visibility and cover signage with dust. The designer should consider these risks when detailing monitoring and maintenance details.
- 2 As the pavement is unsealed, the required stopping distance, especially for heavy vehicles, needs to be considered when assessing the onsite risks.
- 3 Adverse weather conditions may temporarily delay or postpone work and may have a significant impact on works. Will a contingency plan be required?
- 4 Rural alignments can include significant curves that create blind corners. When placing signage in advance of works, consider the risk of blind corners within the site specific road geometry.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 Maintenance grading and resheeting may be carried out either with or without leaving a windrow as indicated. The work completed without leaving a windrow normally involves the use of either a windrow eliminator or a second grader in tandem.
- 2 The sight distance of the grader's vehicle-mounted warning device needs to be visible for 250 m through the entire section of roadworks.
- 3 The maximum length of work that it that can be carried out for is 10 km. The sign ROADWORK NEXT 10 km is to be placed at the end of each section.
- 4 Requirements for the display of advance warning signs and devices will vary according to factors such as the speed of approaching traffic, the degree to which the hazard requires modification of speed or diversion of travel path, or extra vigilance for other reasons, and the sight distance available to the hazard, including sight obstruction caused by other traffic.
- 5 Works on unsealed roads have different risks when compared to similar scenarios on sealed road corridors. The consideration of site specific risks is paramount to good design and implementation practices.

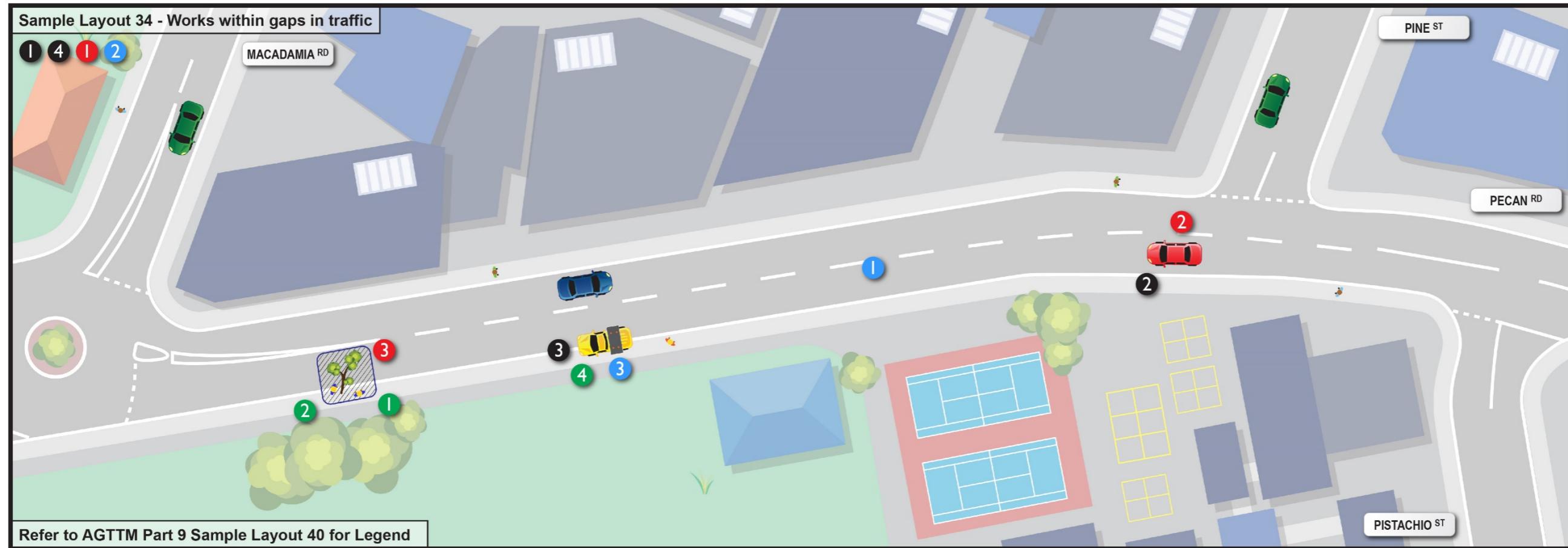
AGTTM Reference

- 1 For key considerations when treating unsealed roads refer to AGTTM Part 4, Section 3.8.13.
- 2 When performing maintenance grading or resheeting of unsealed roads refer to AGTTM Part 4, Section 3.8.13.
- 3 When treating short-term partial road closures on unsealed roads refer to AGTTM Part 4, Section 3.8.13.

Appendix G Sample Layouts (Short Term Low Impact – Works on Roads)

Application for New Zealand

Note that the layouts described in this section and in the accompanying figures are based on layouts applied within the Australian context. For layouts applied within New Zealand, refer to the New Zealand Code of Practice for Temporary Traffic Management.



Scenario

The City of Arbour Bay's maintenance crew is undertaking periodic tree clearing and requires a traffic guidance scheme for works typically undertaken in gaps in traffic on local roads.

AGTTM Reference

- 1 Design of works in gaps between traffic is covered in AGTTM Part 5, Table 4.1.
- 2 For required sight distances to works being conducted within gaps in traffic (with or without a lookout person) refer to AGTTM Part 5, Table 4.1 and Table 4.2.
- 3 When installing traffic control devices for works between gaps in traffic refer to AGTTM Part 5, Section 4.2.3.
- 4 Prior to installing work zones, pre-installation process should be carried out as per AGTTM Part 5, Section 4.2.4.

Risk Considerations

- 1 Prior to undertaking these work activities, a risk assessment must be undertaken to ensure the works can be safely completed.
- 2 Risk assessment should confirm that factors such as traffic volume and speed, road geometry and width, and the general behaviour of road users are considered when determining the appropriate traffic management arrangement, and whether working in gaps in traffic is suitable.
- 3 When determining if gaps in traffic are suitable, it is important to consider if the person undertaking the work will be able to hear the lookout person while undertaking the works. Loud machinery or noise from adjacent property may mean that gaps in traffic is not a suitable option, even if traffic volumes and speeds are low.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 Works must be short enough to be completed between gaps in live traffic under these arrangements. This is typically only suited to a single worker with basic tools and materials accompanied by a lookout person.
- 2 Work between gaps in traffic do not require an approved TGS diagram when the works are completed in accordance with this clause.
- 3 Some traffic management vehicles may have the ability to convey a variable message. The designer should consider an appropriate warning message to display.

Implementer Considerations

- 1 At any time when conducting these activities, the lookout person must be adjacent to the worker on the side of the road. This will ensure any warning provided can be immediately conveyed to the worker. Additionally, a vehicle-mounted warning device is required to be used and parked clear of traffic lanes.
- 2 The lookout person may be dispensed with if the work takes 10 seconds or less and the sight distance of approaching traffic to the vehicle-mounted warning device is a minimum distance as shown in AGTTM Part 6 Table 4.2. The worker is required to be aware of the approaching vehicles within the distance if no lookout person is required.
- 3 Equipment or materials which are brought onto the work area should be unloaded from the non-traffic side of a stationary work vehicle, or the rear of a stationary work vehicle with a lookout person or shadow vehicle in place.
- 4 The preferred location of the work vehicle is to be placed adjacent to the works while maintaining worker escape routes at all times. If this is not possible due to inability to find an appropriate adjacent area to park the vehicle, the vehicle must still be close to the worker and display a flashing light.



Scenario

PowerUp Distributions needs to do routine maintenance of their overhead powerline infrastructure on Queen Street. The works are short term (less than 5 minutes) and will have no impact to the carriageway, but access to the infrastructure will require an elevated work platform on the edge of the roadway.

AGTTM Reference

- 1 For required criterion when conducting short-term works in traffic refer to AGTTM Part 5, Table 4.4 and Table 4.5.
- 2 For required sight distances to short-term works in traffic (with a vehicle-mounted warning device or a lookout person) refer to AGTTM Part 5, Table 4.6.
- 3 When installing traffic control devices for short-term works in traffic refer to AGTTM Part 5, Section 4.3.3.
- 4 Prior to installing work zones, pre-installation process should be carried out as per AGTTM Part 5, Section 4.3.4.

Implementer Considerations

- 1 The preferred location of the work vehicle is to be placed adjacent to the works. If this is not possible due to inability to find an appropriate adjacent area to park the vehicle, the vehicle must still be close to the worker and display a flashing light.
- 2 At any time when conducting these activities, the lookout person must be adjacent to the worker on the side of the road. This will ensure any warning provided can be immediately conveyed to the worker. Additionally, a vehicle-mounted warning device is required to be used and parked clear of traffic lanes.
- 3 The lookout person may be dispensed with if the work takes 10 seconds or less and the sight distance of approaching traffic to the vehicle-mounted warning device is a minimum distance as shown in AGTTM Part 5 Table 4.2. The worker is required to be aware of the approaching vehicles within the distance if no lookout person is required.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 Short-term low impact works must be completed/removed in less than 20 mins if more than 1.2m away from traffic and 5 mins if within 1.2m or partially in lane. Work crews and plant must be able to be mobilised quickly and without the need for extensive signage, traffic control devices or traffic control personnel.
- 2 Short term works in traffic do not require an approved TGS diagram.
- 3 When considering short term works in traffic, specific criterion needs to be met in regards to location of works, duration, availability of a lookout person, work vehicle and a vehicle-mounted warning device, sight distance, traffic volume, and the remaining roadway width. If any of the criterion cannot be achieved, alternative static or mobile solutions should be considered.
- 4 Designer should consider the need for additional spotters if the nature of works is impacting high volumes of pedestrians/cyclists/passing vehicles.

Risk Considerations

- 1 Workers and plant are normally positioned close to live traffic with minimal protection and it is vital that a site-specific risk assessment is undertaken prior to commencement of works to determine if a short-term low impact work site is suitable.
- 2 Risk assessment should confirm that factors such as traffic volume and speed, road geometry and width, and the general behaviour of road users are considered when determining the appropriate traffic management arrangement, and whether working in gaps in traffic are suitable.



Scenario

The City of Arbour Bay has engaged Map-N-Save (an asset management company) to survey the locations of all stormwater pits. As the works take less than 5 minutes at each pit and are behind the kerb, the works are performed as a frequently changing worksite.

Designer Considerations

- 1 As the work areas progressively move so do the shadow vehicle, work vehicle and lookout person.
- 2 The placement of any works zones, workers and signs should consider the impact on vulnerable road users, and in particular the impact on cyclists.
- 3 Ensure a maximum distance of 2km between advance warning signs for opposing directions of travel is not exceeded at any time by progressively changing their location as the work location changes.
- 4 Frequently changing works within traffic do require a Traffic Guidance Scheme diagram.
- 5 Designer should consider the need for additional spotters if the nature of works is impacting high volumes of pedestrians/cyclists/passing vehicles.

Risk Considerations

- 1 Prior to undertaking these work activities, a risk assessment must be undertaken to ensure the works can be safely completed. Risk considerations are outlined in AGTTM Part 5 Section 2.2.1 including whether the use of a TMA is required.
- 2 The lookout person may be dispensed with if the works at an individual location takes 10 seconds or less and the sight distance of approaching traffic to the vehicle-mounted warning device is a minimum distance as shown in AGTTM Part 5 Table 4.12 and a specific risk assessment is completed.
- 3 Risk assessment should confirm that factors such as traffic volume and speed, road geometry and width, and the general behaviour of road users are considered when determining the appropriate traffic management arrangement, and whether working in gaps in traffic are suitable.
- 4 When the work zone is situated in the vicinity of an intersection, the designer should evaluate the risks associated with vehicles passing on the opposite side of the roadway.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

AGTTM Reference

- 1 For required criterion when operating a frequently changing work area in a traffic lane refer to AGTTM Part 5, Table 4.7.
- 2 For required sight distances when operating a frequently changing work area in a traffic lane (with a vehicle mounted warning device or a lookout person) refer to AGTTM Part 5, Table 4.8.
- 3 When installing traffic control devices for the operation of a frequently changing work area in a traffic lane refer to AGTTM Part 5, Section 4.4.3.
- 4 Prior to installing work zones, pre-installation process should be carried out as per AGTTM Part 5, Section 4.4.4.

