

CONSTRUCTION TRAFFIC MANAGEMENT PLAN

Sydney Metro West – Western Tunnelling Package

James Ruse Drive Barrier Installation, Rosehill

September 2024 – January 2026

Document Reference #: **SMWSTWTP-GLO-RSH-TF-PLN-000001**

Current Revision: **B**

Issue Date: **September 2024**

Document Details

Document Title	James Ruse Drive Barrier Installation
Project Name	Sydney Metro West – Western Tunnelling Package
Client	Sydney Metro
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Revision Date	September 2024

Revision History

Rev	Date	Comments
A	13 August 2024	For review
B	10 September 2024	For approval Revise dates, stakeholder comments inserted

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Document Authorisation

Action Type	Position	Name	Signature	Date Signed
Prepared by	Traffic Manager	[REDACTED]	[REDACTED]	10 Sept 2024
Reviewed by	Logistics Manager	[REDACTED]	[REDACTED]	10 Sept 2024
<p>I hereby confirm this activity and all associated work, have been appropriately planned and the relevant resources are available to conduct the work in accordance with the agreed method.</p> <p>I hereby approve this activity to commence, as the stated controls applications are the most appropriate and are in accordance with the Risk Matrix.</p>				
Approved by	Project Director	[REDACTED]	[REDACTED]	10 Sept 2024

NOTES: Once all signatures have been obtained, the Document Author is responsible for ensuring the signed and approved hard and soft copies are uploaded on to the project share drive or passed to the Responsible Person for filing.

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1 Introduction

1.1 Purpose

This document has been prepared to propose a concrete safety barrier installation along James Ruse Drive, Rosehill to protect the Rosehill Site Compound Offices at the Clyde Dive Site. Barriers would be on the eastern side adjacent to southbound lane 1. Approximate span of 90-100m would be required between Prospect Street and Virginia Street. Figure 1 below shows approximate location.

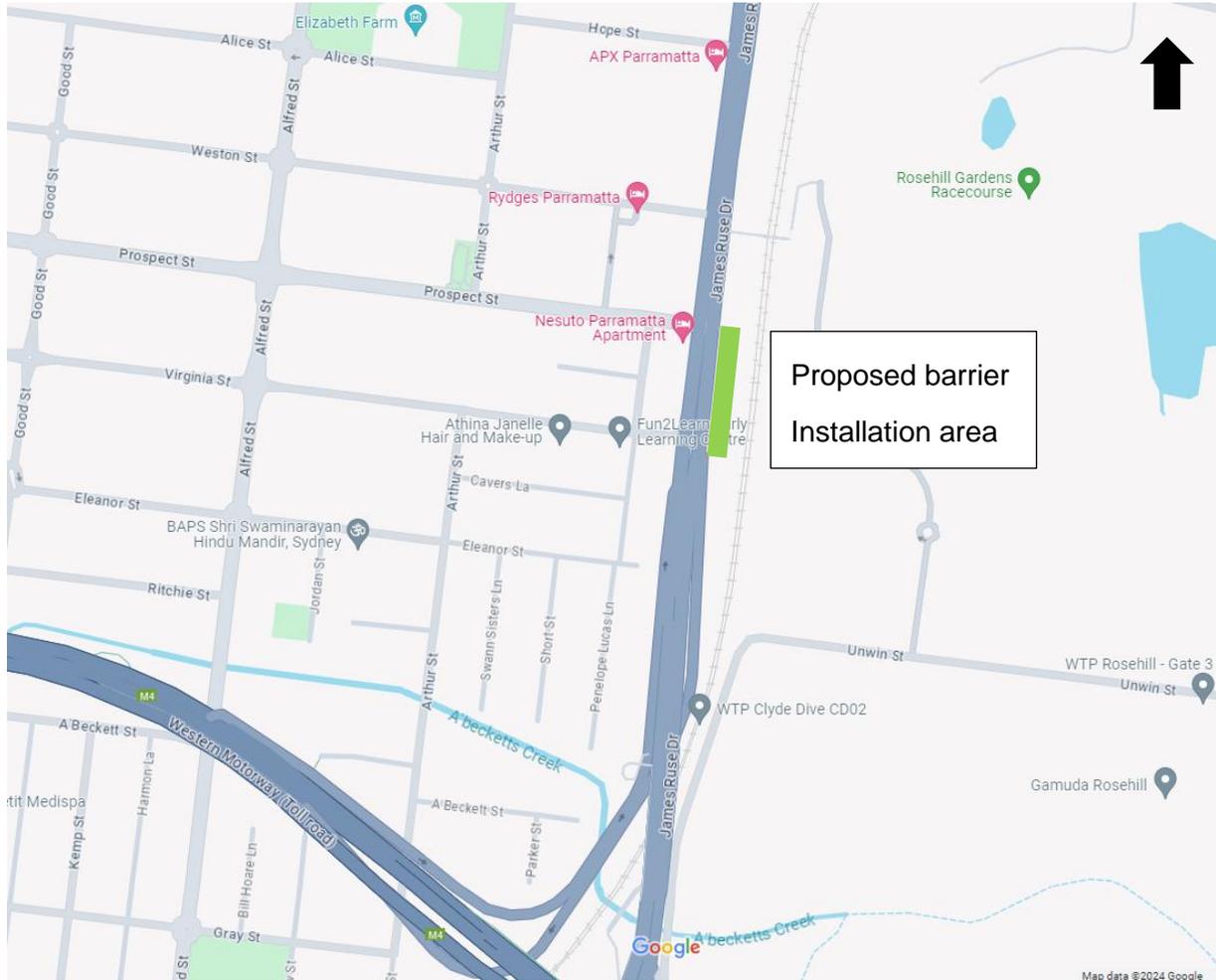


Figure 1 - Proposed area location

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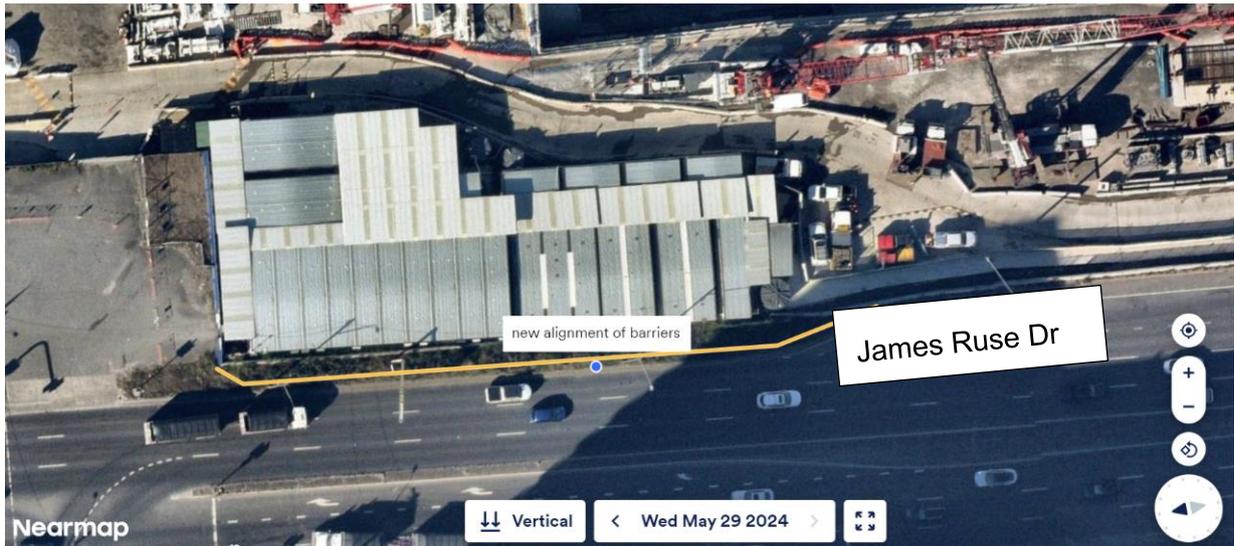


Figure 2 - Proposed section of barriers

Current set-up has barriers approximately 4+m from southbound kerb but are situated below road level as shown in figure 3 below. In the event of a possible run off road incident the site offices still have the potential to be impacted by an errant vehicle.



