Queensland Hunter
Gas Pipeline

Appendix I
Traffic assessment

PROPOSED QUEENSLAND TO HUNTER GAS PIPELINE

Assessment of Traffic Impacts and Management Implications

August 2008

Reference 0822

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LIST OF ILLUSTRATIONS

1. INTRODUCTION

This report has been prepared for to accompany a Part 3A Application to the Department of Planning for a proposed High Pressure Gas Pipeline between Wallumbilla in Queensland and Newcastle in New South Wales (Figure 1).

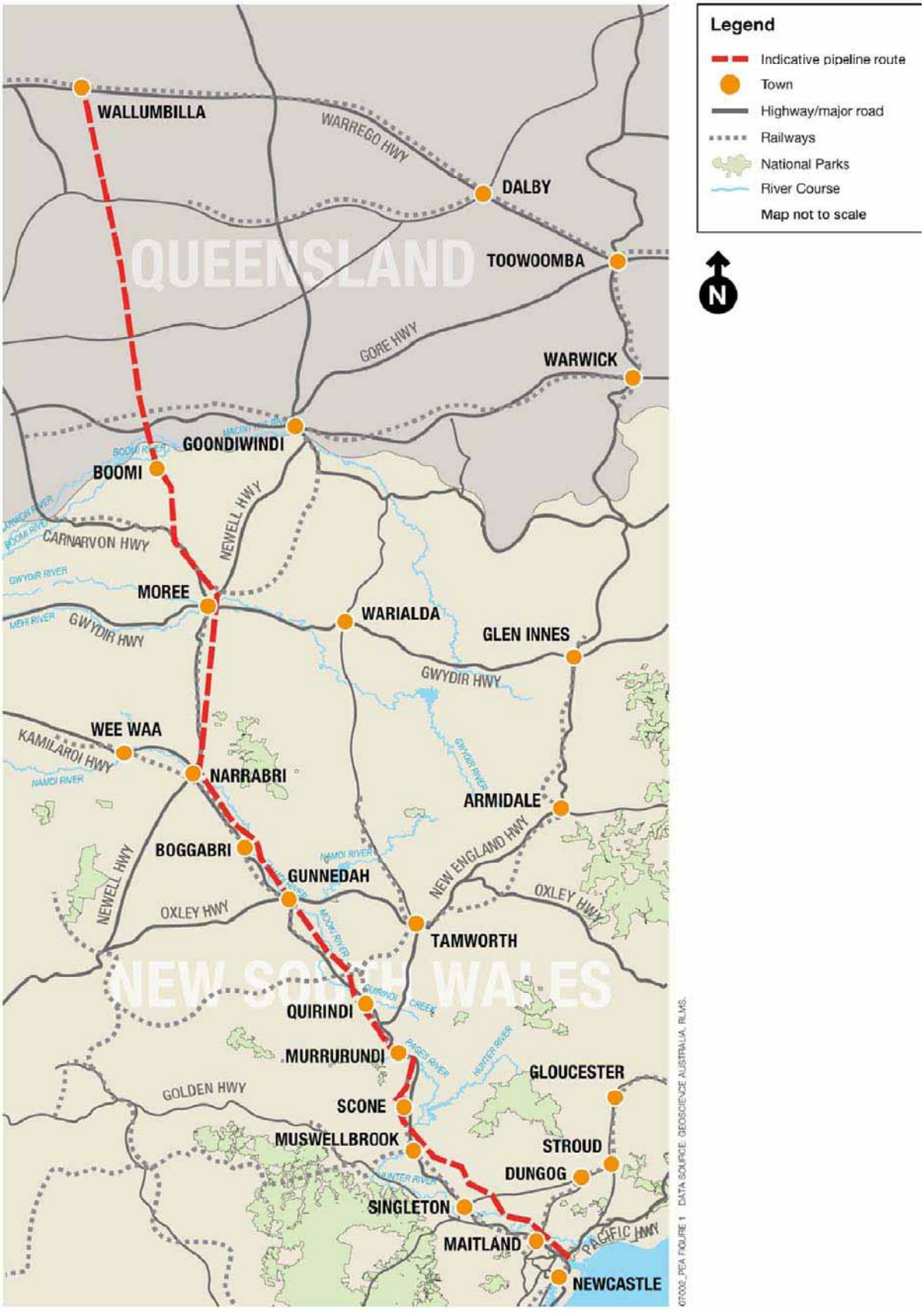
The purpose of this report is to respond to the Director General's Requirements (DGRs) as stipulated in the Department of Planning document dated 3 March 2008. In relation to traffic assessment, the DGRs identify the following requirements under the heading Human Amenity Impacts:

- *Include a framework for the mitigation, management and monitoring of heavy vehicle movements during construction of the project, particularly with respect to impacts in and around major centres, and with respect to large / long loads and peak vehicle movement generation (for example, haulage of spoil or other materials).*

This reports responds to the above DGR by providing the following information:

- a summary description of the pipeline scheme
- a description of the haulage process
- the establishment of a system for assessing the local impact on the road network
- details of Traffic Management procedures for implementation under various road crossing scenarios

This Traffic Management Plan has been prepared in accordance with the requirements stated in the Australian Pipeline Industry Association (APIA) Code of Environmental Practice for Onshore Pipelines.



LEGEND

N

LOCATION

FIG 1

2. PROPOSED DEVELOPMENT SCHEME

2.1 PROPOSED PIPELINE DETAILS

The proposed pipeline is being constructed by Hunter Gas Pipeline Pty Ltd between Newcastle in New South Wales and Wallumbilla in the Surat Basin of south central Queensland. The route covers a total distance of 825km and is divided by the State Boundary so that 603 km will be within NSW with the remaining 222 km in QLD. The scope of this report includes only the section located within NSW.

The pipeline will comprise a single 500 mm diameter pipe, which will consist of high strength steel fabricated in 18 metre long sections. The pipe sections will be manufactured in Australia and/or imported and transported to distribution points along or near the route. The pipe will be constructed within a trench having a depth of 1250mm, provided around 750mm of cover. The trench will have a width of approximately 600mm, but will be located within a Right of Way (ROW) of 30 metres wide. The ROW will accommodate the pipeline as well as generally providing the construction zone along the route.

Pipeline construction requires a number of procedures to be undertaken in sequence, being:

Survey and fencing
Establishment of temporary facilities
Clearing and grading of the ROW
Trenching
Pipe stringing and bending
Pipe welding and inspection
Joint coating
Pipe placement in the trench (lowering in and laying)
Backfilling and compaction
Hydro-testing and reinstatement

This suite of activities is referred to as a 'spread', which will occur over a 4-month period at any one location along the route. In relation to the impact at the road crossings, the activities which involve the road surface being disrupted are limited to the period between trenching and backfilling/reinstatement of the pavement. The duration of this activity would be a matter of days, rather than weeks, as a dedicated workforce will be employed to ensure that the road crossings are constructed within a tighter timeframe. Details of these arrangements are discussed in Section 5 of this report.