Implementer Considerations

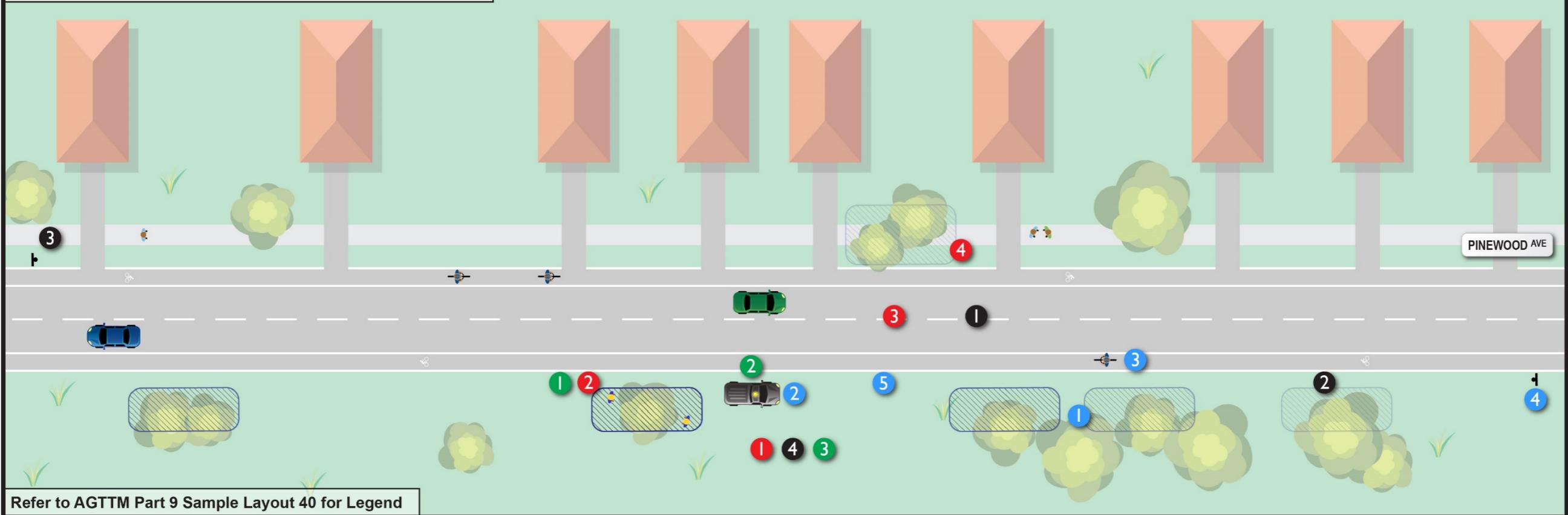
- 1 At any time when conducting these activities, the lookout person must be adjacent to the worker on the side of the road. This will ensure any warning provided can be immediately conveyed to the worker. Additionally, a vehicle-mounted warning device is required to be used and parked clear of traffic lanes.
- 2 If the work is being carried out by workers on foot or small items of plant with, or without large plant items, the shadow vehicle will follow in the same lane as the works, 40 m behind the work vehicle or workers.
- 3 Vehicles used to install signage and equipment must have a yellow flashing lamp(s) that is visible to all approaching road users. The preferred order to erect signs and devices is as follows:
 - 1) Intermediate Advance Warning Signs
 - 2) Advance Warning Signs
- 4 Before any equipment or materials are brought onto the work area, it is recommended that a drive through check of the work zone traffic management set up be made in all directions, including all side roads if required. This is to confirm that the arrangement is safe for all workers and road users, and signs and devices are placed as indicated on the TGS.

Appendix H Sample Layouts (Short Term Low Impact - Works off Roads)

Application for New Zealand

Note that the layouts described in this section and in the accompanying figures are based on layouts applied within the Australian context. For layouts applied within New Zealand, refer to the New Zealand Code of Practice for Temporary Traffic Management.

Sample Layout 37 - Frequently changing sites (within shoulder)



Refer to AGTTM Part 9 Sample Layout 40 for Legend

Scenario

The Department of Little Critters is looking to develop a regular wildlife spotting regime that will require their staff to work in the shoulders of various road corridors for short periods of time.

AGTTM Reference

- 1** For required criterion when operating a frequently changing work area outside of a traffic lane refer to AGTTM Part 5, Table 5.5.
 - 2** For required sight distances when operating a frequently changing work area outside of a traffic lane (without a lookout person) refer to AGTTM Part 5, Table 5.5.
 - 3** When installing traffic control devices for the operation of a frequently changing work area outside of a traffic lane refer to AGTTM Part 5, Section 5.3.3.
 - 4** Prior to installing work zones, pre-installation process should be carried out as per AGTTM Part 5, Section 5.3.4.

Risk Considerations

- Prior to undertaking these work activities, a risk assessment must be undertaken to ensure the works can be safely completed. Risk considerations are outlined in AGTTM Part 5 Section 2.2.1. Where works of this nature are carried out on category 3 (AGTTM Part 8) roads, the use of a TMA must be present.
 - The lookout person may be dispensed with if the works at an individual location takes 10 seconds or less and the sight distance of approaching traffic to the vehicle-mounted warning device is a minimum distance as shown in AGTTM Part 5 Table 4.12 and a specific risk assessment is completed.

Disclaimers

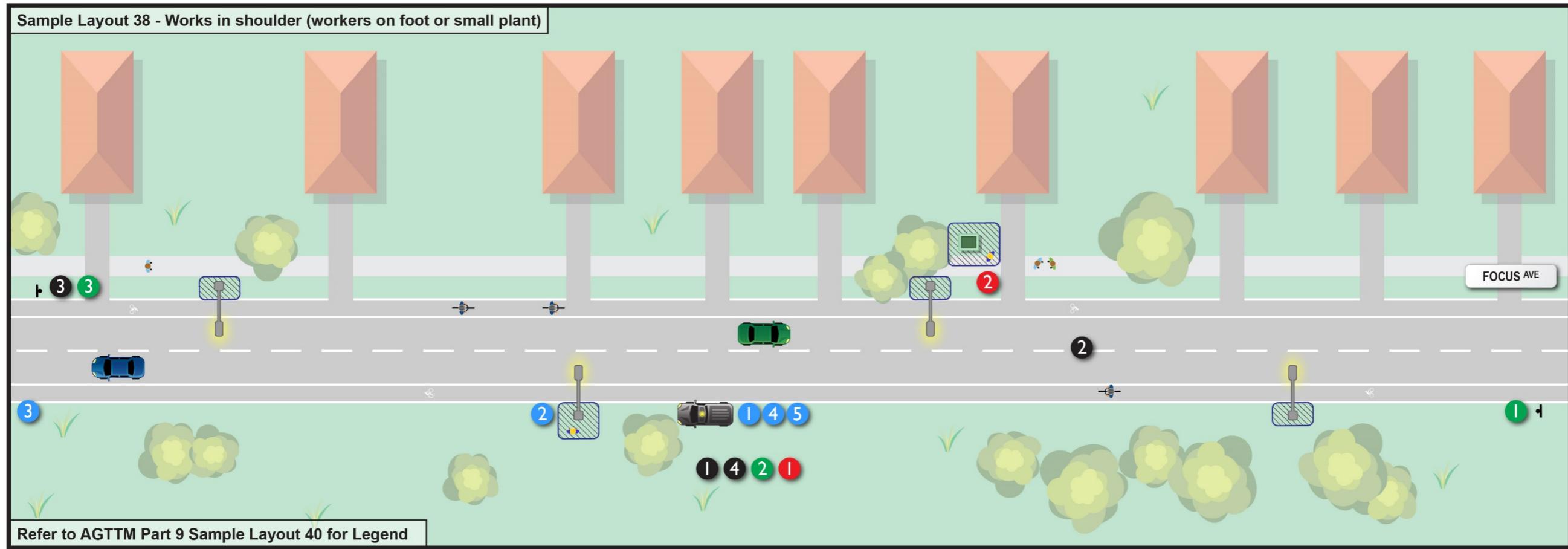
This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 Frequently changing work areas are similar to short term works in traffic but frequently move between successive locations in one shift. Each work site is considered as a specific area (i.e. work site is not continuously moving).
 - 2 As the work areas progressively move so do the shadow vehicle, work vehicle and lookout person.
 - 3 The placement of any works zones, workers and signs should consider the impact on vulnerable road users, and in particular the impact on cyclists.

Implementer Considerations

- 1 At any time when conducting these activities, the lookout person must be adjacent to the worker on the side of the road. This will ensure any warning provided can be immediately conveyed to the worker. Additionally, a vehicle-mounted warning device is required to be used and parked clear of traffic lanes.
 - 2 Vehicles used to install signage and equipment must have a yellow flashing lamp(s) that is visible to all approaching road users.



Scenario

BrightSparks maintenance crew have been requested to attend a street lighting outage along Focus Avenue. Upon initial investigation, it was concluded that rodents have damaged the cabling and joints within the system, which will require replacing. All the works shall be within the verge and conducted behind the lighting poles, within cable pits along the property boundaries.

AGTTM Reference

- 1 For required criterion when conducting works in a roadway shoulder with workers on foot or in a small plant refer to AGTTM Part 5, Table 5.1.
- 2 For required sight distances when conducting works in a roadway shoulder with workers on foot or in a small plant refer to AGTTM Part 5, Table 5.2.
- 3 When installing traffic control devices for the operation of works in a roadway shoulder with workers on foot or in a small plant refer to AGTTM Part 5, Section 5.1.3.
- 4 Prior to installing work zones, pre-installation process should be carried out as per AGTTM Part 5, Section 5.1.4.

Risk Considerations

- 1 Prior to undertaking these work activities, a risk assessment must be undertaken to ensure the works can be safely completed. Risk considerations are outlined in AGTTM Part 5 Section 2.2.1. When undertaking any works on medians, the median must be a minimum width of 1.2 m for this clause to apply. If workers are exclusively behind a safety barrier, no additional methods of protection are required.
- 2 The location of the parked work vehicle should consider any existing driveways and intersections to ensure the sight lines for egressing vehicles is not impeded.

Disclaimer

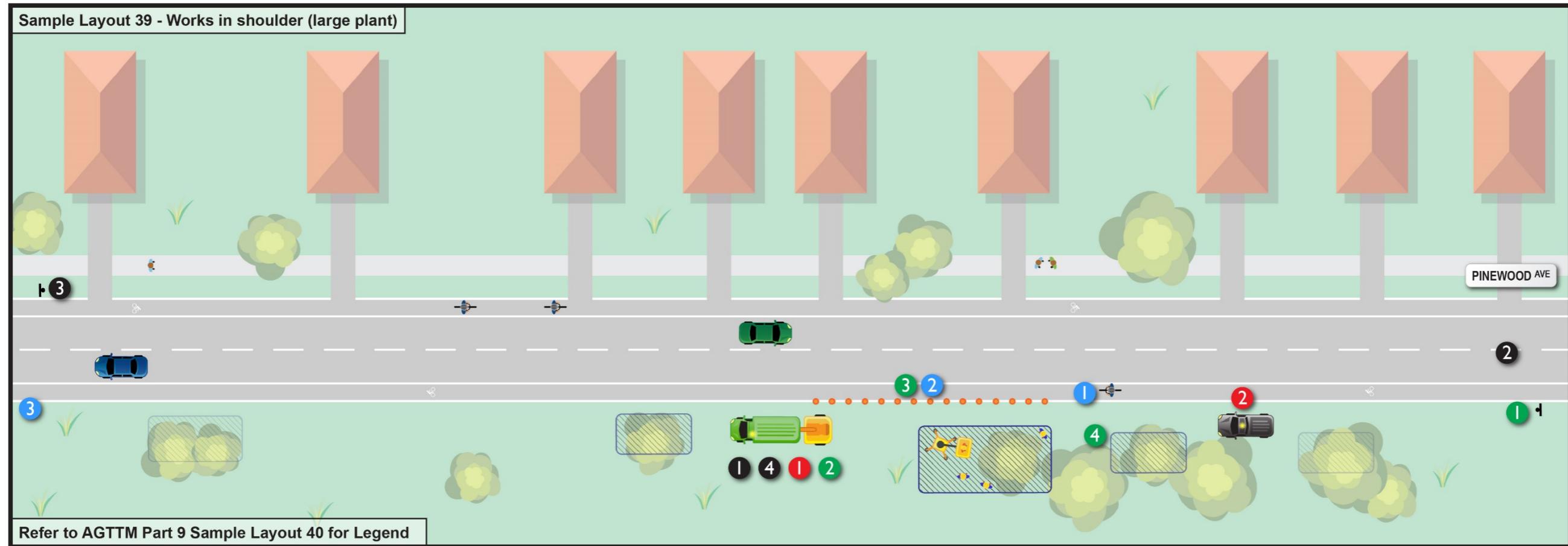
This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 The placement of any works zones, workers and signs should consider the impact on vulnerable road users, and in particular the impact on cyclists.
- 2 The criteria for determining whether short term works off road can be used are outlined in AGTTM Part 5 Table 5.1.
- 3 There are no termination sign requirements for this type of traffic management layout.
- 4 The designer should provide guidance for the need for a site-specific risk assessment where the sight distance of approaching traffic to the vehicle-mounted warning device is not exceed the minimum distance required in AGTTM Part 5 Table 5.2.
- 5 The designer should consider the condition of the existing verge and its suitability for parking work vehicles.