Figure 3 - Current set-up of barriers

The proposed barrier alignment would site sit behind the face of the kerb where possible. Barriers would be required to be separated at two (2) points to be able to overlap existing street lighting posts.

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Traffic management will be undertaken in a manner that shall provide for the safety of all staff, subcontractors and the public, and will ensure that road and path users are not exposed to foreseeable risks.

1.2 Clyde/Rosehill Construction Traffic Management Plans

Table 1 - Current CTMP's for area

Plan #	Plan name	Description	Status
SMWSTWTP-GLO-1NL-NL000-TF-PLN-00001	Project Wide CTMP	Overarching Traffic Management Plan	Approved
SMWSTWTP-GLO-CLJ-TF-PLN-000001	Clyde/Rosehill Site Establishment	For works to establish the Clyde/Rosehill sites	Approved
SMWSTWTP-GLO-CLJ-TF-PLN-000004	Clyde/Rosehill Site Operations	Site Operating Conditions at Clyde/Rosehill	Approved
SMWSTWTP-GLO-CLJ-TF-PLN-	Clyde Road Alignment Works	Site Operating Conditions at Clyde/Rosehill	Approved
SMWSTWTP-GLO-CLJ-TF-PLN-	James Ruse Drive Barrier Installation	Site Operating Conditions at Clyde/Rosehill	This Plan

Plans have been prepared in accordance with SSI 10038 Planning Approval Condition D85 and will be submitted to the Planning Secretary of the NSW Department of Planning and Environment for information prior to the commencement of any construction in the area identified and managed within this CTMP

NOTE: There are no operational changes to any of the above listed Plans. This plan only relates to barrier installation on James Ruse Drive only with no other site impacts.

1.3 Objectives

GLC are committed to striving to achieve the objectives as outlined in the CTMP and the environmental performance outcomes, namely:

- a) Minimising disruption and maintaining safety for all road users including pedestrian, cyclists, motorists and public transport users and providers
- b) Minimising change to traffic operations and kerbside access
- c) Minimising construction traffic generation during network peak periods, as outlined in the EIS
- d) Maintaining access to properties, businesses, and utility providers/ maintainers
- e) Remain incident and injury free to workers and members of the public
- f) Working collaboratively with other stakeholders and other major projects to mitigate traffic and transport impacts

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2 Proposed Site Conditions

Indicative time: September 2024 through to January 2026

Indicative duration: 12-18 months

The site operations work will consist of the following:

Table 2 - Site operations schedule

Task	Proposed Dates
Short term lanes closures for site preparation and barrier installation	September 2024
Barrier long term set-up	September 2024-January 2026
Short term lane closures for barrier removal and site return	January 2026

2.1 Working hours

The standard construction hours for the project are as noted in the Ministerial Conditions of Approval (MCoA D35) are:

- a) 7AM to 6PM Monday to Friday
- b) 8AM to 6PM Saturdays and
- c) at no time on Sundays or public holidays

Ministerial Conditions if Approval D37 also allows for works to be 24hours per day, seven days per week for tunnelling, delivery of materials to directly support tunnelling activities, haulage of spoil and works within the acoustic shed, under Low Impact circumstances.

2.2 Proposed Timings

Barriers are expected to be in place for 12-18 months.

One (1) to two (2) shifts are expected to install the barriers as area is required to be made suitable prior to actual barrier installation.

2.3 Operating Conditions

All site operating conditions will remain the same as already approved CTMP's. These proposed barriers are external to site along existing road alignment. They will have no impact on existing traffic conditions and have no impacts on site entry/exit points or any other works.

Figure 4 below shows proposed barrier installation area in respect to current site overview zones.

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Barrier design drawing is shown in Figure 5 on page 12.



Figure 4 Clyde / Rosehill Site Overview

2.4 Site Gate Access

Site access/ egress is not impacted and remain as per current approved CTMP's.

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2.5 Construction Traffic Generation

Construction traffic generation is minimal and as works will occur at night is outside AM and PM peak periods. Table 2 below shows construction traffic generation as part of this CTMP.

Table 3 - Construction traffic generation

Construction Stage	Vehicle Type	Estimated Vehicle movements per shift		
		In	Out	Total
Site mobilisation	Traffic Vehicle	1	1	2
	TMA	1	1	2
	Staff work vehicle	3	3	6
	Bogie (site prep)	1	1	2
	Semi-trailer (barrier delivery)	2	2	4
	Franna	1	1	2
Operation	Nil			
Site demobilisation	Traffic Vehicle	1	1	2
	TMA	1	1	2
	Staff work vehicle	2	2	4
	Semi-trailer (barrier delivery)	2	2	4
	Franna	1	1	2
Total		16	16	32

2.6 Temporary Safety Barriers

Barriers are expected to be in place for 12-18 months.

Barriers to be used will be the T-Lok Safety Barrier with an approval issue date of 7 March 2024, with a containment level of MASH TL3 and are rated to 100km/h

Barrier design drawing is as per figure 5 overpage.

Table 4 indicates temporary safety barrier statement of operation.

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Figure 5 - Temporary safety barrier design

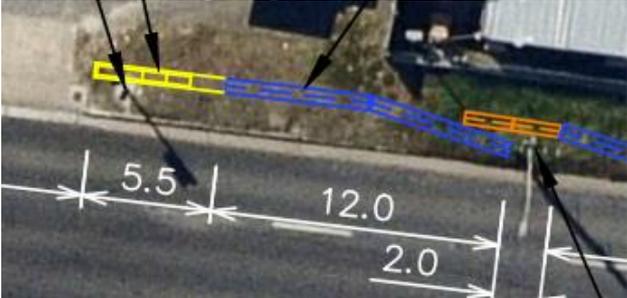
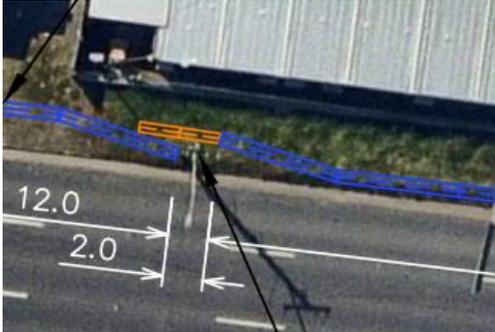
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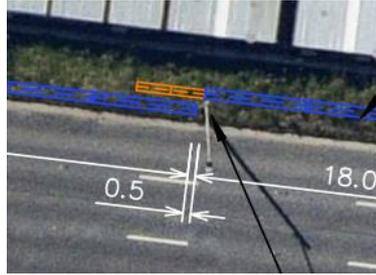
Table 4 - Barrier design statement

Temporary Safety Barrier Statement			
James Ruse Drive southbound barrier installation	Location/Description	Direction	Barrier Placement
	Opposite Prospect St - Lead in of 15.5m including Terminal	South	1.5m behind kerb transition to 0.2m behind kerb face
	Centre run of 44.0m	South	Start 1.5m behind kerb and transition to 0.2m behind kerb face
	Trailing run of 30.0m ending opposite Virginia St. (Note connects to existing barriers)	South	1.5m behind kerb transition to connect to existing barriers
Barrier Systems	Barrier Type		Terminals
	T-Lok MASH Safety Barrier 240307-TCU-T-Lok-MASH-Safety-Barrier-Temporary.pdf (austroads.com.au)		Absorb-M Crash Cushion
	Transitions		
<p>1. Lead in from terminal to first lighting post</p>  <p>2. First transition barriers behind lead in run and behind lighting pole</p> 			

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3. Centre run to terminate at second lighting post recommence behind centre run barriers and lighting post.