2.2 PROPOSED PIPELINE ROUTE

The pipeline will involve approximately 175 road crossings and 46 unsealed track crossings within NSW, which will be constructed by either boring beneath the carriageway or by implementing a trenching technique similar to that being employed along the majority of the route.

The overall project will likely involve three components where an impact on the surrounding road network may arise, being:

* The transportation of pipe sections to the distribution facilities and onto the route

* The construction activity at or near the road crossings

* The movement of the workforce between the route and the accommodation facilities.

Details of the proposed route are provided on the plans prepared by Manidis Roberts, which accompany the Application and are reproduced in part overleaf.

3. ROAD NETWORK AND TRAFFIC CONDITIONS

3.1 ROAD NETWORK

The proposed pipeline route will cross approximately 175 roads within NSW which are summarised in the following:

Highways (all will be bored to minimise surface disruption)

Carnarvon Highway	-	South of Garah
Carnarvon Highway	-	North of Ashley
Newell Highway	-	Northeast of Moree
Gwydir Highway	-	East of Moree
Kamilaroi Highway	-	South of Narrabri
Kamilaroi Highway	-	North of Boggabri
Oxley Highway	-	East of Gunnedah
Kamilaroi Highway	-	North of Quirindi
New England Highway	-	South of Scone
Pacific Highway	-	North of Newcastle
Principal Roads	-	5 crossings
Secondary Road	-	19 crossings
Minor Road (incl. unsealed)	-	141 crossings

4. PIPE DELIVERY AND LOGISTICS

Each 18-metre section of pipe will be manufactured in Australia and /or imported by sea and then transported by a combination of rail and road to central distribution facilities located in close proximity to the route, where they will be stored before being transported by road to the required points along the route. The delivery system enables a stock of 50 kilometres of pipe to be held at the central distribution points prior to delivery to the ROW. A flow chart of the transportation process is contained overleaf.

The pipeline will be constructed with two spreads working simultaneously. The rate of pipe delivery, which contributes directly to the heavy vehicle activity, can be calculated based on the projected pipe laying timeframe and the maximum load capacity of the delivery vehicles as follows.

Each of the two spreads will be laying the pipeline at a rate of 4 kilometres per day, which equates to 222 sections of pipe, per spread. The 18 metre pipe sections have a weight of 2.8 Tonnes each, which requires the movement of 620 Tonnes of pipe per day at each spread. The delivery vehicles have a maximum load capacity of 24 Tonnes meaning that 26 vehicles are required to transport the 620 Tonnes of pipe. It is intended that the two spreads will be active concurrently, but will each be served by different distribution facilities.

In terms of traffic generation, the addition of 52 heavy vehicle movements per day, per spread on the road network will be accommodated with regard to the road capacity. However, drivers may experience some delay for short periods, when following a delivery vehicle where overtaking opportunities are not available.

In order to fully assess the impact of these vehicle movements and to establish mitigating measures, the location of the central storage facilities and the method of

transportation to these facilities needs to be identified and subjected to further analysis.

Oversize vehicles would be subject to appropriate signage, lighting and pilot vehicles if required, in accordance with the RTA requirements. Permits are required to be awarded by the RTA where oversized vehicles are to be used.

In relation to the spoil from the trench, it is not proposed to remove any material from the ROW. The trench material will be backfilled and only the volume taken by the pipe remains, which is distributed over the ROW and compacted to match the former ground levels.

5. ROAD CROSSING TRAFFIC MANAGEMENT

The extent and type of traffic management treatments at each crossing will depend on a number of factors relating to the exiting background traffic volumes, the traffic activity associated with the works and the scale of the construction works taking place at each crossing point. While a generic crossing detail may be applicable in most instances, other factors such as access to property and geography will also influence the construction process and therefore the traffic management treatment.

While under the normal construction process the spread duration would be some 4 months at any given location, the road crossings would be managed quite differently in order to minimise the impact on the network. A small, specialised crew would be employed at each crossing. Where open cut is required, this crew would trench, lay the pipe section and backfill each side of the carriageway generally within 1 or 2 days. A small access hole would be left to the sides of the carriageway allowing the main crew to access the laid pipe section when required.

The typical crossing details for the various road types are described in the following and illustrated on the drawings contained overleaf:

* Highways - The pipe will be bored beneath the Highway crossings in order to limit the impact on these highly trafficked routes.

* Major Road - In most locations, it is expected that major roads having only one lane in each direction, would provide sufficient space within the hard shoulders to offset the carriageway and coordinate a pipe joint near the centreline of the carriageway. The arrangement would then be mirrored on the opposing side. In situations where suitable width is not available, the carriageway would be narrowed to a single lane, requiring the enforcement of direction control by either manual or

mechanical means. In some instances it may also be necessary to temporarily close the carriageway.

* Minor Road - It is expected that most minor roads would provide insufficient width to accommodate the offset arrangement described above. This will either involve a single lane with direction control or a temporary closure.

Where traffic management is required on any roadway, all features of the management are to be installed in compliance with the requirements of Australian Standard 1742.3, Part 3 – Traffic Control Devices for Works on Roads. The Standard is also described in the series of Field Guide Handbooks, which apply to the various circumstances and road types, which will be encountered along the proposed route. Where works are required within a road under the jurisdiction of the RTA, the traffic controls are to be implemented in accordance with the RTA's Traffic Control at Worksites Manual.

Carriageway closures should generally only be implemented under the following conditions:

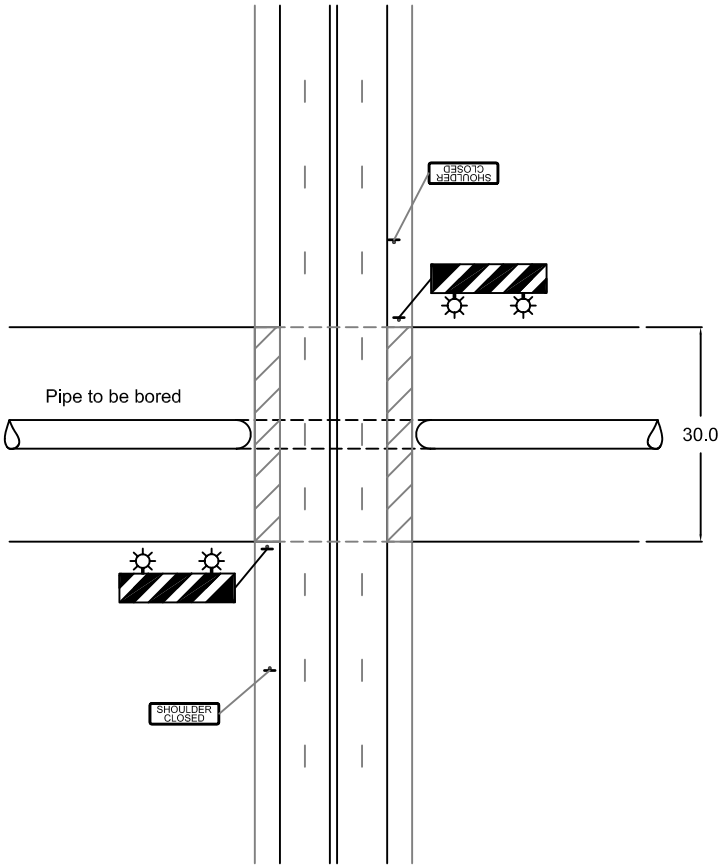
* The duration of the closure should be limited to less than one week