Implementer Considerations

- 1 Ensure a maximum distance of 2km between advance warning signs for opposing directions of travel is not exceeded at any time by progressively changing their location as the work location changes.
- 2 The designer should provide guidance on the need to confirm that WHS paperwork, such as job safety awareness forms, has been completed and signed off by the supervisor or relevant person.
- 3 Implementers to ensure that all required devices/equipment have been checked and accounted for prior to leaving for site, and all devices are retrieved at the end of the shift.



Scenario

Chop-A-Tree is contracted to perform vegetation management along Pinewood Avenue. The works require relatively large mulching and machinery to be operated within the verge.

Disclaimer

This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.

AGTTM Reference

- 1 For required criterion when conducting works in a roadway shoulder with large plant items refer to AGTTM Part 5, Table 5.3.
- 2 For required sight distances when conducting works in a roadway shoulder with large plant items refer to AGTTM Part 5, Table 5.4.
- 3 When installing traffic control devices for the operation of works in a roadway shoulder with large plant items refer to AGTTM Part 5, Section 5.2.3.
- 4 Prior to installing work zones, pre-installation process should be carried out as per AGTTM Part 5, Section 5.2.4.

Designer Considerations

- 1 The placement of any works zones, workers and signs should consider the impact on vulnerable road users, and in particular the impact on cyclists.
- 2 The need for an exclusion zone or sight screen should be considered based on the nature of the works and the potential presence of pedestrians or cyclists. Examples may include overspray of debris, hazardous gases, exhaust fumes, asbestos removal and excessive noise levels.
- 3 There are no termination sign requirements for this type of traffic management layout.
- 4 The designer should consider the condition of the existing verge and its suitability for parking work vehicles.

Risk Considerations

- 1 Prior to undertaking these work activities, a risk assessment must be undertaken to ensure the works can be safely completed. Risk considerations are outlined in AGTTM Part 5 Section 2.2.1. When undertaking any works on medians, the median must be a minimum width of 1.2m for this clause to apply. If workers are exclusively behind a safety barrier, no additional methods of protection are required.
- 2 A site-specific risk assessment should be completed where the sight distance of approaching traffic to the vehicle-mounted warning device does not exceed the minimum distance required in AGTTM Part 5 Table 5.4.

Implementer Considerations

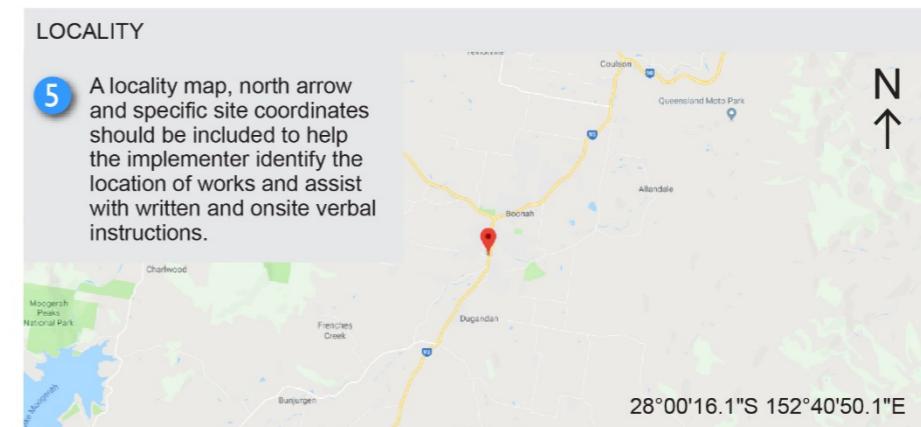
- 1 Ensure a maximum distance of 2km between advance warning signs for opposing directions of travel is not exceeded at any time by progressively changing their location as the work location changes.
- 2 The designer should provide guidance on the need to confirm that WHS paperwork, such as job safety awareness forms, has been completed and signed off by the supervisor or relevant person.
- 3 Implementers to ensure that all required devices/equipment have been checked and accounted for prior to leaving for site, and all devices are retrieved at the end of the shift.
- 4 Spotters should be provided where short duration high risk works are being undertaken (that may not warrant an exclusion zone), such as felling of trees or loading of machinery.

Appendix I Sample Layouts (Worked Examples)

Application for New Zealand

Note that the layouts described in this section and in the accompanying figures are based on layouts applied within the Australian context. For layouts applied within New Zealand, refer to the New Zealand Code of Practice for Temporary Traffic Management.

Sample Layout 40 - Title block, notes and certification

PROJECT AND CONTRACTOR DETAILS		GENERAL NOTES	LEGEND	QUANTITIES																																																															
<p>6 The client/contractor and project details should be included. This should include a list of contacts for onsite and emergency communication.</p>		<p>9 General notes should summarise the nature of the works, identification of works that are not suitable for the TGS, relevant standards and references and any workplace health and safety requirements.</p>	<p>8 A legend of devices that are shown within each TGS should be provided. For a small project this could be shown on every page, but for large projects over long distances it may be more convenient to show one master legend at the start of the TGS drawing package.</p>	<p>16 A resource quantity list should be provided for each discrete TGS. Quantities should not be summarised for individual pages in a multi-page TGS as this may result in confusion.</p>																																																															
IMPLEMENTATION DETAILS		SITE-SPECIFIC NOTES	NOTICE	<table border="1"> <thead> <tr> <th>SYMBOL</th><th>DESCRIPTION</th><th>QUANTITY</th></tr> </thead> <tbody> <tr> <td>●</td><td>Traffic Cone/Bollard</td><td>100</td></tr> <tr> <td>■</td><td>Temporary Sign</td><td>20</td></tr> <tr> <td>■</td><td>Permanent Sign</td><td>2</td></tr> <tr> <td>■</td><td>Traffic Controller</td><td>4</td></tr> <tr> <td>■</td><td>Worker</td><td>-</td></tr> <tr> <td>■</td><td>Traffic Control Ute</td><td>2</td></tr> <tr> <td>■</td><td>Traffic Control Ute + Attenuator</td><td>1</td></tr> <tr> <td>■</td><td>Work Vehicle</td><td>-</td></tr> <tr> <td>■</td><td>Police Vehicle</td><td>-</td></tr> <tr> <td>■</td><td>Fencing</td><td>200m</td></tr> <tr> <td>■</td><td>Typical Site Access</td><td>2</td></tr> <tr> <td>■</td><td>Water Filled Barriers</td><td>100m</td></tr> <tr> <td>■</td><td>Temporary Signals</td><td>2</td></tr> <tr> <td>■</td><td>Boom Barrier</td><td>4</td></tr> <tr> <td>■</td><td>Temporary Speed Management Device</td><td>2</td></tr> </tbody> </table>	SYMBOL	DESCRIPTION	QUANTITY	●	Traffic Cone/Bollard	100	■	Temporary Sign	20	■	Permanent Sign	2	■	Traffic Controller	4	■	Worker	-	■	Traffic Control Ute	2	■	Traffic Control Ute + Attenuator	1	■	Work Vehicle	-	■	Police Vehicle	-	■	Fencing	200m	■	Typical Site Access	2	■	Water Filled Barriers	100m	■	Temporary Signals	2	■	Boom Barrier	4	■	Temporary Speed Management Device	2															
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RECORD KEEPING AND MONITORING		<p>Disclaimer</p> <p>While AGTTM provides guidance on the design of elements within a TGS, there are no prescribed standards for the layout, format and content of typical traffic guidance scheme documentation. Sample Layout 40 provides one example of a typical title block layout for a TGS with annotations providing a summary of information a designer should consider including. Depending on the level of complexity of the project and/or organisational scope of operations, designers may choose to develop either simpler or more complex document title block templates, and more than one type of standardised template may be required to suit different scales or styles of TGS.</p>	<p>14 It may be appropriate for the designer to include disclaimers relating to constraints around the use and details including within a traffic guidance scheme. For example a TGS may be developed using a base design plan for the permanent or staged road layout which is developed by others and therefore the TGS should only be implemented at a certain stage in a project. Designers should always consider the accuracy and timeliness of the information within a disclaimer. Legal advice should be considered with regard to use of generically worded disclaimer statements as these may or may not be effective in reducing an individual's liability, or that of the designers employer.</p>																																																																
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AGTTM		<p>Designer Considerations</p> <ol style="list-style-type: none"> The logo of the organisation producing the design and the organisation that will be conducting the works should be included and are typically shown within the bottom information banner. The traffic guidance scheme must always include revision information such as; dates of each revision, revision identifier, description of updates. In the event the traffic guidance scheme is complex and includes an extensive amount of information that needs to be provided for the implementors, multiple pages should be created to ensure the details of the traffic guidance schemes are not obscured on a single page, or shown at size that is too small to be read when printed. All TGS need to include the certification details of the designer, and any additional engineering specialists certification where required (such as complex geometry, permanent signs and lines, barriers, temporary pavements, traffic signals and non-standard treatments). 																																																																	
SIGNAGE REGISTER			<p>5 A locality map, north arrow and specific site coordinates should be included to help the implementer identify the location of works and assist with written and onsite verbal instructions.</p>  <p>28°00'16.1"S 152°40'50.1"E</p>																																																																
1  COMPANY_LOGO COMPANY_DETAILS		<table border="1"> <thead> <tr> <th>Issue</th><th>Description</th><th>Date</th><th>Auth.</th><th>Design DES_BY DES_QUAL DES_NO DES_DATE</th><th>Project Title</th><th>Drawing Title</th><th>Project no.</th></tr> </thead> <tbody> <tr> <td>A_NO</td><td>AMEND_DESCRPT</td><td>A_DATE</td><td>A_BY</td><td></td><td>PROJECTTITLE1</td><td>DRAWTITLE1</td><td>PROJECT_NO</td></tr> <tr> <td>A_NO</td><td>AMEND_DESCRPT</td><td>A_DATE</td><td>A_BY</td><td></td><td>PROJECTTITLE2</td><td>DRAWTITLE2</td><td></td></tr> <tr> <td>A_NO</td><td>AMEND_DESCRPT</td><td>A_DATE</td><td>A_BY</td><td></td><td>PROJECTTITLE3</td><td>DRAWTITLE3</td><td>DRAWING_NO</td></tr> <tr> <td>A_NO</td><td>AMEND_DESCRPT</td><td>A_DATE</td><td>A_BY</td><td></td><td>PROJECTTITLE4</td><td>DRAWTITLE3</td><td></td></tr> <tr> <td>A_NO</td><td>AMEND_DESCRPT</td><td>A_DATE</td><td>A_BY</td><td>Drawn DRA_BY DRA_QUAL DRA_NO DRA_DATE</td><td>Authorised for Issue</td><td></td><td>Sheet SHEET_NO. Revision ISSUE</td></tr> <tr> <td>A_NO</td><td>AMEND_DESCRPT</td><td>A_DATE</td><td>A_BY</td><td>Checked CHE_BY CHE_QUAL CHE_NO CHE_DATE</td><td>PROJECTTITLE4</td><td></td><td></td></tr> <tr> <td>A_NO</td><td>AMEND_DESCRPT</td><td>A_DATE</td><td>A_BY</td><td></td><td></td><td></td><td></td></tr> </tbody> </table>	Issue	Description	Date	Auth.	Design DES_BY DES_QUAL DES_NO DES_DATE	Project Title	Drawing Title	Project no.	A_NO	AMEND_DESCRPT	A_DATE	A_BY		PROJECTTITLE1	DRAWTITLE1	PROJECT_NO	A_NO	AMEND_DESCRPT	A_DATE	A_BY		PROJECTTITLE2	DRAWTITLE2		A_NO	AMEND_DESCRPT	A_DATE	A_BY		PROJECTTITLE3	DRAWTITLE3	DRAWING_NO	A_NO	AMEND_DESCRPT	A_DATE	A_BY		PROJECTTITLE4	DRAWTITLE3		A_NO	AMEND_DESCRPT	A_DATE	A_BY	Drawn DRA_BY DRA_QUAL DRA_NO DRA_DATE	Authorised for Issue		Sheet SHEET_NO. Revision ISSUE	A_NO	AMEND_DESCRPT	A_DATE	A_BY	Checked CHE_BY CHE_QUAL CHE_NO CHE_DATE	PROJECTTITLE4			A_NO	AMEND_DESCRPT	A_DATE	A_BY					<p>2</p> <p>4</p> <p>3</p>
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Sample Signage 41 - Resource Quantification and Signage