4. Join in to existing barrier system



Specific relevant considerations/restrictions

2 x lighting posts on alignment

Design Requirements

T-Lok MASH Safety Barrier - Temporary		MASH Test Level (TL 1-4)	Accepted impact speed (km/h)	Minimum installation length (m)	Dynamic Deflection (m)	Working Width (m)
	Required Value from manufacturer information/ R132	TL 3	100km/h	58.5m	1.27m	1.88m
	Designed Value what has been designed	TL 3	70km/h	1. 17.5m 2. 46.0m 3. 60.0+m	1.5+m	2.0+m

Design Variations

Minimum length required to be variable due to position of lighting poles along alignment.

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	<p>Barrier specifications are based on 100km/h. James Ruse Drive is posted as 70km/h and as such some deflection and clear zone widths would be less.</p> <p>As per Austroads Technical Advice SBTA 23-003 (Working Widths for Lower Impact Speeds)</p> <p>A modification factor would be applied to the MASH TL-3 system width. At 70km/h modification factor is $0.65 \times 1.27 = 0.825\text{m}$. With system width of 0.61m the working width would now be calculated at $0.61\text{m} + 0.825\text{m} = 1.435\text{m}$ compared with original working width of 1.88m</p> <p>Gawk screens are proposed to also be placed on barriers.</p>
--	--

3 Assessment of Construction Impacts

3.1 Mobilisation Impact on Traffic Flow

There will be minimal impacts on traffic flow during site mobilisation as this will only be conducted at night under TfNSW ROLs when traffic volumes permit. Single lane closure is expected to be set-up to start preparing the site and then pushed to a two-lane closure for barrier installation.

TGS to be utilised are attached in Appendix 1. Table 1 below shows brief description of TGS.

Table 5 - TGS Table

TGS #	Road	between	Timing	Traffic Control	Impact
LGP-111691-GLC192-James Ruse Dr	James Ruse Drive	Oak St and Virginia St	Night (possible 2100-0500)	Single lane closure southbound (lane 1)	Minimal as will occur under ROL when traffic volumes permit.
LGP-111691-GLC192-james Ruse Dr (REV1)	James Ruse Drive	Oak St and Virginia St	Night (possible 2200-0500)	Two-lane closure southbound (lane 1 & 2)	Minimal as will occur under ROL when traffic volumes permit.
Note	Timings are indicative only. ROL licenses when issued will give proper timings.				

3.2 Operational Impact on Traffic Flow

There will be no impacts on traffic flow as part of this CTMP. All existing lanes and lane widths are maintained in their current configuration.

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3.3 Impact on public transport

There are no impacts on Public Transport as part of this CTMP implementation.

3.4 Impact on active transport

There are no impacts on active transport as part of this CTMP implementation.

3.5 Impact on access, properties and utilities

There are no impacts on access, properties or utilities as part of this CTMP implementation.

3.6 Impact on parking

There are no impacts on parking as part of this CTMP implementation.

3.7 Impact on Emergency Services

There are no impacts to Emergency Services as part of this CTMP implementation.

3.8 Impact on Major Events

There are no impacts to any major events as part of this CTMP implementation.

4 Other Considerations

4.1 Road Safety Audits

Road safety audits will be undertaken during the development of the CTMP and upon implementation of the long-term work site, refer to Appendix B.

4.2 Inspections and Monitoring

Typical inspections and monitoring is as per Table 6 below. (source: Traffic Control at Worksites Manual Table 8-1)

Table 6 - Inspections and frequency

Stage	Activity	Purpose
Planning	TGS verification	To ensure that the TGS selected or designed is suitable for the works and location
	Weekly inspections	To ensure that the CTMP and relevant TGS are appropriate and operating safely, effectively and efficiently

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During temporary traffic management	Shift inspection	To ensure that the TGS is implemented as designed. This includes at a minimum twice per shift and when: <ul style="list-style-type: none"> A. TGS is installed/ changed or updated B. At regular frequency after work commences (every 2 hours) C. Once aftercare arrangements have been installed, if required
	CTMP review	To ensure that the CTMP controls are achieving the required outcomes
	Road safety audits	To identify road safety crash potential and areas of risk that could lead to traffic crashes
Post completion	Post completion inspection	To ensure that the site has been demobilised as planned and is safe for opening to traffic

4.3 Emergency and incident management

In the event of an incident that has the potential to impact traffic or public transport, at sites managed by GLC, GLC will ensure that traffic control resources are provided. These resources include:

- Traffic control personnel
- Traffic control vehicle containing:
 - Barrier boards
 - Cones/ bollards
 - Flashing arrow
 - Signs
 - Spill kit

GLC will report all traffic incidents to Sydney Metro, the Transport Management Centre (13 17 00), M4 West Connex Motorway Control Centre (02) 9595 9600, and Customer Journey Planning.

4.4 On Site Contacts

Site contacts are shown below in table 7.

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Table 7 - Site contacts

Name	Position	Organisation	Contact #	Email
	Logistic Manager	GLC		
	Traffic Manager	GLC		
	Superintendent	GLC		
	Surface Works Construction Manager	GLC		
	Place Manager	GLC		

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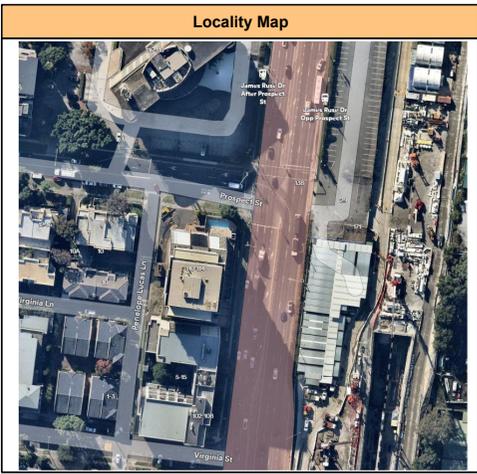


5 APPENDIX 1 – Traffic Guidance Schemes

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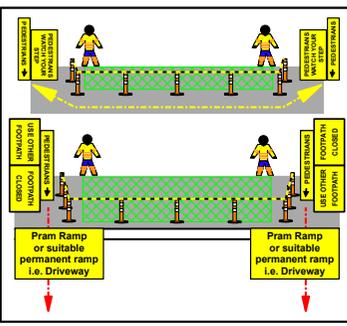




Personnel Requirements	Asset Requirements
Traffic Controllers	3
UTE	1
CONE TRUCK	0
ESAS	0
TMA	0
ESTOP	0
BOOM GATE	0
EXTRA REQUIREMENTS	0

Above requirements are for guidance only as they may change due to unforeseen circumstances

Legend	
	Work Area
	Bollard
	Safety Barrier
	Safety Zone
	Traffic Controller
	Escape Route
	Portable Traffic Signal
	Portaboom
	Barrier Board
	Tiger Tail
	Trailer VMS
	Traffic Cone
	Temporary Bus Stop
	Open Bus stop
	Closed Bus stop
	Arrowboard
	Sign Cover
	Existing Signs
	Traffic Flow
	Traffic Flow
	Pedestrian Flow
	TMA
	Cone Truck
	Work Vehicle
	Police Car
	VMS Vehicle
	Traffic Vehicle