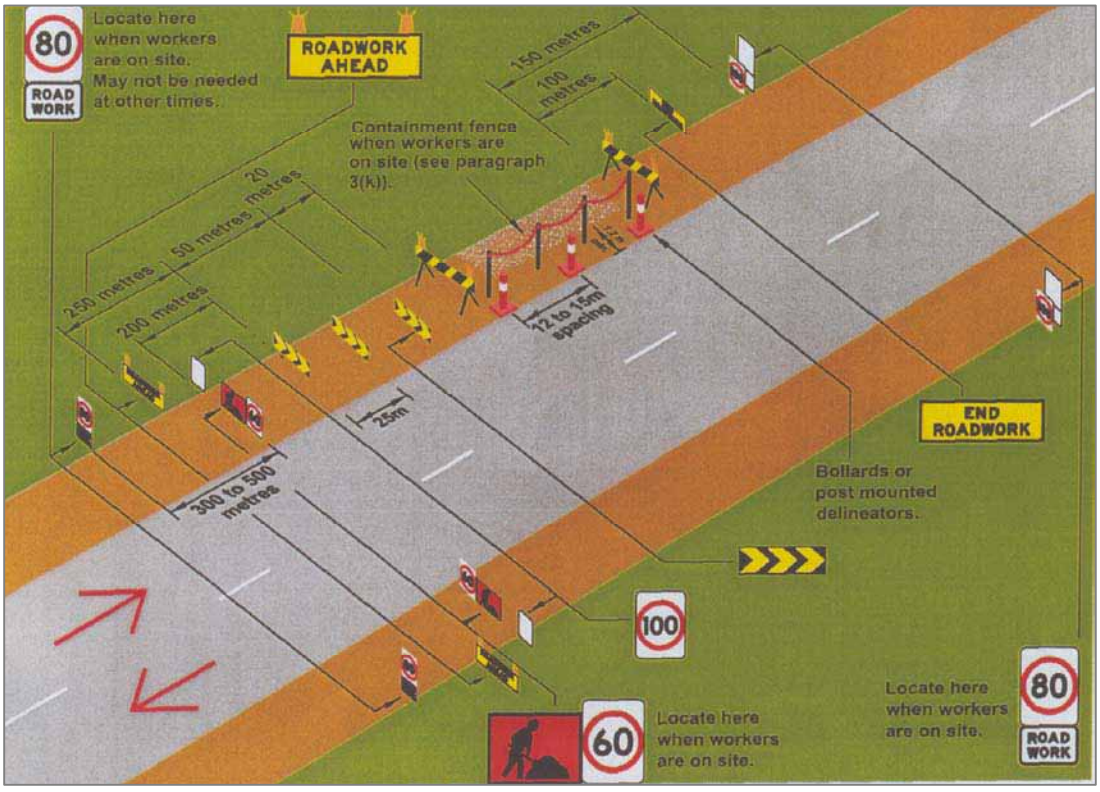
* The road should not form the single route to or from a major settlement

* The road should not be relied upon for necessary local services such as public transport or school bus routes

* The length of the detour should be less than 4 kilometres.

Where a road closure is required all signage should be installed in accordance with AS1742.3 and the RTA Technical Direction TD 2006/05, which is reproduced in Appendix A.