Disclaimer

The designer should always consider the complexity of the traffic management design and the audience to whom the design is intended for. Quantifying the traffic management resources and signage required for each traffic guidance scheme is important to ensure the traffic management crews understand the resourcing needs prior to travelling to the site. Sample Layout (SL) 41 shows an example of how more complex traffic management designs that include multiple stages or work zones could be presented to the implementers by cataloguing the resources required using the multi-stage project example shown in Sample Layouts 47, 48, 49 and 50.

Resource Quantification Example

	Traffic Cone	Bollard	Temporary Sign	Permanent Sign	Traffic Controller	Traffic Control Ute	Traffic Control Ute + Attenuator	Police Vehicle	Police Officer	Temporary Fencing	Water Filled Barriers	Temporary Signals	Boom Barriers	Temporary Speed Management Device
SL47	●	●	●	●	●	●	●	●	●	●	●	●	●	●
93	-	14	-	5	2	-	-	-	-	75m	-	-	-	-
82	-	12	-	5	2	-	-	-	-	50m	-	-	-	-
96	-	14	-	7	2	-	-	-	-	75m	-	-	-	-
SL48	4	-	8	-	-	-	-	-	-	50m	-	-	-	-
SL49														
SL50														

Signage Quantification Example

	Advanced Warning/Termination/Speed Management	Prepare to Stop	Symbolic Aftercare	Lane Closures	Sidetracks	Pedestrians	Cyclists	Detours	Road Closure
Sample Layout 47	(40) x3 ROADWORK AHEAD x3 (50) x2 END ROAD WORK x3	PREPARE TO STOP x4	● x4 ● x3	DO NOT OVERTAKE X2 } x20	-	◀ PEDESTRIANS x1 ▶ PEDESTRIANS x1	BICYCLE LANE CLOSED AHEAD x2 ● x2	-	-
Sample Layout 48	(40) x3 ROADWORK AHEAD x3 (50) x2 END ROAD WORK x3	PREPARE TO STOP x4	● x4 ● x3	DO NOT OVERTAKE X2 } x14	-	-	BICYCLE LANE CLOSED AHEAD x2 ● x2	-	-
Sample Layout 49	(40) x3 ROADWORK AHEAD x3 (50) x2 END ROAD WORK x3	PREPARE TO STOP x4	● x4 ● x3	DO NOT OVERTAKE X2 } x17	-	◀ PEDESTRIANS x1 ▶ PEDESTRIANS x1	BICYCLE LANE CLOSED AHEAD x2 ● x2	-	-
Sample Layout 50	-	-	-	NO LINES x4	DO NOT OVERTAKE X4	-	◀ PEDESTRIANS x1 ▶ PEDESTRIANS x1 WATCH YOUR STEP x2 PEDESTRIAN HAZARD x2	-	-

Sample Layout 42 - Application of AGTTM Part 3 Figure 5.1**Purpose**

This scenario is designed to demonstrate the step-by-step process (as per AGTTM Part 4 Figure 5.1) that must be followed when designing a lane closure on a multi-lane road to accommodate a work zone on a divided, dual-lane carriageway.

Disclaimer

This diagram is not a traffic guidance scheme and the values identified herein apply specifically to the chosen road environment and the type of work being undertaken. Distances, speed limits and other values will change as a result of these variables. Values in this diagram are not directly transferrable to other lane closure or roadwork scenarios.

- 1** Identify the required method of control and ascertain the general worksite layout required for the works to occur safely.
For guidance regarding the design process and hierarchy of control, refer to AGTTM Part 3, Section 2.

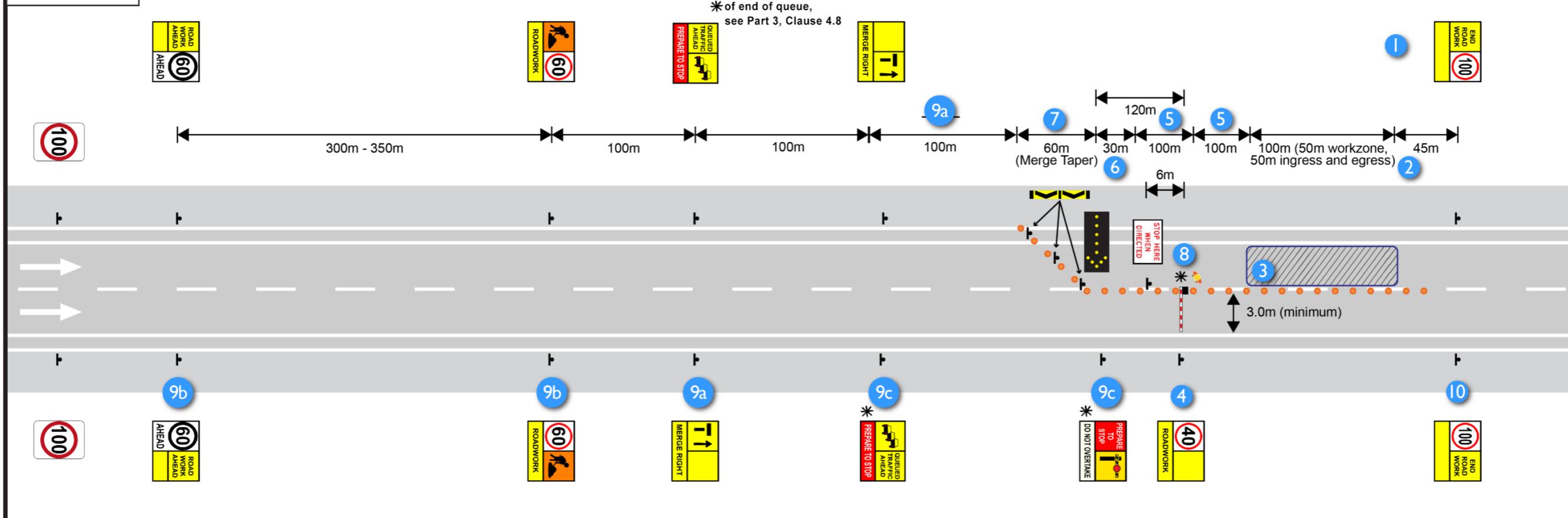
- 2** The contractor requires 50m of physical working area and ingress/egress/parking. The resulting 100m work zone does not exceed the 200m limit for 40km/hr work zones.
For information and values of recommended work zone length, refer to AGTTM Part 3, Table 5.5.

- 3** Work area separation via lateral separation and the route delimitation using traffic cones/bollards is appropriate for a single shift operation.
For information regarding work area separation and delimitation, refer to AGTTM Part 3, Section 5.3 and 5.4.

- 4** Workers are expected to be within 1.2m of live traffic and therefore require a work zone speed limit of 40km/hr.
For information and values of recommended work zone speed limits, refer to AGTTM Part 3, Table 5.5.

- 5** Safety buffers are required prior to work zones. This scenario is a high speed environment and a multi-lane carriageway, requiring a safety buffer of 100m. The designer should consider the distance between the merge and the stopping location and include additional spacing to reduce risk of rear end crashes.
For information and considerations with regard to safety buffers, refer to AGTTM Part 3, Section 5.6.

- 6** Additional warning areas may be required in order to provide room for a traffic control vehicle without it obstructing the safety buffer.
For considerations when treating additional warning areas, refer to AGTTM Part 3, Section 5.8.

NOT TO SCALE**Scenario**

- 1** An asphalt contractor needs to replace a 50m section of rutted pavement on a four-lane divided carriageway (Category 2 Road). The maintenance works are planned for nightshift and are only expected to take 6 hours. The works will require sporadic truck and plant movements into and out of the site (no more than 5 minutes at a time). The entire width of the lane needs to be replaced, therefore there is an expectation that works will be within 1.2m of live traffic.

2 Understanding Contractor Requirements:

Type of closure:	Single lane
Works duration:	Single shift (night work)
Work zone speed:	Required due to worker proximity
Live traffic stoppage:	Required for ingress/egress and some works
Posted speed:	100km/hr
Existing lane width:	Both 3.5m
Work area:	50m at works (include an area for access/working room)

- 7** Merge tapers are required immediately prior to a work zone to divert traffic and create a work zone. In this scenario, the merge taper length is 60m.
For recommended lengths of merge tapers, refer to AGTTM Part 3, Table 5.6 and Figure 2.2.

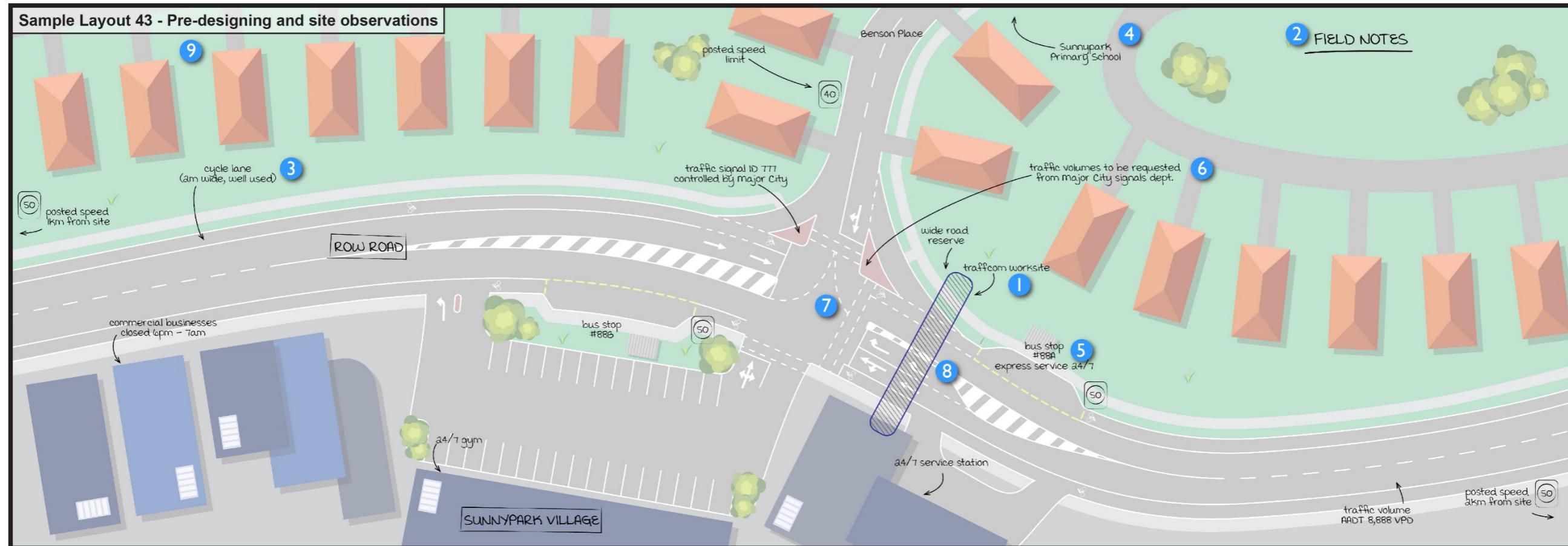
- 8** When designing work zones, preference should be given to portable traffic control devices before considering manual traffic controllers.
For considerations regarding traffic control placement/signage, refer to AGTTM Part 3, Section 5.10.2 and AGTTM Part 7. For information regarding the choice of manual traffic controllers or traffic control devices, refer to AGTTM Part 3, Section 5.10.1.