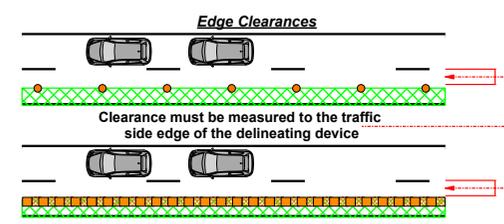


Pedestrian / Cyclist Note: Crossing location must consider site conditions including sight distance, number of lanes, traffic volumes, traffic speed, numbers of pedestrians

Pedestrian Management Options Analysis			
Options Available	THROUGH	PAST	AROUND
Options Selected		Selected	

Cyclist Management Options Analysis			
Options Available	THROUGH	PAST	AROUND
Options Selected		Selected	

Traffic Management Options Analysis			
OPTION	DESCRIPTION	METHOD TYPE	TGS SELECTED
AROUND	Vehicles detoured via existing road network or sidetrack	Full road closure / One-way road closure / Detour	
PAST	Vehicles past delineated work zones	Lateral Shift	
		Shoulder closure	
		Contraflow (2 way traffic maintained)	
		Single or Multi Lane Closure	Selected
THROUGH	Vehicles through work zone	Temporary Road Closure / Hold & Release / Local Traffic Access / Pilot Vehicle	
		Single Lane Shuttle Flow	



Edge of traffic lane to:	Edge Clearance
Line of traffic cones or bollards	- 0.5 m for traffic speeds less than 65 km/h - 1.0 m for traffic speeds greater than 65 km/h
Barrier boards, temporary guide posts or temporary hazard markers	- 1.0 m
Road safety barrier system	- 0.3 m for traffic speeds less than 45 km/h - 0.5 m for traffic speeds 45 to 65 km/h - 1.0 m for traffic speeds 65 to 85 km/h - 2.0 m for traffic speeds greater than 85 km/h

Dimension "D" (Main Roads)	70,50,30	metres
Dimension "D" (Minor Roads)	30,15	metres

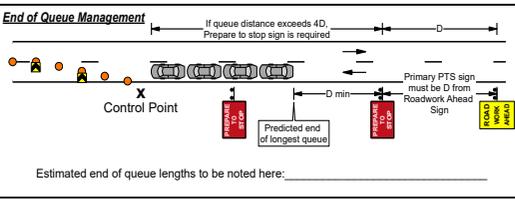
Taper Lengths			
Approximate speed of traffic	Traffic control at beginning of taper	Lateral shift taper	Merge taper
45 or less	15	15	15
46 - 55	15	15	30
56 - 65	30	30	60
66 - 75	N/A	70	115
76 - 85	N/A	80	130
86 - 95	N/A	90	145
96 - 105	N/A	100	160
> 105	N/A	110	180

Speed (km/h)	Distance between tapers (m)
45 or less	10
46 to 55	25
56 to 65	70
Greater than 65	1.5 x Speed Limit (D)

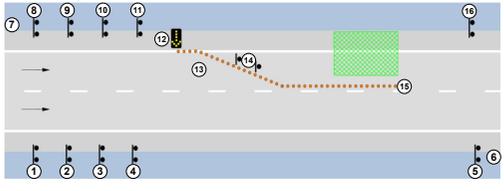
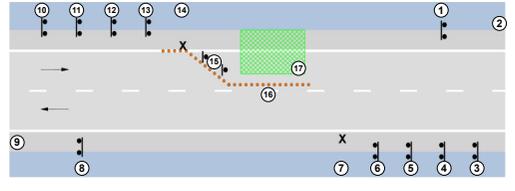
Delineation Spacing		
Purpose & Usage	Speed zone of device location km/h	Maximum Spacing m
On approach to a traffic controller position (center line or edge line)	All cases	4
Merge Tapers	55 to 75 Greater than 76	9 12
Lateral shift tapers	55 to 75 Greater than 76	12 18
Protecting freshly painted lines	56 to 75 Greater than 76	24 60
All other purposes	less than or equal to 55 26 to 75 greater than 76	4 12 18

TGS Verification Checklist:		
Verified By:	Position:	Signature:
Qualification:	Expiry / Issue Date:	Date of Verification:

Traffic Guidance Scheme Modifications:		
Modified By:	Qualification Number:	
Expiry / Issue Date:	Signature:	Date of Modification:
Modification Notes:		



Installation & Removal of Signs & Devices	
<p>Two-lane, two-way roads: The sequence of installation should be as illustrated in the following order: 1: Install the termination signs when initially leaving work area, 'End Road Work/speed reinstatement' (affected direction). 2: Use the existing road network to turn where safe to do so. 3 to 7: Place approach signs in unaffected direction, including the PTCD (traffic controller to remain with the PTCD). 8: Install 'End Road Work/speed reinstatement' (unaffected direction). 9: Use the existing road network to turn where safe to do so. 10 to 14: Place approach signs in the affected direction, including the PTCD (traffic controller to remain with PTCD). 15 and 16: Traffic controller/s to stop traffic and taper/lane closure delineation implemented. 17: ITCP qualified person completes drive around to confirm TGS is installed as designed.</p>	<p>Multi-lane roads: The sequence of installation should be as illustrated in the following order: 1: Locate advance warning vehicle and TMA to shadow sign installation vehicle. 2 to 5: Install advance warning signs in unaffected lane. 6: Install 'End Roadwork/speed reinstatement'. 7: Use the existing road network to turn where safe to do so. 8: Locate advance warning vehicle and TMA to shadow sign installation vehicle. 9 to 12: Install advance warning signs in obstructed (affected) lane. 13: Install 'Flashing Arrow' and delineation devices on approach to start of taper. 14: Position TMA in travel lane to shadow installation of taper. 14 and 15: Install taper and delineation devices to form taper, safety buffer and past work area. 16: Install 'End Roadwork/speed reinstatement'. 17: Use the existing road network to turn where safe to do so. 18: TMA positioned to shadow work area. 19: ITCP qualified person completes drive around to confirm TGS is installed as designed.</p>



Sign spacing requirements		
Number of signs	Approach Speed	
	less than 65 km/h	65 km/h or greater
One advanced sign	D	2D
Multiple advanced signs	D	D

ALTERNATE SIGN SPACING	
Dimension 'D': AGTTM: A distance expressed in metres, determined in accordance with Table 2.2 and used for positioning of advance signs. To be considered if TCAWS dimension "D" cannot be provided due to site conditions.	
Speed of Traffic - km/h	Dimension - m
55 or less	15
56 to 65	45
Greater than 65	speed of traffic, in Km/h

Issue	Desg	Appd	Date & Time	Amendment Description
01	PI	IS	19/06/2024 12:30	Original Issue
02				
03				
04				
05				

TGS Name & Number:	LGP - 111691 - GLC 192 - James Ruse Dr Rosehill
Works Location:	29 James Ruse Drive, Rosehill (Racecourse Carpark)
Project Name:	Sydney Metro Western Tunneling
Project Description:	Kerb Side Barrier Installation

TGS Designed By:	PWZTMP:	Exp: N/A	Signature:	Date of Approval:	Page 1 / 6
TGS Approved By:	PWZTMP:	Exp: N/A	Signature:	19/06/2024	
Client Company:	Gamuda Australia	Client:			
Client Contact:	Contact Number:				

TGS Risk Assessment

Hierarchy of Controls

- Eliminate the hazard altogether.
eg. Road closures.
- Substitute the hazard with a safer alternative.
eg. Using PTCs instead of stop bats.
- Isolate the hazard from anyone who could be harmed.
eg. Drop zones for clients works in elevated work zones.
- Use engineering controls to reduce the risk.
eg. The use of traffic control devices to protect work area.
- Use administrative controls to reduce the risk.
eg. Ensure personnel are trained in their field.
- Use PPE.
eg. Wearing gloves while manual handling.