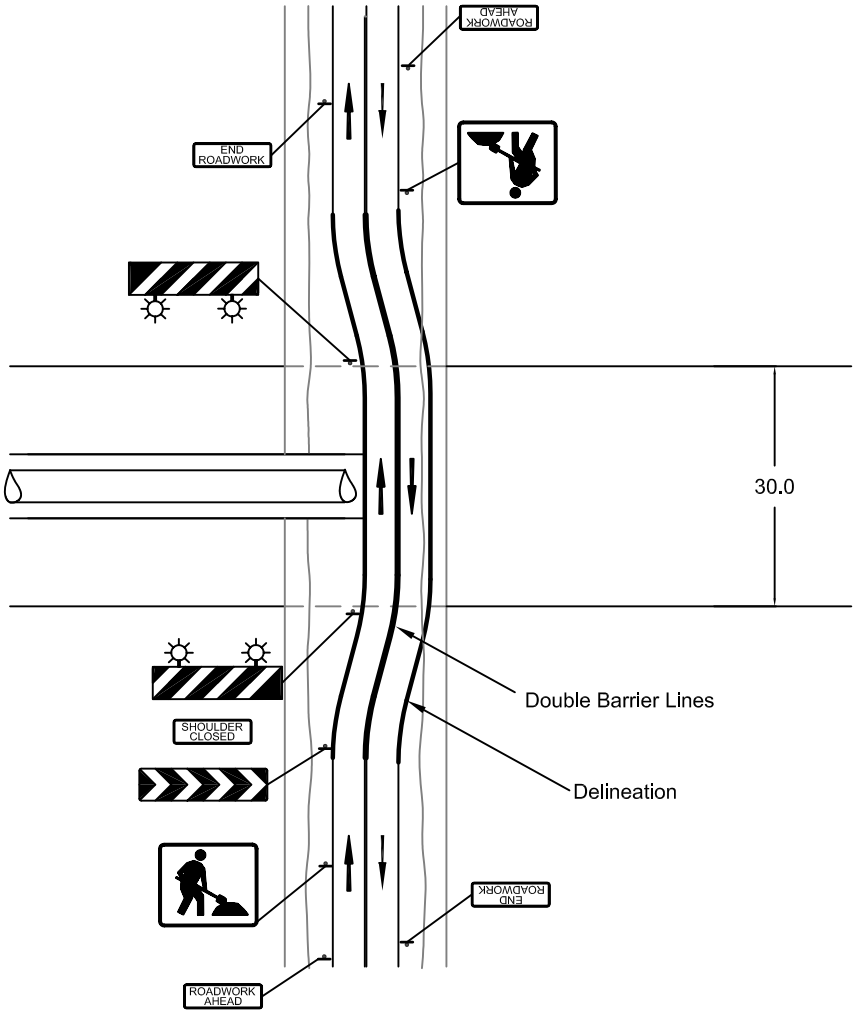


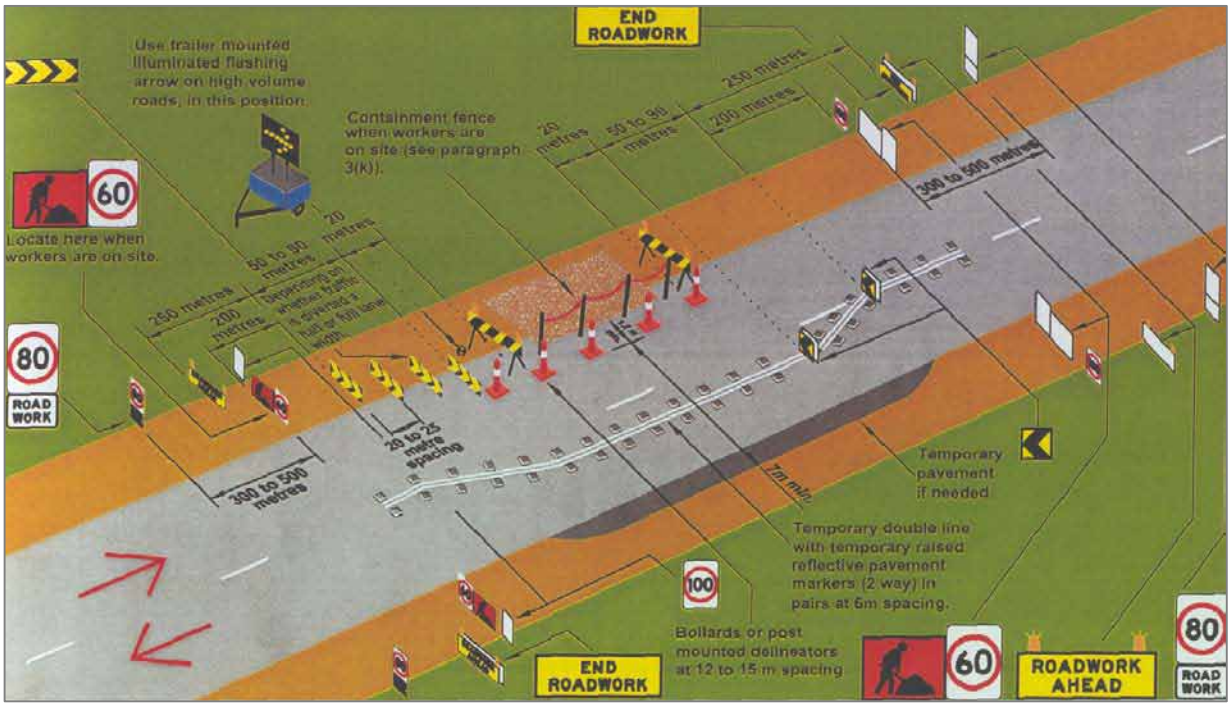
Note: Speed Limit may vary

LEGEND

SCHEMATIC TRAFFIC MANAGEMENT FOR HIGHWAYS

FIG 2



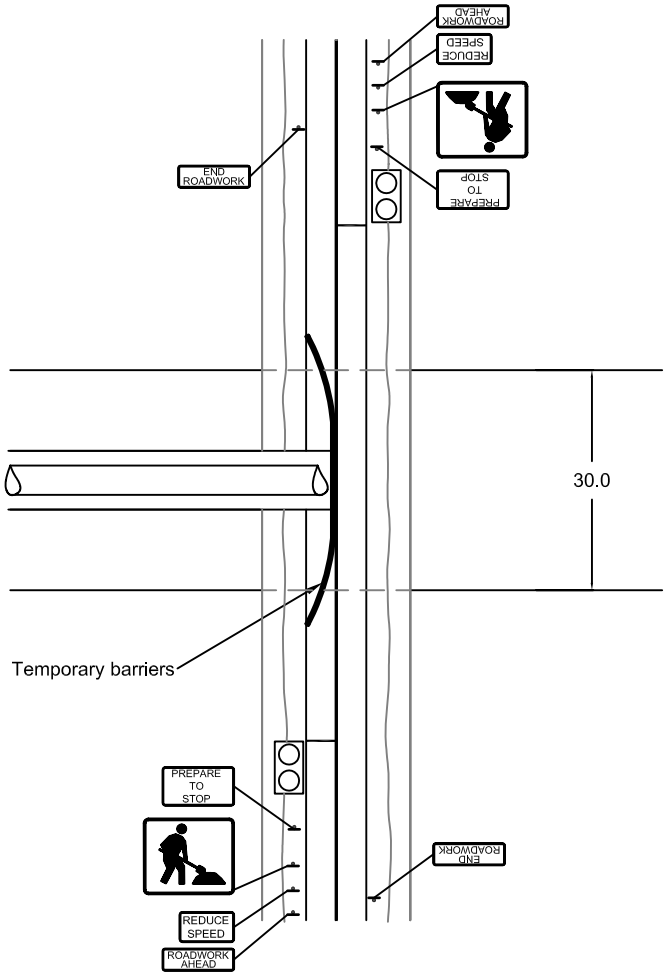


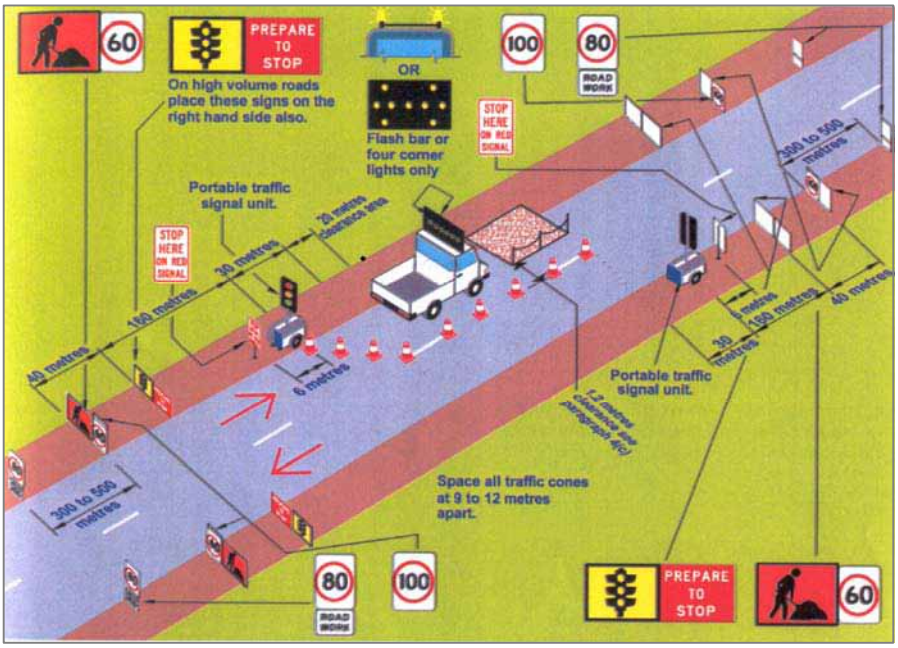
LEGEND

SCHEMATIC TRAFFIC MANAGEMENT FOR PRINCIPAL ROAD A

(Mirrored for other side)