- 9a** Lane status signage is required in the advance warning area and is to be positioned to allow 100m of sight distance in advance of the beginning of the taper. Signage must be adjusted to accommodate minimum sign spacing requirements.
For recommendations on required lane status signage, refer to AGTTM Part 3, Figure 5.24 and Table 2.2.

- Incremental reductions in speed limits are required in advance of the work zone to ensure vehicles are aware of the upcoming work zone and reduction in speed. Speed limit reductions of 40km/hr require 'speed limit ahead' signage.
For information and considerations regarding speed reduction, refer to AGTTM Part 3, Section 5.5.1.

- 9c** When stopping traffic, it is possible for queues to extend past 'prepare to stop' signage, generating an increased risk of end-of-queue collisions.
For information regarding end-of-queue safety provisions, refer to AGTTM Part 3, Section 4.8.

- 10** Termination signage is used to alert road users to the end of a work zone and a resumption of normal traffic conditions.
For necessary termination distances, refer to AGTTM Part 3, Table 5.8.



Scenario

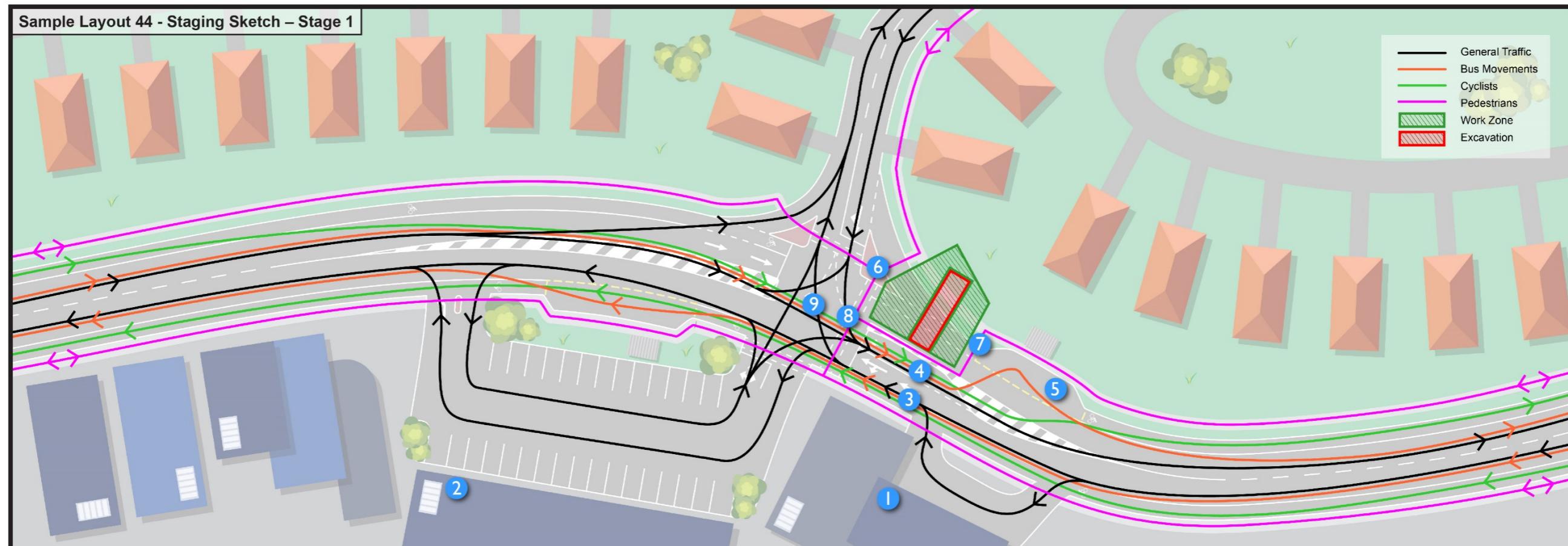
Traffcom, a small electric and communications contractor, has engaged a traffic management designer to develop a traffic management plan and traffic guidance schemes for the upgrade of the telecommunication connection to the Sunnypark Village and the surrounding commercial properties. The works involve connecting the fibre optic network currently installed on the northern side of Row Road to the southern side by installing an underground conduit. Traffcom has approval from Major City to commence works once they have received an approved traffic management plan and road occupancy permits. Major City has not imposed working times and has instructed Traffcom that these should be determined as part of the traffic management. Sample Layout 43 summarises the designers field notes taken during a pre-design site inspection to gather information.

Disclaimer

The worked example shown in Sample Layouts 43 - 50 are intended only to illustrate the application of AGTTM guidance and are not to be used as generic traffic guidance schemes. The development of site-specific staging plans and traffic guidance schemes is recommended for all work zones.

Designer Considerations

- 1 For any project, an inception meeting should be organised between the traffic management designer and the persons planning the works to gather all the construction methodology inputs, as well as identify traffic management constraints that may require construction methodologies to be adjusted.
- 2 A site visit should be organised prior to commencing the designs where practical. For remote or rural sites the designer may need to request the contractor gathering information (such as photos and video) as it may not be financially viable or time efficient to travel to the site location.
- 3 During site inspections, existing site characteristics should be gathered and may include: footpath widths, cycle lanes, lane widths, median widths, location of key signage such as posted speed limits and wayfinding, bus stop locations. Designers should take note of key adjacent land uses and identify operating times for commercial properties. Additional data may need to be gathered in the office using aerial photography, online mapping and publicly available information (such as public transport timetables).
- 4 The surrounding land use should be investigated to ensure the designer considers the operational times of all driveways, businesses, residential properties and surrounding attractors such as sporting fields, day-care centres and schools. These will influence traffic volumes at different times of the day and may need to be considered when developing working times. It is important that the designer not only consider land uses adjacent the works but also for side streets in proximity to the project. This may assist with identifying vulnerable users who may not be present at the time of the site inspection (such as school children).
- 5 The bus stop operation times will be useful when deciding if they need to be considered as closed, relocated or retained. However the bus service operator will need to be consulted before determining if a public stop can be relocated, and minimum notification periods may apply.
- 6 Using existing traffic volumes, analysis should be undertaken to develop the appropriate working times. Existing traffic volumes can be determined by commissioning a data collection firm or may be available from the road authority. Where traffic signals are present, the authority may be able to provide data (where the signals are using inductive loops to count traffic). Engineering analysis and advice may be needed to determine the permissible closure times that will not result in significant travel delays, particularly for large signalled intersections.
- 7 For manual control for traffic through a signalled intersection, where complex realignment of traffic is required to maintain all traffic movements, it may be safer to consider alternative solutions. These could include police control with some movement restrictions and detouring longer distances or minor side street closures with localised detours.
- 8 Using the data from the site inspection and other data collected, the designer should conduct an analysis of around/through/past options for all road users which should be documented within a traffic management plan.
- 9 Once the construction methodology is determined and the around/through/past analysis options are considered, staging plans should be developed to work out the required path of travel for each road user, determine the construction work zone and construction parking and storage areas, identify key risks and establish geometric or operational constraints. Staging plans will also assist in determining whether multiple TGS are required for each stage of work (for example aftercare plans where temporary works are required or works are not able to be completed in one shift). Example Staging plans for the Traffcom project are provided in Sample Layouts 44 - 46. Example Traffic Guidance Schemes based on the Staging Plans are provided in Sample Layouts 47 - 50.



Scenario

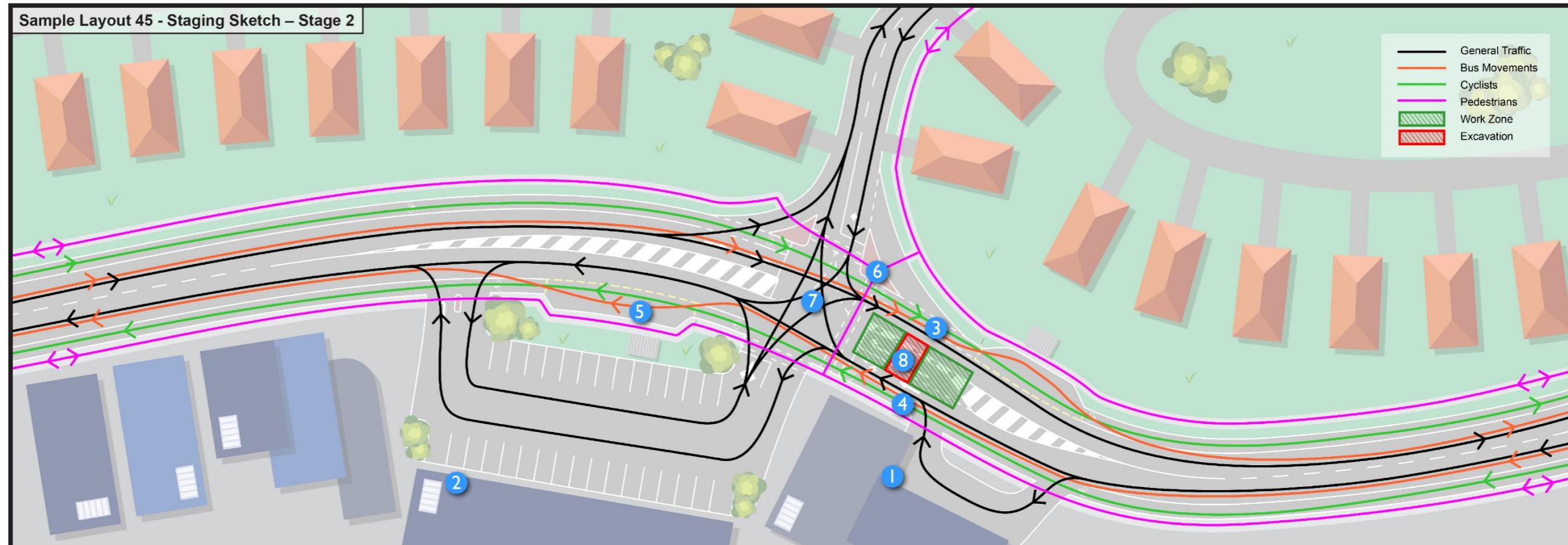
Stage 1 of the works includes conduit installation from the northern side of Row Road across the footpath and the eastbound cycle and traffic lanes.

Disclaimer

A typical staging plan should include the general movements of all road user groups, including construction vehicles and the work area (including vehicle and equipment storage). This assists the designer to identify areas of conflict that will need to be managed within each design, and also can be used to communicate constraints and opportunities to stakeholders.