Step 1 - Consequence (impact)					Fatality	Health & Injury	Environ	Quality
Negligible (1)	Minor (2)	Moderate (3)	Major (4)	Severe (5)				
First Aid Treatment	Medical Treatment	Last Time Injury	Permanent Impairment Injury					
Very minor injury that requires no treatment or simple first aid	Injury / illness, which requires medical treatment and may temporarily restrict a persons capacity to work	Injury / illness, which temporarily restricts a persons ability to work in any capacity	Injury / illness, which permanently alters a persons future (eg. Spinal injury, amputation or death)					
Short term damage	Limited but medium term damage	Significant but recoverable ecological damage	Heavy ecological damage, costly restoration	Permanent widespread ecological damage				
Brief delay / slight impact on service delivery	Local or worksite specific impact on service delivery or customer satisfaction	Temporary impact on service delivery or customer satisfaction at a local event / project level	Serious impact on service delivery or customer satisfaction at a state client or large project level	Long term or very severe impact on service delivery or customer satisfaction resulting in loss of business nationally				

Step 3 - The risk rating is where the consequence and the probability intersect

Step 2 - Probability	Almost Certain (5)	Likely (4)	Possible (3)	Unlikely (2)	Rare (1)	Step 3 - Risk Rating					
						Moderate (8)	High (16)	High (18)	High (21)	Extreme (25)	
	The threat can be expected to occur 75% - 99%	The threat will quite commonly occur 50% - 75%	The threat may occur occasionally 20% - 50%	The threat could infrequently occur 10% - 25%	The threat may occur exceptionally infrequently 0% - 10%	Common / Frequent Occurrence	More than 1 event per month	More than 1 event per year	1 event per 1 to 10 years	1 event per 10 to 100 years	Less than 1 event per 100 years

Item #	Worksite Component	Potential Hazard	Initial Risk	Present	Control Measures	Residual Risk			
			C	P	R	C	P	R	
1.0	TGS Drawn / implemented by unqualified person or organization	TGS Drawn / implemented by unqualified person or organization	5	3	23	Y	4	1	13
Departures									
2.0	Stop bat used instead of PTC	Traffic controller hit by vehicle	5	4	24	NA	4	2	14
Advanced Warning									
3.0	VMS	Motorist collides with VMS, motorist confused by VMS	4	4	20	N	3	2	11
3.1	Long Term Works	Confused motorist collides with worker	4	4	20	Y	3	3	12
3.2	Delays or Queue extends beyond advanced warning signs	Motorist collides with end of queue	4	4	20	Y	4	2	14
3.3	Changed traffic conditions (eg Slippery surface, no lines, changed line marking, banned turning movements, detours)	Motorist loses control, is confused, or attempts a banned manoeuvre causing MVA	4	4	20	Y	3	2	11

Item #	Worksite Component	Potential Hazard	Initial Risk			Present	Control Measures	Residual Risk		
			C	P	R			C	P	R
3.4	After care	Inadequate signage resulting in motorist losing control and crashing or motorist becomes frustrated due to inappropriate signage	4	4	20	N	Always: - Install RWA (T1-1) if diverting traffic along a sidetrack, detour, or unexpected conditions, such as loose stones or the absence of line marking - Cover any signs that are not applicable - Erect Condition signs in accordance with TCWS Manual - Provide delineation or temporary line marking - Aftercare speed limit to suit road conditions	3	3	12
3.5	Poor sight distance or speed compliance or Approach speed > 85km/h, or multi lane roads with traffic volume > 10,000vpd	Speeding vehicle doesn't have time to react and fails to negotiate merge taper	5	4	24	N	Always: - Install RW 1km Ahead if approach speed is > 85km/h or sight distance is less than 150m - Use 700mm cones where traffic speed is greater than 75km/h - Use 900mm cones on high speed to high volume roads (e.g., expressway) or on any work site where increased visibility is required - Duplicate Lane status sign. Consider: - Installing RWA (T1-1) - Increasing taper lengths - Increasing the number of advance warning signage installed - Increasing the size of signage installed - Need for duplication of signs.	4	2	14
3.6	Side Roads	Vehicles enters work site from a side road and collides with workers	3	4	17	Y	- Always install advance warning signage for vehicles entering from side road in advance of the work site.	3	2	11
3.7	Temporary Speed Zone	Motorist travelling too fast for the conditions causing MVA	5	4	24	Y	- Ensure speed zones are designed in accordance with TCAWS, AS1742.3 and AGTTM. - Ensure speed zoning is consistent with the work activity and road environment. - Consider the use of speed radar VMS to monitor traffic speeds and advise motorists. - Review the TGS and adjust where possible to enhance traffic calming through the work site.	4	2	14
Transition										
4.0	Lane closure	Motorist fails to negotiate taper and collides with worker, vehicle or plant	5	4	24	Y	Always: - Install taper lengths and cones in accordance with TCAWS Manual - Install & duplicate/repeat Lane Status Sign (T2-6-1 or 2) on multi lane roads - Use a minimum of 2 temporary hazard markers (T5-4 or 5) on tapers - Install a 30m minimum buffer zone at the end of tapers - Check setup before commencing work - Consider using a shadow vehicle (or vehicles) with flashing lights to protect workers - Ensure appropriate site distance to start of taper	4	2	14
Work Area										
5.0	Traffic Control	Motorist not concentrating or speeding collides with end of queue or traffic controller	5	4	24	Y	- Design and implement TGS in accordance with TCAWS, AS1742.3 and AGTTM. - Ensure all relevant traffic management personnel involved in the design and implementation of the TGS are certified as competent persons to perform the traffic management tasks they are required to undertake. - Conduct regular inspections in accordance with TCAWS, AS1742.3 and AGTTM. - Rectify any deficiencies as a matter of urgency. - Review traffic controls to suit changes in site conditions.	4	2	14
5.1	Working adjacent to travel lane	Motorist collides with worker, vehicle or plant	4	4	20	Y	Always: - Install workman T1-5 sign if workers on road - Space cones in accordance with TCAWS Manual - Check setup before commencing work - Reduce speed based on lateral clearance between the work area and travel lane Consider: - Using a shadow vehicle(s) with flashing lights to protect workers - Using spotters with workers - Using safety barriers	4	2	14
General										
6.0	Night work	Due to poor visibility motorist collides with end of queue, worker, vehicle or plant	5	4	20	Y	- Consider providing portable lighting to ensure traffic controllers are visible and ensure the positions of any temporary lighting are clearly shown on the TGS & always use applicable night PPE.	4	2	14
6.1	Wind / Rain / Fog / Obstructions	Rain/fog reduces visibility and causes road to be slippery increasing risk of a collision with workers, plant or other traffic Wind blows over signs Vehicle parks in front of sign	5	4	20	Y	- Always monitor weather and traffic - Always regularly check setup to ensure signs are visible. If visibility has been obstructed, consider shifting signs, duplication, or repetition. - Consider additional advance warning signage - Liaise with client to reconsider setup or continuation of works	3	3	12
6.2	Vehicle Movements	Plant collides with motorist, workers, or other plant	4	3	19	Y	Always: - Ensure positive communications Consider: - Using Traffic Control and/or Spotters to manage work vehicles - Installation of exclusion Zones - Preparing a VMP where required.	3	3	12
6.3	Pedestrians and Cyclists	Pedestrian and/or cyclist enters the work zone or travel lane and is hit by vehicle or plant	4	5	21	Y	- Ensure TGS design caters for all road users including pedestrians and cyclists. - Always clearly delineate the work area. - Do not obstruct pedestrian and cyclists travel paths with traffic control signs and devices. - Consider the use of additional warning and guidance signage for pedestrians, cyclists and motorists. - Comply with shoulder and lane width criteria in the design of the TGS. - Consider the use of traffic control at crossing points especially where contra-flow arrangements are in place. - Consider the use of additional traffic controllers to monitor and assist pedestrian and cyclist movements where required. - Ensure the use of existing or temporary ramps for crossing points. - Undertake consultation to determine existing travel paths, desire lines, volumes, and types of users.	4	2	14