FIG 3





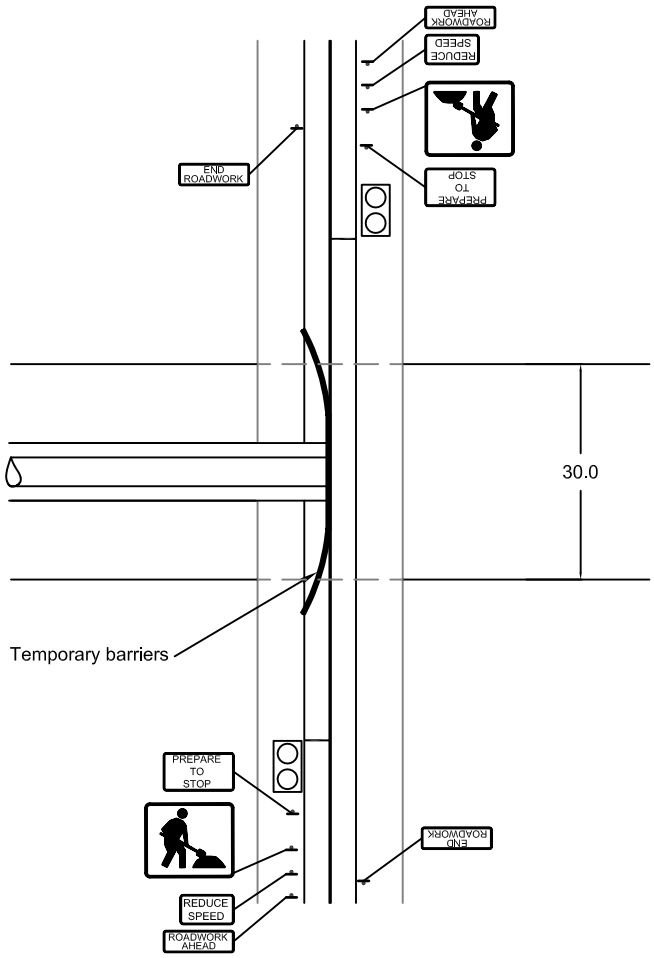
Note: Speed Limit may vary

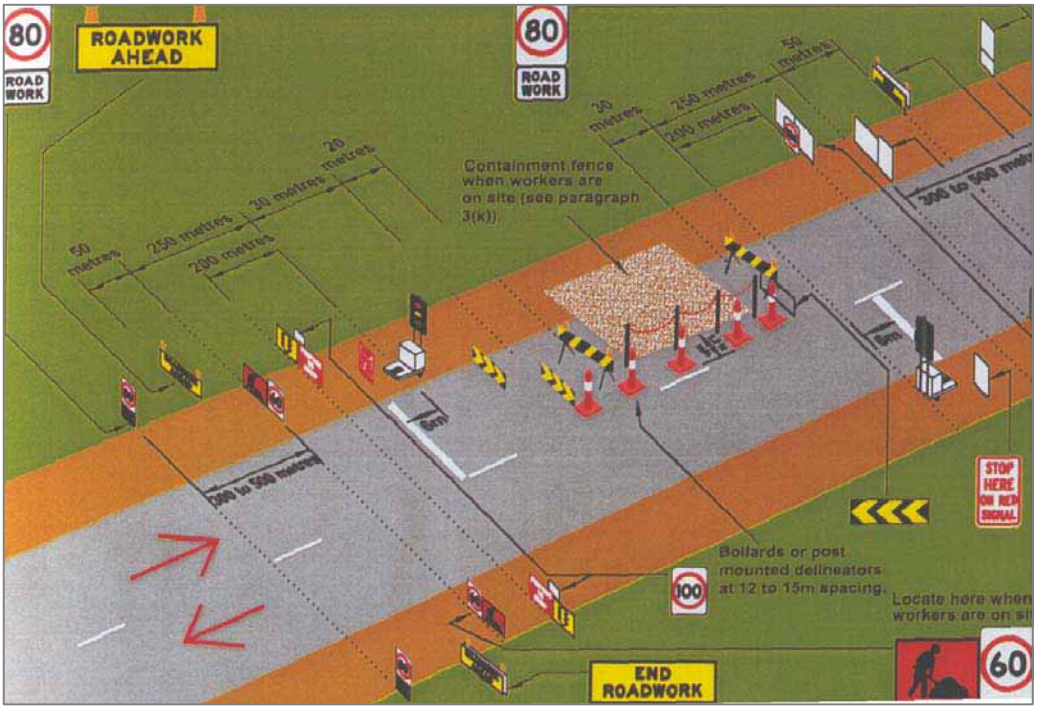
LEGEND

SCHEMATIC TRAFFIC MANAGEMENT FOR PRINCIPAL ROAD B

(Mirrored for other side)

FIG 4





Note: Speed Limit may vary

LEGEND

SCHEMATIC TRAFFIC MANAGEMENT FOR MINOR ROAD

FIG 5

While the full requirements are documented in AS1742.3 a summary of important considerations is provided in the following:

1. Do not force drivers to break the law. Make sure that the traffic diversions do not force drivers to cross double lines or disobey regulatory signs. If this cannot be avoided, a traffic controller may need to be employed to direct traffic specifically to make movements that are not normally permitted.

2. All traffic control and management devices are to be supplied, place and maintained in accordance with current Australian Standard 'Manual of Uniform Traffic Control Devices' (AS 1742.3).

3. All employees are to ensure the health, safety and welfare of their employees, at all times, in accordance with the NSW *Occupational Health and Safety Act 2000.*

4. All traffic control works, including signage, barriers, delineation and temporary markings are to be installed and maintained by appropriately qualified RTA accredited work site traffic controllers.

5. It is the responsibility of the contractor to ensure all relevant approvals are obtained prior to works commencing. A road occupancy application is to be made to RTA for all works on classified roads and within 100 metres of any traffic signals.

6. Drawings provided are issued as a guide only based on an indicative construction staging strategy only. Reference is made to the RTA publication 'Traffic Control at Work sites' (ver. 3.1 – 2006) and associated traffic control plans, if the contractor proposes alternate construction staging the drawings are to be adjusted and resubmitted for approval.