Designer Considerations

- 1 Access to a 24hr service station needs to be maintained.
- 2 Sunnypark Village includes various businesses and a 24/7 gym. Access to the carpark needs to be maintained at all times. The option for diverting to the second driveway requires a local detour (which is unavailable) or additional traffic management to allow a right turn out of the western driveway.
- 3 Due to the need to occupy the eastbound cycle lane and traffic lane, and lack of a suitable detour for these movements, works are planned to be during nightshift, when the lower traffic volumes will enable a contraflow operation to be conducted.
- 4 The works require a closure of the cycle lanes along Row Road. The presence of cyclists will need to be considered in the TGS design, but the risk is significantly reduced due to the very low cyclist volumes during the night.
- 5 There is a 24-hour bus service on Row Road which operates every one hour throughout the night. Even though the frequency is reduced the bus stops will need to remain operational. Initial assessment shows access to the bus stop will be possible in Stage 1.
- 6 Pedestrians using the northern verge of Row Road will be impacted by the work zone. Major City will not approve access to the private property to the north. And therefore a pedestrian diversion is required onto the carriageway, around the worksite. A longer pedestrian detour was considered but as the bus stop is nearby it was felt that a long detour would be ignored.
- 7 The pedestrian diversion will utilise the existing kerb ramp on the western side of the works, but will require a temporary kerb ramp on the eastern side between the work zone and the bus stop.
- 8 As the un-signalled slip lane from Benson Place will be shut during Stage 1, left turning vehicles will be diverted into the intersection. This introduces a new risk as there will be a conflict with vehicles turning onto the pedestrian crossing. The design needs to consider this risk and develop an appropriate mitigation measure.
- 9 Due to the need to manage four directions of traffic as well as two directions of pedestrian movement, the traffic signals will be turned to 'flash' with traffic controllers manually holding traffic on each approach with one direction released one at a time.



Scenario

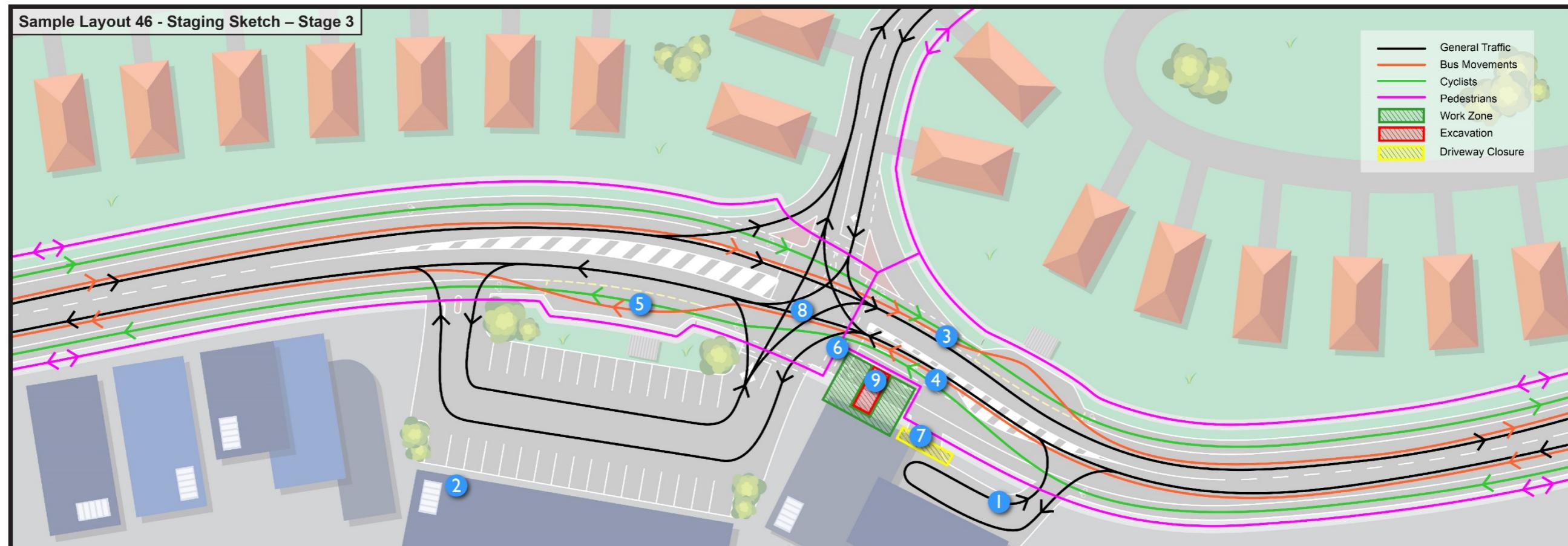
Stage 2 of the works includes conduit installation within the middle of Row Road, with general traffic passing either side of the work zone.

Disclaimer

A typical staging plan should include the general movements of all road user groups, including construction vehicles and the work area (including vehicle and equipment storage). This assists the designer to identify areas of conflict that will need to be managed within each design, and also can be used to communicate constraints and opportunities to stakeholders.

Designer Considerations

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- 2 Sunnypark Village includes various businesses and a 24/7 gym. Access to the carpark needs to be maintained at all times. The option for diverting to the second driveway requires a local detour (which is unavailable) or additional traffic management to allow a right turn out of the western driveway.
- 3 As the works will impact on the eastbound and westbound carriageways and due to the lack of a suitable detour for these movements, works are planned to be during nightshift, when the lower traffic volumes will enable a contraflow operation to be conducted.
- 4 The works require a closure of the cycle lanes along Row Road. The presence of cyclists will need to be considered in the TGS design, but the risk is significantly reduced due to the very low cyclist volumes during the night.
- 5 There is a 24-hour bus service on Row Road which operates every one hour throughout the night. Even though the frequency is reduced the bus stops will need to remain operational. Initial assessment shows access to the bus stop will be possible in Stage 2.
- 6 No pedestrian diversion required.
- 7 Due to the need to manage four directions of traffic as well as two directions of pedestrian movement, the traffic signals will be turned to 'flash' with traffic controllers manually holding traffic on each approach with one direction released one at a time.
- 8 The works within Stage 2 will damage the existing signal loops within the right turn lane of the westbound approach. Consultation within traffic signal system operator is required prior to works commencing, this will allow appropriate signal timing to be implemented at the signals until the loops are reinstated.



Scenario

Stage 3 of the works include conduit installation from Stage 2 to the southern verge across the footpath and the westbound cycle and traffic lanes.

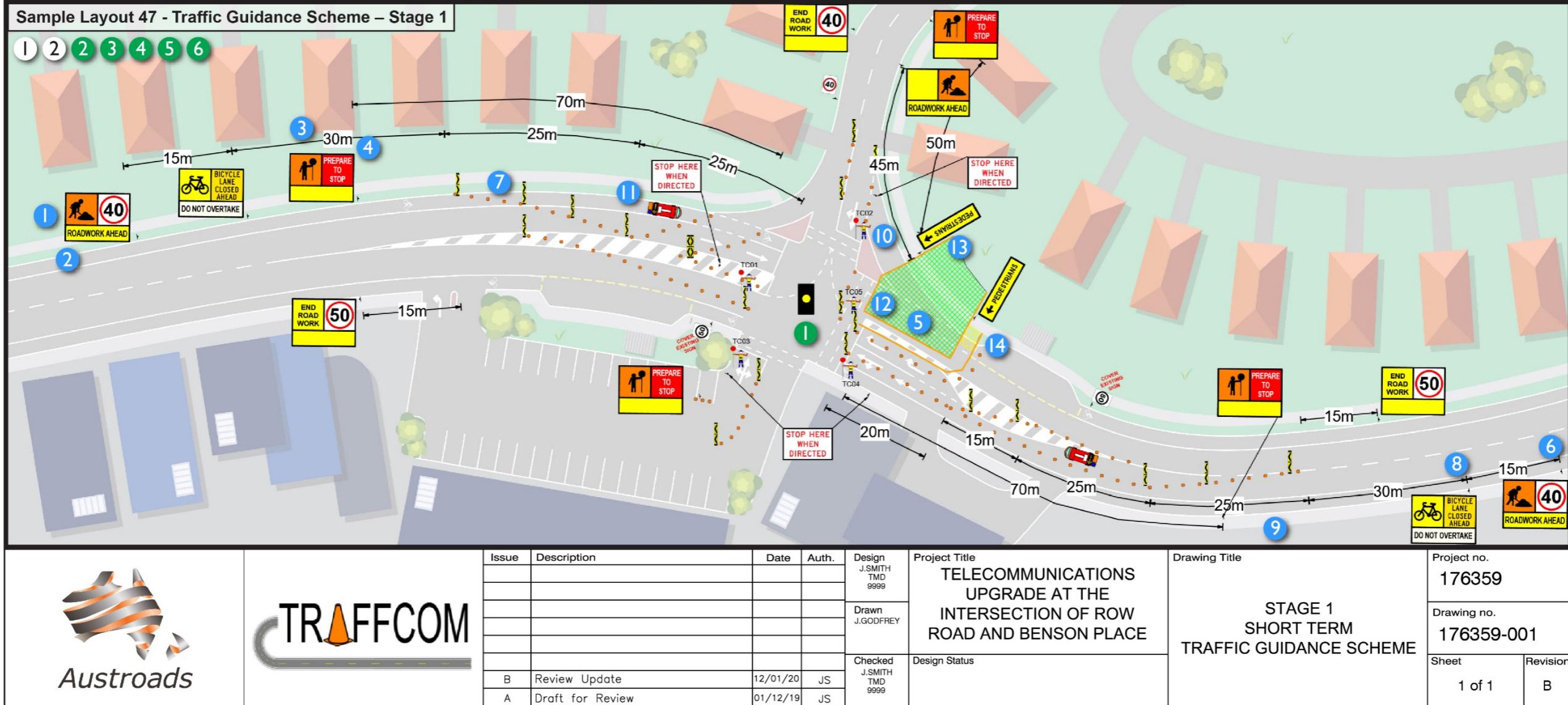
Disclaimer

A typical staging plan should include the general movements of all road user groups, including construction vehicles and the work area (including vehicle and equipment storage). This assists the designer to identify areas of conflict that will need to be managed within each design, and also can be used to communicate constraints and opportunities to stakeholders.