Issue	Desg	Appd	Date & Time	Amendment Description	TGS Name & Number:	TGS Designed By:	PWZTMP:	Exp: N/A	Signature:	Date of Approval:	Page 2 / 6
01	PI	IS	19/06/2024 12:30	Original Issue	LGP - 116191 - GLC 192 - James Ruse Dr Rosehill					19/06/2024	
02					Works Location:	Client Company:					
03					29 James Ruse Drive, Rosehill (Racecourse Carpark)	Gamuda Australia					
04					Project Name:	Client Contact:	Contact Number:				
05					Sydney Metro Western Tunneling						
					Project Description:						
					Kerb Side Barrier Installation						
Scale: 1 : 750											
Original Size A3											
Lack Group acknowledges the traditional owners of country throughout Australia and recognises their continuing connection to land, waters and community. We pay our respect to them and their cultures; and to elders both past and present.											



Item #	Worksite Component	Potential Hazard	Initial Risk			Present	Control Measures	Residual Risk		
			C	P	R			C	P	R
6.4	Bus stops	Bus unable to pull up safely causing MVA	3	3	12	N	- Consider notifying bus companies that operate in the area - Always provide adequate provision for buses or carry out work at night when buses aren't operating - Where temporary bus stops are created, ensure buses are able to meet the curb - Ensure TGS clearly shows affected stops - Traffic controllers to manage and assist where safe and possible	2	2	5
6.5	Property accesses - commercial or private	Collisions due to property access restrictions	3	4	17	Y	- Consider staging work outside of business hours - Create physical barrier to prevent traffic entering site & driveways	2	2	5
6.6	Excavations within work area	Errant vehicle drives into excavation	5	4	25	N	- For excavations shallower than 0.5m and within 3m of the edge of traffic lane, delineate the excavation with plastic mesh fencing, barrier boards placed perpendicular to the traffic flow or cones/bollards. - For excavations deeper than 0.5m and within 3m of the edge of traffic lane, a temporary safety barrier must be installed. When traffic is greater than 3m from the excavation, the requirement for a temporary safety barrier should be considered based on a documented risk assessment. - Where the excavation is deeper than 200mm, is open for more than 2 weeks and the distance from the edge of traffic lane is less than 3m for 60km/h, 6m for 80km/h and 9m for 100km/h, a temporary safety barrier must be installed.	4	2	14
6.7	Parking	Parked vehicle or worker exiting vehicle hit by passing vehicle	4	4	20	Y	- Always check adequate parking is available for workers and visitors - Consider providing safe parking within the work area	4	2	14
6.8	Concurrent Works	Motorist confused by conflicting signs causing MVA	3	4	17	Y	- Always establish communication with other site if possible - Always cover any conflicting signs and adjust TGS as necessary - Complete conflict checks where required	3	3	12
6.9	Heavy Vehicles and OSOM Vehicles	HV cannot travel past work site without knocking over delineation	4	4	20	Y	- Comply with shoulder and lane width criteria in the design of the TGS. - During the design of the TGS, check vehicle swept path where necessary to ensure the largest known vehicle travelling through the work site can negotiate the changed traffic conditions. - Traffic controllers to communicate with heavy vehicle and OSOM drivers to warn and guide them through the work site as required. - Traffic control to monitor heavy vehicle movements and if required, make adjustments to the signs and devices within approved tolerances. If more significant changes are required, liaise with Client/Supervisor and arrange for TGS to be reviewed and modified by the designer.	4	2	14
Dynamic Works										
7.0	General Traffic	Motorists speeding / not concentrating / tired / distracted. Not having enough time to merge causing MVA	5	5	25	N	- Always use a minimum 1 AWW and consider the use of a 2nd AWW. - Consider use of TMA on higher speed roads >85km - Use speed reduction best suited to work activity and road environment - Use applicable AW signage displayed on AWW - Ensure sight distances between AWW, shadow vehicles are clearly labelled on TGS - Ensure 20-40m buffer zone between shadow vehicle and work vehicle. No less than 40m when using a TMA as a shadow vehicle - Positive communications to be held at all times - Workers to remain shadowed at all times - Monitor traffic queues on all road configurations, convoy to clear roadway if required until traffic has cleared	4	2	14

Item	Additional Control Measures
8.0	
9.0	
10.0	
11.0	
Item	Departures: State the departure and reason for departure
12.0	
13.0	
14.0	
Departures Sign Off (CLIENT):	
Client Name:	
Client Signature:	Date:

NOTES:
GENERAL NOTES

- This Traffic Guidance Scheme (TGS) is to be used in conjunction with the Traffic Management Plan (TMP) and associated road authority permits and management plans, including Road Occupancy Licence (ROL), vehicle movement plan (VMP) and pedestrian movement plan (PMP) where applicable.
- This TGS has been produced by a Prepare Work Zone Traffic Management Plan (PWZTMP) qualified person in accordance with the requirements of the TNSW Traffic Control at Work Sites manual, Issue 6.1 dated 28 February 2022 (TCAWS 6.1) and with reference to AS1742.3 and AUSTRROADS Guide to Temporary Traffic Management Parts 1 – 10, version 1.1 dated September 2021 (AGTTM).
- This TGS is suitable for ~~short term~~ **long-term** works.
- Lack Group does not accept responsibility for this TGS if it is implemented or modified by external parties.

APPROVALS

- The TGS must be approved for use before implementation.
- Ensure all road authority approvals and associated conditions of approval are met prior to implementing the TGS.

TGS VERIFICATION

- Prior to use on site, the selected or designed TGS must be verified to ensure it is suitable for the works and location by undertaking an inspection of the work site where the TGS will be implemented. The TGS verification must be completed in accordance with TCAWS 6.1, Section 8.1.2 by an Implement Traffic Control Plan (ITCP) or PWZTMP qualified person. Refer Page 1 of this TGS for Site Verification sign-off.

RISK ASSESSMENT

- A desktop risk assessment has been undertaken in developing this TGS. However, when implementing this TGS on site, the site supervisor should undertake a site specific risk assessment to ensure that the TGS has considered and mitigated all identified hazards and risks.

INSTALLATION AND REMOVAL OF SIGNS AND DEVICES

- All traffic management signs and devices prescribed for use in this TGS are in accordance with TCAWS 6.1 with reference to AS1742.3 and AGTTM.
- The TGS must be installed, maintained and removed in a planned and safe manner. The implementation must only be undertaken by an ITCP qualified person.
- All signage shown on this TGS is not to conflict with any long-term existing signage arrangements in the area. If this occurs, cover all conflicting road signage where required.