7. All safety barriers are to be an approved type concrete or reflectorised plastic. Plastic barriers are to comply with 'NCHRP 350'. Barriers are to located a

minimum of 500mm from edge or works, maintaining a minimum adjacent lane width of 3.0 metres.

8. Signs:
   - workers symbolic signs (T1-5) are to be displayed at all times when workers are on-site
   - all signs are to be 'Class 1' retroflective, Size B
   - placed a minimum 1.0 metre clear of a travelled path
   - for works longer than 2 weeks to be post mounted 2.2 metres above ground.

9. All signage, delineation, flashing lights and barrier boards are to be in place prior to daily works commencing. Regular maintenance and recording in accordance with AS 1742.3 is to be undertaken, signs are to be removed in sequence to maintain safety at all times.

10. At completion of daily works:
    - all non-essential signs must be covered/removed
    - relevant signs for the safe night passage of vehicles and pedestrians through the site are to be installed
    - barrier boards with flashing lights are to be placed across the work site at 30 metre intervals.

The RTA has provided initial comments on the overall project, which are summarised in the letter dated 7 November 2006. The letter is contained as an Appendix within the Environmental Assessment, however the following extracts are relevant to the road access and traffic control process:

* All works within the road reserve should include a description of the work location (including location plan), giving the distance from the nearest major town (or other well defined feature). At completion of the works the pipeline should be identified by survey and work-as-executed plans forwarded to the RTA.

* All arrangements for the control of traffic shall be in accordance with the RTA's Traffic Control at Worksites Manual. A Road Occupancy License (ROL) will be

required for any work that will impact upon traffic. For times of access and ROL applications please contact the Traffic Operations Manager / Traffic Commander in the respective regions.

6. MOVEMENT OF WORKFORCE

The construction phase workforce will involve approximately 600 persons. It is proposed to provide accommodation in one sufficient camp per spread along the route, which would be located to limit the travel distance to the pipeline to within 70 kilometres where possible. A more detailed description of the accommodation facilities is provided in the Environmental Assessment Report. The establishment of each camp would involve around 120 semi-trailers delivering the accommodation and facilities units.

The average daily traffic activity associated with a camp is summarised in the following:

Activity	No. of units	No. of trips per unit per day	Approx trips per day
Water cartage $20m^3$/truck (potable and dust suppression)	5	5	25
Fuel	3	1	3
Camp service and waste disposal	6	0.3	2
Floating equipment around construction corridor	11	0.3	3
Total			**33**

The work force would be transported to the work sites in groups using vehicles, which would be included in the vehicle fleet associated with the works. The local impact of this traffic activity and the identification of mitigating measures would be assessed following the determination of the camp locations and the relationship with the pipeline access points.

7. CONCLUSION

The traffic assessment undertaken for the proposed Queensland to Hunter Pipeline has assessed the four activities associated with the works, which may cause some impact to the operation of the road network and the associated remediation measures:

* The Mobilisation and demobilisation of construction plant, equipment and camps would involve a short-term traffic impact in the vicinity of each campsite. The establishment of each camp would involve around 120 semi-trailers delivering the accommodation and facilities units.

* The delivery of pipe sections from the central holding areas to the spread will involve approximately 52 heavy vehicle movement per day per spread, which will be primarily accommodated within the arterial road network, other than at the place of delivery where local roads may be used. This number of vehicles will not cause a notable impact on the capacity of the road network, however where oversized vehicles are used, suitable controls and management will be put in place.

* The pipeline will cross a number of roads where open cut will be required rather than boring beneath the carriageway. In order to limit the impact of these works on the road network, a number of traffic controls are available in addition to a specialised crew, which will dramatically reduce the normal construction period, so that a road trench may be excavated and backfilled within a single day where conditions permit.

* The movement of the workforce represents another component of the project where an impact on the road network may result, given the number of persons involved. In order to limit the traffic activity associated with the workforce, it is proposed to provide transportation to/from the spread using a fleet of coaches and buses. In addition, it is noted that the accommodation sites will be self-

APPENDIX A

RTA TD 2006/05

Technical direction

For traffic and transport practitioners

TDT 2006/
05
September 2006

SIGNPOSTING FOR TEMPORARY RURAL ROAD CLOSURES

INTRODUCTION

There are a range of situations where it is necessary to close a state road or national highway for a limited duration but on a regular basis. In some of these situations, it is necessary for signposting to be provided which gives clear guidance in a form that road users can identify from previous experience. These guidelines consolidate a number of previous signposting practices. No previous policy existed.

BACKGROUND

There are a range of reasons for closing part of the state road or national highway network. They might be summarised as being:

- Spontaneous or unplanned incidents – vehicle accidents, fire etc
- Irregular or short notice incidents – floods, traffic saturation, civil demonstrations etc, or
- Planned incidents – roadworks.

This *Technical Direction* applies only where a rural state road is regularly closed.

The underlying principle for signposting under these guidelines is to provide signs that can be easily read, understood and acted upon at the detour departure point and thereafter until detour traffic reaches permanent signs indicating their destination.

For: Director, Road Network Infrastructure; Director, Motorways; Director, Road Safety & Road User Management; Director, Operations & Services; Traffic Management personnel.

Supersedes: NIL
Enquiries Email: technical_directions_publication@rta.nsw.gov.au

The type of closure will give some indication of the likely time that the road is closed. It may be appropriate, or indeed necessary, particularly in rural areas where a detour is relatively long, to supplement any signs with an officer and or a variable message board which can provide supplementary information at the detour point.

PRACTICE/ GENERAL

Figure 1 is an example of an advance detour (G9-325) sign, where the detoured traffic is via an existing focal point. The sign is foldable and lockable in both open and closed positions. The top panel indicates a changeable distance to the start point where the road is closed. This allows road users to judge whether their destination is beyond the closure point. Depending on the length of the road being detoured and the density of settlement along it, the changeable distance increments might be 5, 10 or 20 kilometres.

The lower panel of the sign indicates the detour route via a signposted focal point. All advance direction, intersection direction and reassurance direction signs along the detour route must indicate this focal point (Casino in this example), until signposting indicating the through focal point is reached, see Figure 3. Where the route does not travel via a signposted focal point, see Figure 7.

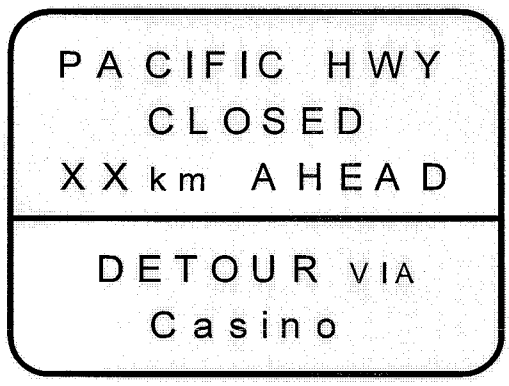


Figure 1 - Advance detour sign (G9-325)

Figure 2 is an example of an advance road closure (G9-325-1) sign, where no obvious or practical detour is available. Through traffic is advised to call the Transport Management Centre traffic information line on 132701, to consider alternative routes to their intended destination.