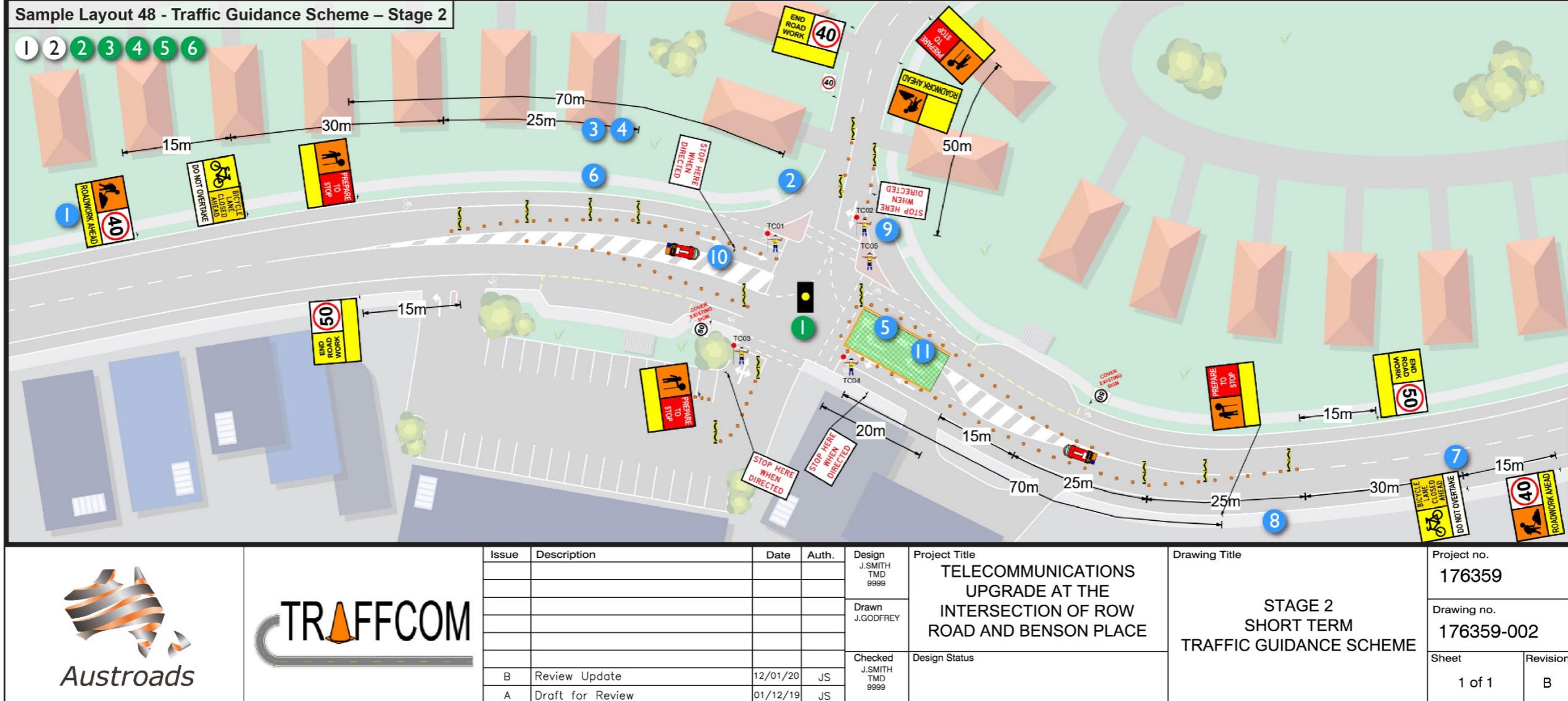
Designer Considerations

- 1 Access to the 24hr service station to be maintained. Due to the proximity of the pedestrian diversion, the exit driveway will need to be closed for Stage 3. Consultation with the operators of the business will need to be facilitated by Traffcom. The entrance driveway is only 4.5m wide which is insufficient for two-way movement, and therefore management of the conflict will be required.
- 2 Sunnypark Village includes various businesses and a 24/7 gym. Access to the carpark needs to be maintained at all times. The option for diverting to the second driveway requires a local detour (which is unavailable) or additional traffic management to allow a right turn out of the western driveway.
- 3 Due to the need to occupy the eastbound and westbound traffic lanes, and lack of a suitable detour for these movements, works are planned to be during nightshift, when the lower traffic volumes will enable a contraflow operation to be conducted.
- 4 The works require a closure of the cycle lanes along Row Road. The presence of cyclists will need to be considered in the TGS design, but the risk is significantly reduced due to the very low cyclist volumes during the night.
- 5 There is a 24-hour bus service on Row Road which operates every one hour throughout the night. Even though the frequency is reduced the bus stops will need to remain operational. Initial assessment shows access to the bus stop will be possible in Stage 3.
- 6 Pedestrians using the southern verge of Row Road conflict with the work zone. There is not physical space within the commercial property to the south, therefore the pedestrian diversion is required onto the carriageway.
- 7 The pedestrian diversion will utilise the existing kerb ramp on the western side of the works and the temporarily closed driveway of the 24hr service station.
- 8 Due to the need to manage four directions of traffic as well as two directions of pedestrian movement, the traffic signals will be turned to 'flash' with traffic controllers manually holding traffic on each approach with one direction released one at a time.
- 9 The works within Stage 3 will damage the existing signal loops within the through lane of the westbound approach. Refer to Stage 2 for mitigation requirement.

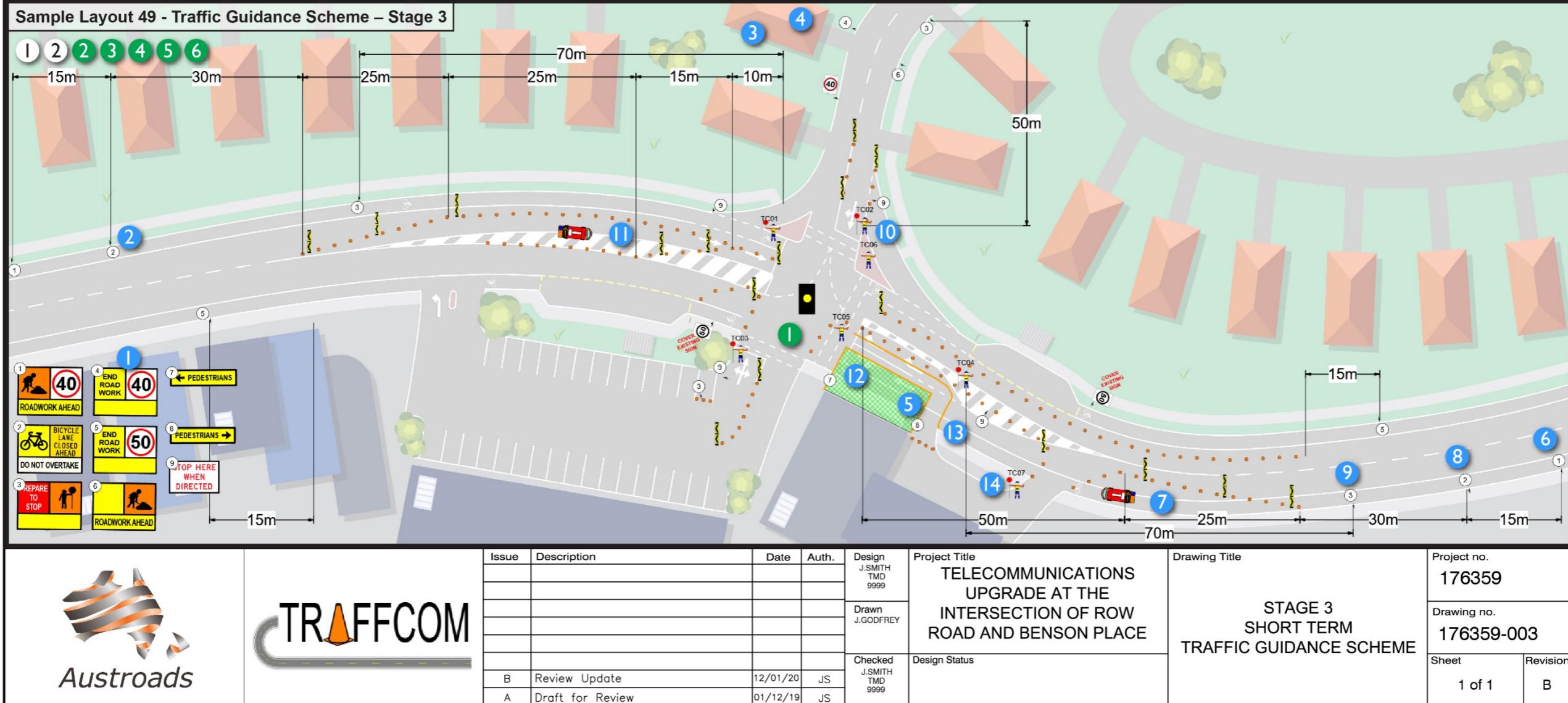
- 1** Sample Layout 47 demonstrates how Stage 1 of the example project (Sample Layout 44) could be developed into a site-specific TGS. The notes summarise the detailed decisions and design development process for preparing a TGS to address the issues identified for Stage 1.
- 2** This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.
- 1** The presentation style of signfaces shown is typical of engineering drawings and beneficial for reviewers as all the signage can be read without rotating the drawing, however there may be risks that signs are installed incorrectly.
- 2** A potential risk with presenting signage oriented in the same direction is that implementers could place signs within multi-message frames in the wrong configuration (i.e. speed restriction signs away from the road).
- 3** In the majority of cases, TGS should be shown to scale. This helps the designer make an assessment of the best location of sign and taper placement and any potential additional treatments that may be required for existing road furniture.
- 4** The style of dimensioning shown follows the curvature of the road. This style is clear and easy for implementers to follow, but can become cluttered and conflict with other details should a TGS require more complex arrangements.
- 5** For a posted of 50km/h, the assessment of the need for a work zone speed reduction was initially determined as not required due to sufficient separation from traffic (>1.2m).
- 6** Following a risk assessment, it was determined that there was a need to reduce the speed prior to the lateral shift tapers due to the need for cycle lane closure and maintaining the reduced speed through the work zone due to the pedestrian diversion in proximity to traffic.
- 7** While a shorter lateral shift taper is specified in AGTTM Part 3 (15m for a posted speed limit 50km/h), due to the presence of a cycle lane the taper has been extended an additional 10m due to the 2m width of the cycle lane.
- 8** Advisory signage is provided to warn both cyclists and motorists of the cycle lane closure along Row Road.
- 9** Advisory 'prepare to stop' signage has been included, independent of the advance warning signage, in advance of the location where traffic will be stopped on all intersection approaches. As the works are planned for nightshift, where traffic volumes are low and queuing is anticipated to be minimal, the position of the 'prepare to stop' signage is slightly higher than the requirements of AGTTM Part 3 Table 4.4.
- 10** Traffic controllers performing the stop-go function will all have a clear path of escape at the nominated locations.
- 11** The placement of traffic control vehicles has been considered and utilised on the approaches with lateral shift requirements.
- 12** Traffic controller has been positioned to manage the conflict between vehicles turning left out of Benson Place and pedestrians crossing Row Road.
- 13** Containment fencing is provided around the work area to prevent unauthorised access to the site. In addition, containment fencing has been placed on the outside of the footpath diversion to ensure pedestrians do not enter the live traffic lanes.
- 14** Temporary kerb ramp required at the locations shown (type of device should be included within the legend and schedule of quantities, and any installation instructions provided to implementers).
- 1** When working at signalised intersections, implementers should always be given contact details for the traffic signal system operator, and instructions regarding contacting the operator prior to establishing any worksite.
- 2** Designers should provide detailed advice on the sequencing of the TGS implementation (e.g. for this Scenario an appropriate order would be (1) minor approaches, excluding the slip lane closure on Benson Place, (2) westbound Row Road to the intersection stop bar, (3) eastbound Row Road to the intersection stop bar, with all approaches on hold once setup is near intersection (4) additional staff to implement the closure on the departure sides of the intersection (5) operation of signals is to be switched off when traffic is being held in all directions).
- 3** For complex arrangements, it is good practice to assign identifiers for each traffic controller position and detail the tasks that position will be performing during the operation of the TGS.
- 4** The designer should clearly identify the need for aftercare plans and cross-reference to the appropriate aftercare TGS.
- 5** Based on the duration of works, the designer should provide details of the required sign foundations (e.g. multi-message frames for short-term and post mounted signs for long-term). The height above ground for post mounted signage shall be in accordance with AGTTM Part 3 and may depend on the presence of pedestrians and cyclists.
- 6** The designer should include guidance/information on Project Details, Contractor Contacts, Stakeholder Contact Details, Implementation (and Monitoring) Instructions, Generic and Site Specific Notes, Legend and Resource Quantities, and Implementation and Removal Sequencing (see Sample Layout 40 for title block and notes guidance).