PLACEMENT OF SIGNS AND DEVICES

- Signs must be properly displayed and securely mounted at all times and within the line of sight of the intended road user. Regulatory and detour signs must be located nearest to the travel edge of the lane. Signs must not be obscured from view, such as by vegetation or parked cars. Obscure other devices from the line of sight of the intended road users; Create a hazard for road workers and road users, including pedestrians and cyclists; Be a hazard that deflects traffic into an undesirable path; Restrict sight distance for drivers entering from side roads or streets, or private driveways; and Be installed using supports that could be a hazard if struck by a vehicle.
- Signs mounted on frames for short-term works should be mounted a minimum 200mm from the ground to the lower edge of the sign.
- Signs mounted on posts for long-term works in open road situations, the underside of the sign must be at least 1.5m above the level of the nearest edge of the travelled path. When installed on a kerb or footpath, the underside of the sign must be at least 2.2m above the level of the nearest edge of the travelled path.

ORIENTATION OF SIGNS

- On the outside of a curve, the sign face must be at 0 degrees, or 'normal to traffic'. On a straight, the sign face must be angled at approximately 5 degrees normal to oncoming traffic and on the inside of a curve, the sign face must be angled at approximately 5 degrees normal to oncoming traffic at 200m preceding the sign.

TOLERANCES

- Local constraints may not allow signage and devices to be placed in accordance with this TGS. Unless stated otherwise on the TGS, the tolerances on the positioning of signs, length of tapers or pavement markings detailed in the TGS is a minimum 10% less and a maximum 25% more than the distances or lengths stated and for the spacing of delineation devices a maximum 10% more than the spacing detailed in the TGS.
- Any variation to the positioning of signs and devices within the approved tolerances must be marked and installed on the TGS held on site, with the name of the person making the changes shown on the TGS.

MODIFYING TGS

- Modifications to a Site Specific or Site Suitable TGS must be approved by a person holding the PWZTMP qualification and must be supported by a TMP or risk assessment to ensure that the TGS has considered and mitigated all identified site specific conditions and risks.
- If it is identified that by implementing the TGS with modifications outside of the approved tolerances it will generate risks, then the works must be stopped (including the implementation of the TGS), the site must be made safe and an updated TGS must be provided by a PWZTMP qualified person prior to works recommencing. Any concerns regarding the suitability of the TGS must be raised with the Site Manager and your immediate Supervisor.

TRAFFIC CONTROLLERS

- The implementation of traffic control must be conducted in line with the hierarchy of controls with the elimination of harm to workers and the travelling public considered in the first instance.
- Where traffic control is required, a portable traffic control device (PTCD) must be used rather than using a manual traffic controller when the existing permanent speed limit is greater than 45 km/h.
- TCAWS 6.1, Section 5.4 provides the conditions under which a manual traffic controller may be used.
- Where PTCDs or traffic controllers are used, approach speeds of traffic must be reduced to less than 65 km/h.
- All persons operating a portable traffic control device or performing manual traffic control must be qualified with 'Traffic Control' training; and authorised by the relevant road authority.

ROAD USER MANAGEMENT

- The needs of specific road users, including travel paths and desire lines, must be considered and managed for the extent of the works to ensure safety and access is maintained. Specific road user groups to be considered include: Pedestrians including high-risk pedestrians such as persons with a disability, children, the elderly or persons using mobility aid devices; Cyclists; Motorcyclists; Heavy Vehicles, including oversized overmass vehicles; Public transport; and Emergency services. The needs of these specific road users have been considered in the design of this TGS, however the needs of all road users should be considered in the site specific risk assessment before implementing the TGS to ensure the TGS is appropriate.
- Road users are to be monitored for the duration of the works. If additional signage and/or devices are required to manage the needs of specific road users, such as pedestrians and cyclists, this would be subject to following the procedure for modifying a TGS.

ACCESS MANAGEMENT

- Access to properties located within the extent of works must be maintained at all times.
- Property access impacted by the works should be identified and addressed in the TGS. Consultation with the property owner/resident must be undertaken prior to implementing the TGS if required.

INCIDENT MANAGEMENT

- The site contractor is to determine the appropriate procedure for incident management where appropriate.
- If an incident occurs within the extent of the traffic control arrangement: Call for assistance if incident requires (emergency services 000 or 112); Notify the work site supervisor or Team Leader immediately of any incident; Maintain effective traffic control, if necessary, relocate the traffic control station to a suitable location clear of any further danger; and Record sufficient notes of the incident, including observations, to complete an incident report.

INSPECTIONS

- Temporary traffic management monitoring activities must be undertaken in all instances where work is being performed or aftercare is in place. This includes day and night times as required. The type of inspections and frequency are to be in accordance with TCAWS 6.1, Section 8.1.1.

REVIEW OF TGS

- Generic TGSs must be reviewed by a PWZTMP qualified person every 12 months so that they remain appropriate. Once reviewed the date and details of the PWZTMP person must be updated on the TGS to ensure persons selecting can confirm currency.
- All active site specific and site suitable TGS are designed for the nominated work activity and are only valid for the time period of works specified on the TGS. They must be reviewed as part of the weekly inspections as detailed in TCAWS 6.1, Section 8.1. If the work activity is intended to be longer than 12 months, then the TGS must be formally reviewed by a PWZTMP qualified person at least every 12 months and issued with the review date and the details of the person undertaking the review.

RECORD KEEPING

- Supervisory personnel are to keep daily records of the TGS implementation including: Site specific risk assessments; Approved TGS used, including versions where modifications or updates have been made; Completed inspection checklists that have been undertaken; Records of traffic related incidents that occurred during the works; and Any other relevant document generated by the process of completing the temporary traffic management works.

60

Hassall St

ROAD WORK AHEAD

Grand Ave

70 m

70

James Ruse Dr

70 m

Pedestrian Bridge

Pedestrian Bridge

Pedestrian Bridge

09

35 m

09

70

James Ruse Dr

70 m

50

Hope St

Joins page 4

Joins page 5

Date of works: Start time of works: End time of works: (24 hour time)

Issue	Desg	Appd	Date & Time	Amendment Description	TGS Name & Number:	TGS Designed By:	PWZTMP:	Exp: N/A	Signature:	Date of Approval:	Page 4 / 6
01	PI	IS	19/06/2024 12:30	Original Issue	LGP - 111691 - GLC 192 - James Ruse Dr Rosehill	TGS Approved By:	PWZTMP:	Exp: N/A	Signature:	19/06/2024	
02					Works Location:	Client Company:			Client:		
03					29 James Ruse Drive, Rosehill (Racecourse Carpark)	Gamuda Australia			GAMUDA		
04					Project Name:	Client Contact:	Contact Number:		LANE O'ROURKE		
05					Sydney Metro Western Tunneling				back group		
					Project Description:						
					Kerb Side Barrier Installation						

Scale: 1 : 750

Original Size A3

Lack Group acknowledges the traditional owners of country throughout Australia and recognises their continuing connection to land, waters and community. We pay our respect to them and their cultures; and to elders both past and present.