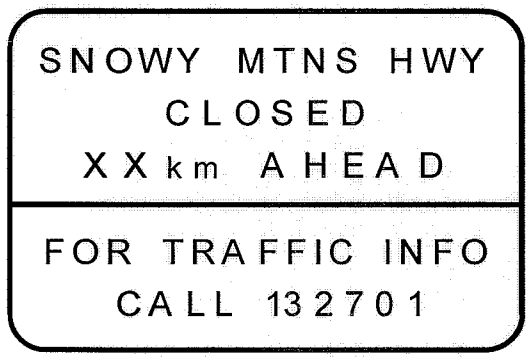


Figure 2 - Advance road closure sign (G9-325-1)

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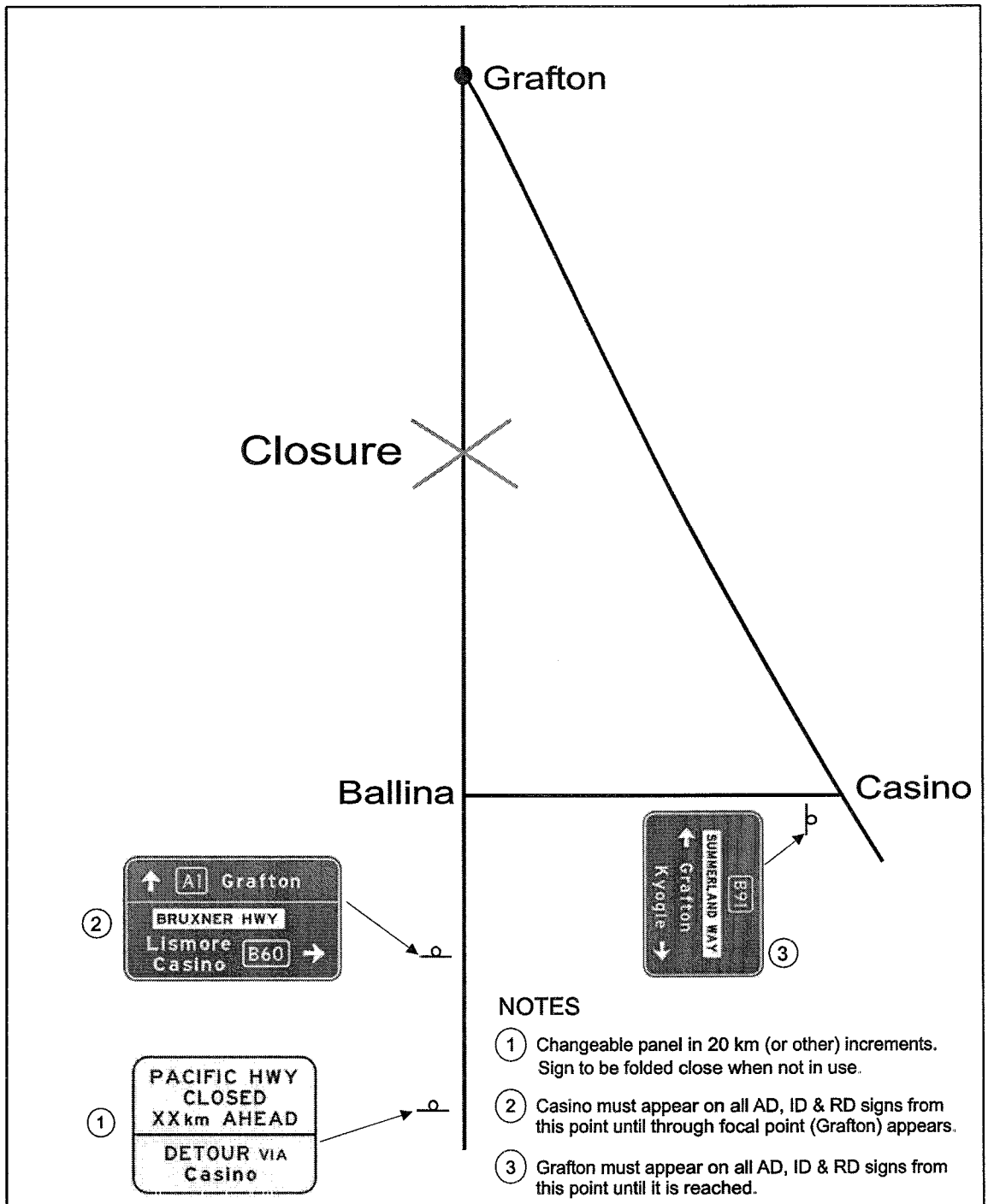

Figure 3

Rural situation where detour is via a signposted focal point.

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RURAL DETOURS

Figures 4, 5, 6 and 7 relate to a rural detour that is not via a signposted focal point. The detour may be along any combination of national highway, state, regional or local roads.

Figure 4 details an advance detour (G9-326) sign. The sign is foldable and lockable in both open and closed positions. The top panel is designed as for the G9-325 sign in Figure 1. The lower panel introduces the "D" for detour symbol.

Figures 5 and 6 detail the designs of the supplementary advance detour (G9-327) sign and the supplementary intersection detour (G9-328) sign. These signs are not to be permanently displayed on state roads but may be permanently displayed along the designated detour routes, depending on the likely frequency of use of the detour. Where they are not permanently displayed they may be hinged vertically. These designs are generic and only the letter / sign sizes will change according to the letter / sign sizes they supplement. Signs must be erected at every intersection along the route until the through route is reached, including where there are no existing guide signs. If the detour follows local roads it may not be necessary to install supplementary advance detour signs where supplementary intersection signs are sufficient for clear guidance - See Figure 7.