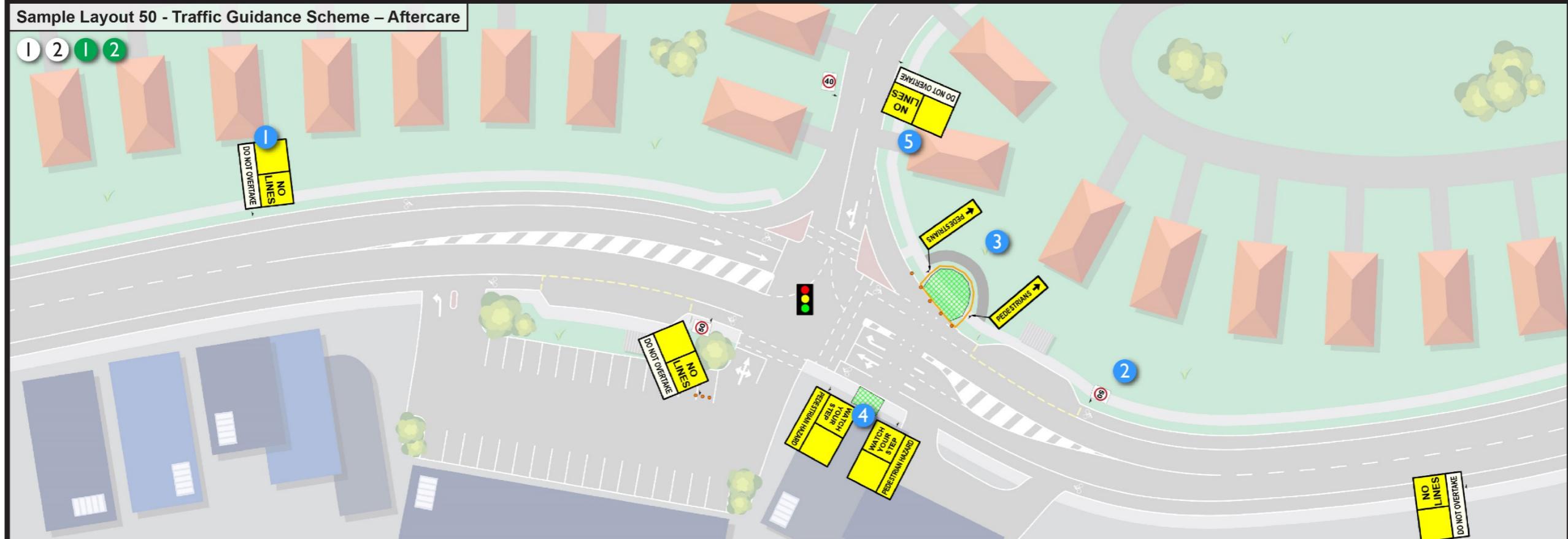
- 1** Sample Layout 48 demonstrates how Stage 2 of the example project (Sample Layout 45) could be developed into a site-specific TGS. The notes summarise the detailed decisions and design development process for preparing a TGS to address the issues identified for Stage 2.
- 2** This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.
- 1** The signface presentation style shown is beneficial onsite for implementers as all the signage follow the road geometry and align with the way the sign is designed to face, and therefore it is unlikely a sign will be installed incorrectly.
- 2** Dimensions should be shown relative to an easily identifiable reference location, such as an existing sign, pole, driveway or stop bar. Dimensions that use a different reference location should be presented as a separate dimension string.
- 3** In the majority of cases, TGS should be shown to scale. This helps the designer make an assessment of the best location of sign and taper placement and any potential additional treatments that may be required for existing road furniture.
- 4** The style of dimensioning shown follows the curvature of the road. This style is clear and easy for implementers to follow, but can become cluttered and conflict with other details should a TGS require more complex arrangements.
- 5** For a posted speed of 50km/h, the assessment of the need for a work zone speed reduction was determined as being required due to insufficient separation from traffic (<1.2m).
- 6** While a shorter lateral shift taper is specified in AGTTM Part 3 (15m for a posted speed limit 50km/h), due to the presence of a cycle lane the taper has been extended an additional 10m due to the 2m width of the cycle lane.
- 7** Advisory signage is provided to warn both cyclists and motorists of the cycle lane closure along Row Road.
- 8** Advisory 'prepare to stop' signage has been included, independent of the advance warning signage, in advance of the location where traffic will be stopped on all intersection approaches. As the works are planned for nightshift, where traffic volumes are low and queuing is anticipated to be minimal, the position of the 'prepare to stop' signage is slightly higher than the requirements of AGTTM Part 3 Table 4.4.
- 9** Traffic controllers performing the stop-go function will all have a clear path of escape at the nominated locations.
- 10** The placement of traffic control vehicles has been considered and utilised on the approaches with lateral shift requirements.
- 11** Containment fencing is provided around the work area to prevent unauthorised access to the site, given the high volume of pedestrian movements expected.
- 1** When working at signalised intersections, implementers should always be given contact details for the traffic signal system operator, and instructions regarding contacting the operator prior to establishing any worksite.
- 2** Designer should provide detailed advice on the sequencing of the TGS implementation (e.g. for this Scenario an appropriate order would be (1) minor approaches, including slip lane from Benson Place for escape route (2) westbound Row Road to the intersection stop bar, (3) eastbound Row Road to the intersection stop bar, with all approaches on hold once setup is near intersection (4) additional staff to implement the closure on the departure sides of the intersection (5) operation of signals is to be switched off when traffic is being held in all directions).
- 3** For complex arrangements, it is good practice to assign identifiers for each traffic controller position and detail the tasks that position will be performing during the operation of the TGS.
- 4** The designer should clearly identify the need for aftercare plans and cross-reference to the appropriate aftercare TGS.
- 5** Based on the duration of works, the designer should provide details of the required sign foundations (e.g. multi-message frames for short-term and post mounted signs for long-term). The height above ground for post mounted signage shall be in accordance with AGTTM Part 3 and may depend on the presence of pedestrians and cyclists.
- 6** The designer should include guidance/information on Project Details, Contractor Contacts, Stakeholder Contact Details, Implementation (and Monitoring) Instructions, Generic and Site Specific Notes, Legend and Resource Quantities, and Implementation and Removal Sequencing (see Sample Layout 40 for title block and notes guidance).



- 1** Sample Layout 49 demonstrates how Stage 3 of the example project (Sample Layout 46) could be developed into a site-specific TGS. The notes summarise the detailed decisions and design development process for preparing a TGS to address the issues identified for Stage 3.
- 2** This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.
- 1** In this sample layout, temporary signage is identified using a reference system with each signface type only shown once, in a separate summary. This makes the drawing presentation less cluttered which is beneficial for complex arrangements with numerous devices and notes.
- 2** A potential risk with presenting signage in this style is that implementers could place signs within multi-message frames in the wrong configuration (i.e. speed restrictions away from the road) or miss the sign placement altogether as reference numbers may be mistaken for notes or annotations.
- 3** In the majority of cases, TGS should be shown to scale. This helps the designer assess the location of sign placement and any potential additional treatments that may be required for existing road furniture. TGS that may be suitable for shown not to scale include very simple arrangements on a single roadway with only a limited number of signs.
- 4** The style of dimensioning shown is typical of the format used in engineering drafting for civil design drawings. Dimensions are presented in a consistent alignment, separated away from the traffic arrangements for clarity. This style is clear and easy for implementers to follow.
- 5** For a posted speed of 50km/h, the assessment of the need for a work zone speed reduction was initially determined as not required due to sufficient separation from traffic ($>1.2m$).
- 6** Following a risk assessment, it was determined that there was a need to reduce the speed prior to the lateral shift tapers due to the need for cycle lane closure and maintained the reduced speed through the work zone due to the pedestrian diversion in proximity to traffic.
- 7** While a shorter lateral shift taper is specified in AGTTM Part 3 (15m for a posted speed limit 50km/h), due to the presence of a cycle lane, the taper has been extended an additional 10m due to the 2m width of the cycle lane.
- 8** Advisory signage is provided to warn both cyclists and motorists of the cycle lane closure along Row Road.
- 9** Advisory 'prepare to stop' signage has been included, independent of the advance warning signage, in advance of the location where traffic will be stopped on all intersection approaches. As the works are planned for nightshift, where traffic volumes are low and queuing is anticipated to be minimal, the position of the 'prepare to stop' signage is slightly higher than the requirements of AGTTM Part 3 Table 4.4.
- 10** Traffic controllers performing the stop-go function will all have a clear path of escape at the nominated locations.
- 11** The placement of traffic control vehicles has been considered and utilised on the approaches with lateral shift requirements.
- 12** Containment fencing is provided around the work area to prevent unauthorised access to the site. In addition, containment fencing has been placed on the outside of the footpath diversion to ensure pedestrians do not enter the live traffic lanes.
- 13** The existing kerb ramp and the existing driveway of the service station can be used for the pedestrian diversion, meaning temporary kerb ramps are not required.
- 14** An additional traffic controller has been provided at the driveway entrance to the 24hr service station. The intent is to hold egressing traffic at the driveway until it is safe to proceed.
- 1** When working at signalised intersections, implementers should always be given contact details for the traffic signal system operator, and instructions regarding contacting the operator prior to establishing any worksite.
- 2** Designer should provide detailed advice on the sequencing of the TGS implementation (e.g. for this Scenario an appropriate order would be (1) minor approaches (2) westbound Row Road to the intersection stop bar, (3) eastbound Row Road to the intersection stop bar, with all approaches on hold once setup is near intersection (4) additional staff to implement the closure on the departure sides of the intersection (5) operation of signals is to be switched off).
- 3** For complex arrangements, it is good practice to assign identifiers for each traffic controller position and detail the tasks that position will be performing during the operation of the TGS.
- 4** The designer should clearly identify the need for aftercare plans and cross reference to the appropriate aftercare TGS.
- 5** Based on the duration of works, the designer should provide details of the required sign foundations (e.g. multi-message frames for short-term and post mounted signs for long-term). The height above ground for post mounted signage shall be in accordance to AGTTM Part 3 and may depend on the presence of pedestrians and cyclists.
- 6** The designer should include guidance/information on Project Details, Contractor Contacts, Stakeholder Contact Details, Implementation (and Monitoring) Instructions, Generic and Site Specific Notes, Legend and Resource Quantities, and Implementation and Removal Sequencing (see Sample Layout 40 for title block and notes guidance).



- 1** Sample Layout 50 presents how an aftercare plan relating to the worked example (Sample Layouts 47-49) would be developed into a site-specific TGS. The aftercare plan would be implemented at the end of each shift, and remain in place until works to reinstate linemarking and footpaths are complete.
- 2** This sample layout is intended only to illustrate the application of AGTTM guidance and is not a traffic guidance scheme. The development of site-specific traffic guidance schemes is recommended for all work zones.
- 1** The works will result in portions of the linemarking along Row Road to be removed and require reinstatement. Road users are notified of the likelihood of missing linemarking through signage. Additional annotation should be included within the details of the TGS for temporary, short-term, delineation using temporary Raised Pavement Markers also known as "stick-and-stomps".
- 2** It is important to consider the impacts of any unfinished works when designing aftercare requirements. In this scenario, the missing linemarking is relatively short (i.e. not longitudinal) and does not remove stops bars at the signals, the existing speed limits have been assessed to be appropriate for the aftercare plan.
- 3** Pedestrians within the northern verge have been diverted on a temporary path constructed during Stage 1. The temporary path 1.5m wide, constructed of asphalt, is built within the road reserve and has been approved by Major City's Permits Team. Once the footpath, landscaping and kerbing are reinstated, the minor diversion and signage can be removed.
- 4** Due to the time required to cure a concrete footpath, the footpath within the southern verge is planned to be temporarily reinstated with asphalt during Stage 3. Pedestrian advisory signage has been provided to account for uneven surfaces until the footpath is reinstated to its original condition.
- 5** Trenching works in close proximity to signals has the potential damage the traffic signal loops. Traffic signals need to be kept operational as per their original condition. This will require consultation with the traffic signal system operator.
- 1** The designer should clearly identify the timing of the aftercare plans, and confirm monitoring requirements where sites will be unattended for long periods.
- 2** The designer should include guidance/information on Project Details, Contractor Contacts, Stakeholder Contact Details, Implementation (and Monitoring) Instructions, Generic and Site-Specific Notes, Legend and Resource Quantities, and Implementation and Removal Sequencing (see Sample Layout 40 for title block and notes guidance).



Austroads	TRAFFCOM	Issue	Description	Date	Auth.	Design J.SMITH TMD 9999	Project Title TELECOMMUNICATIONS UPGRADE AT THE INTERSECTION OF ROW ROAD AND BENSON PLACE	Drawing Title AFTERCARE SHORT TERM TRAFFIC GUIDANCE SCHEME	Project no. 176359
						Drawn J.GODFREY			Drawing no. 176359-004
						Checked J.SMITH TMD 9999	Design Status		Sheet 1 of 1
		B	Review Update	12/01/20	JS				Revision B
		A	Draft for Review	01/12/19	JS				

Austroads' Guide to Temporary Traffic Management (AGTTM) details contemporary temporary traffic management practice for application in Australia and New Zealand. It provides guidance for the planning, design and implementation of safe, economical and efficient temporary traffic management designs.

Guide to Temporary Traffic Management Part 9: Sample Layouts provides illustrative and educational sample layouts to support the other parts of AGTTM and to assist Traffic Management Designers in the interpretation of the various requirements of this AGTTM.

Guide to Temporary Traffic Management Part 9



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