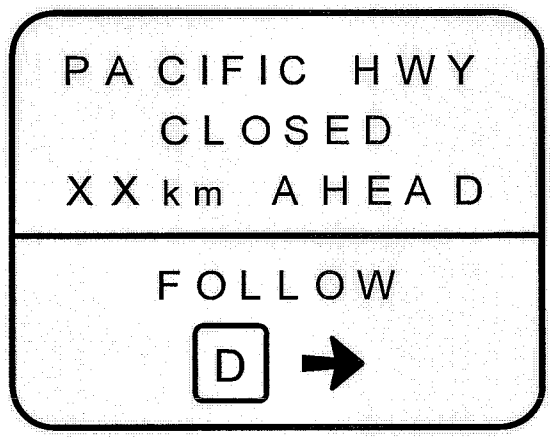

Figure 4 - Advance detour sign (G9-326)

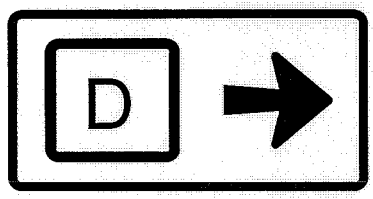

Figure 5 - Supplementary advance detour sign (G9-327)

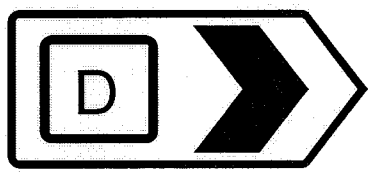

Figure 6 - Supplementary intersection detour sign (G9-328)

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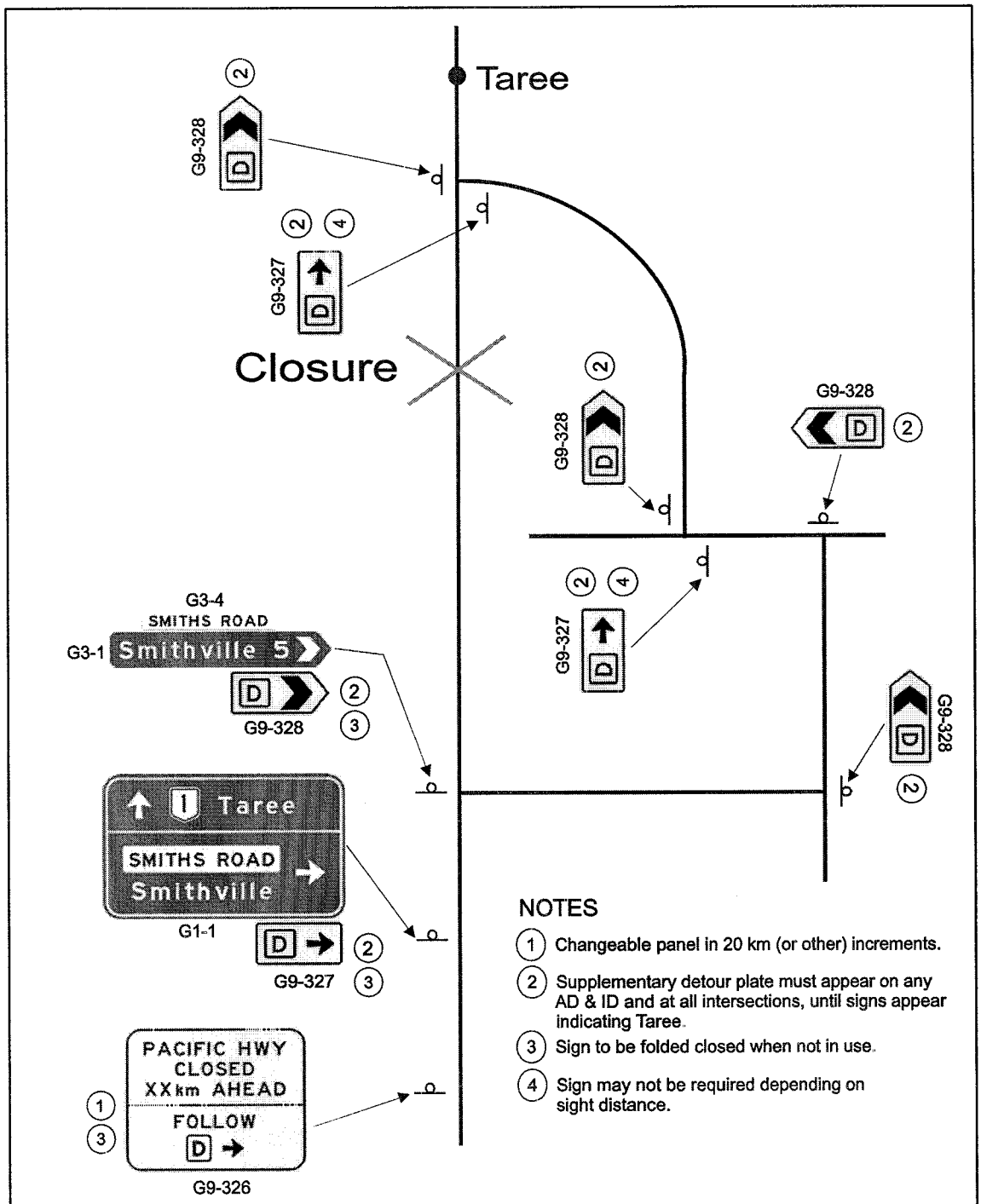

Figure 7

Rural situation where detour is not via a signposted focal point.

Supersedes: NIL
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USE OF OTHER DEVICES

When applicable (i.e. depending on the type of incident, the expected time of closure, availability of equipment, time available etc.) the activation of a particular detour route (particularly those which are not used very often) should be accompanied by the use of variable message signs (VMS) at the start of the detour route.

As well as advising motorists of the particular issue ahead, the VMS should reinforce that there is a detour signposting system in place which should now be followed.

ADVICE TO THE TRANSPORT MANAGEMENT CENTRE (TMC)

The Chief Traffic Operations Controller (CTOC) at the TMC must be advised of the activation of a detour route. This allows the various TMC systems which are used for the recording and dissemination of traffic information to be updated.

LETTER HEIGHTS

Letter heights for rural detours should be selected according to the following table:

Sign Type	Rural one lane	Rural two lanes	Rural three lanes
Advance detour (G9-325) sign	160 E 180/135	180 E 200/150	200 E 240/180
Advance road closure (G9-325-1) sign	160 E 180/135	180 E 200/150	200 E 240/180
Advance detour (G9-326) sign	160 E 180/135	180 E 200/150	200 E 240/180
Supp. advance detour (G9-327) sign	240 E	280 E	320 E
Supp. intersection detour (G9-328) sign	240 E	280 E	320 E

Letter heights for signs on urban detours should be the same as, or one size smaller than, those indicated for advance direction or intersection direction signs in Table 10.1 in the Guide Signs Manual.

ACTION

These guidelines are to be adopted when implementing signposting schemes for temporary road closures.

UPDATES

To ensure that this *Technical Direction* remains current and relevant, minor updates may be made from time to time. This may be done through the RTA website using the Traffic & Transport Policies & Guidelines Register which can be found at:

www.rta.nsw.gov.au/doingbusinesswithus/guidelines/documentregister/index.html

The Register should always be checked prior to using this *Technical Direction*

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ADDITIONAL COPIES

Additional copies of this *Technical Direction* can be downloaded from the Traffic & Transport Policies & Guidelines Register on the RTA website.

Approved by:

SIGNED

Glen Morgan
A / General Manager
Traffic Management Branch

Authorised by:

SIGNED

Phil Margison
A / Director
Traffic and Transport

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