50
Hope St

70 m

70 m

70 m

70
James Ruse Dr

50
Weston St

70
James Ruse Dr

115 m Merge Taper

40

35 m

Date of works: _____ Start time of works: _____ End time of works: _____ (24 hour time)

<table border="1"> <thead> <tr> <th>Issue</th> <th>Desg</th> <th>Appd</th> <th>Date & Time</th> <th>Amendment Description</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>PI</td> <td>IS</td> <td>19/06/2024 12:30</td> <td>Original Issue</td> </tr> <tr> <td>02</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>03</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>04</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>05</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Issue	Desg	Appd	Date & Time	Amendment Description	01	PI	IS	19/06/2024 12:30	Original Issue	02					03					04					05					TGS Name & Number: LGP - 111691 - GLC 192 - James Ruse Dr Rosehill		TGS Designed By: _____ PWZTMP: _____ Exp: N/A Signatures: _____ TGS Approved By: _____ PWZTMP: _____ Exp: N/A Signatures: _____		Date of Approval: 19/06/2024		Page 5 / 6	
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70

James Ruse Dr

115 m Merge Taper

35 m

30 m Safety Zone

30 m

Prospect Street

50

70 m

END ROAD WORK 70

ROAD WORK AHEAD

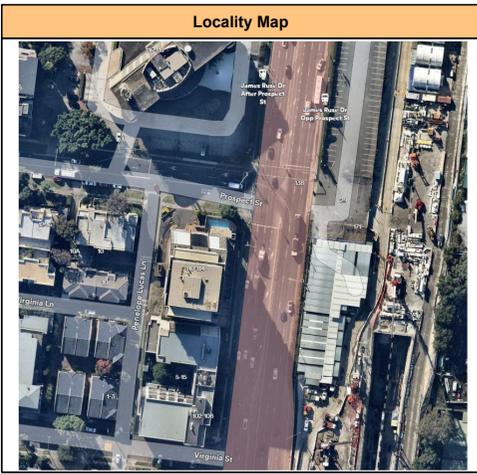
30 m

30 m

Date of works: _____ Start time of works: _____ End time of works: _____ (24 hour time)

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03					Project Name:	Client Contact:	Contact Number:		LANK O'ROURKE		
04					Sydney Metro Western Tunneling				Lack group		
05					Project Description:						
					Scale: 1 : 750 Original Size A3 Lack Group acknowledges the traditional owners of country throughout Australia and recognises their continuing connection to land, waters and community. We pay our respect to them and their cultures; and to elders both past and present.						

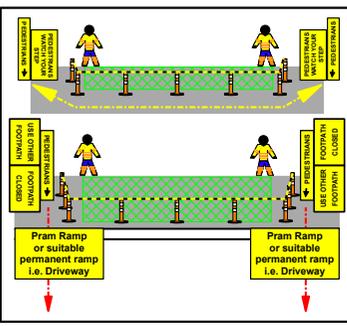




Personnel Requirements	Asset Requirements
Traffic Controllers	4
UTE	1
CONE TRUCK	1
ESAS	0
TMA	0
ESTOP	0
BOOM GATE	0
EXTRA REQUIREMENTS	0

Above requirements are for guidance only as they may change due to unforeseen circumstances

Legend	
	Work Area
	Bollard
	Safety Barrier
	Safety Zone
	Traffic Controller
	Escape Route
	Portable Traffic Signal
	Portaboom
	Barrier Board
	Tiger Tail
	Trailer VMS
	Traffic Cone
	Temporary Bus Stop
	Open Bus stop
	Closed Bus stop
	Arrowboard
	Sign Cover
	Existing Signs
	Traffic Flow
	Pedestrian Flow
	TMA
	Cone Truck
	Work Vehicle
	Police Car
	VMS Vehicle
	Traffic Vehicle

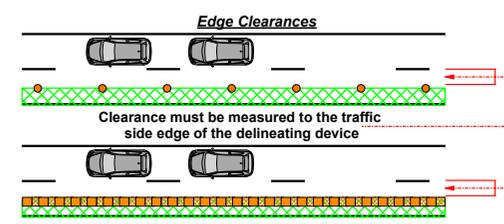


Pedestrian / Cyclist Note: Crossing location must consider site conditions including sight distance, number of lanes, traffic volumes, traffic speed, numbers of pedestrians

Pedestrian Management Options Analysis			
Options Available	THROUGH	PAST	AROUND
Options Selected		Selected	

Cyclist Management Options Analysis			
Options Available	THROUGH	PAST	AROUND
Options Selected		Selected	

Traffic Management Options Analysis			
OPTION	DESCRIPTION	METHOD TYPE	TGS SELECTED
AROUND	Vehicles detoured via existing road network or sidetrack	Full road closure / One-way road closure / Detour	
PAST	Vehicles past delineated work zones	Lateral Shift	
		Shoulder closure	
		Contraflow (2 way traffic maintained)	
		Single or Multi Lane Closure	Selected
THROUGH	Vehicles through work zone	Temporary Road Closure / Hold & Release / Local Traffic Access / Pilot Vehicle	
		Single Lane Shuttle Flow	



Edge of traffic lane to:	Edge Clearance
Line of traffic cones or bollards	- 0.5 m for traffic speeds less than 65 km/h - 1.0 m for traffic speeds greater than 65 km/h
Barrier boards, temporary guide posts or temporary hazard markers	- 1.0 m
Road safety barrier system	- 0.3 m for traffic speeds less than 45 km/h - 0.5 m for traffic speeds 45 to 65 km/h - 1.0 m for traffic speeds 65 to 85 km/h - 2.0 m for traffic speeds greater than 85 km/h

TGS Verification Checklist:

Verified By:	Position:	Signature:
Qualification:	Expiry / Issue Date:	Date of Verification:

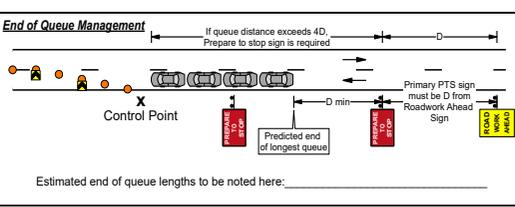
Traffic Guidance Scheme Modifications:

Modified By:	Qualification Number:	
Expiry / Issue Date:	Signature:	Date of Modification:

Modification Notes:

Traffic Guidance Scheme Installation:

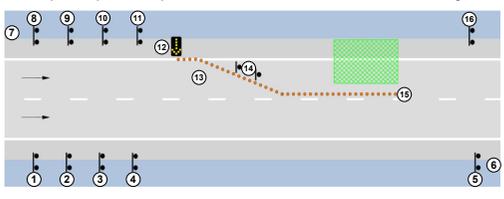
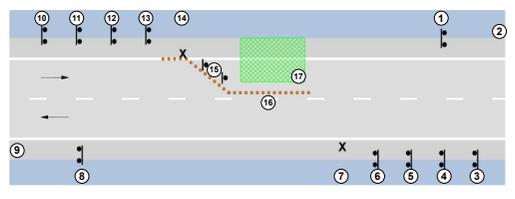
Installed By:	Qualification Number:	
Expiry / Issue Date:	Signature:	Date of Installation:



Installation & Removal of Signs & Devices

Two-lane, two-way roads:
The sequence of installation should be as illustrated in the following order:
1: Install the termination signs when initially leaving work area, 'End Road Work/speed reinstatement' (affected direction).
2: Use the existing road network to turn where safe to do so.
3 to 7: Place approach signs in unaffected direction, including the PTCD (traffic controller to remain with the PTCD).
8: Install 'End Road Work/speed reinstatement' (unaffected direction).
9: Use the existing road network to turn where safe to do so.
10 to 14: Place approach signs in the affected direction, including the PTCD (traffic controller to remain with PTCD).
15 and 16: Traffic controller/s to stop traffic and taper/lane closure delineation implemented.
17: ITCP qualified person completes drive around to confirm TGS is installed as designed.

Multi-lane roads:
The sequence of installation should be as illustrated in the following order:
1: Locate advance warning vehicle and TMA to shadow sign installation vehicle.
2 to 5: Install advance warning signs in unaffected lane.
6: Install 'End Roadwork/speed reinstatement'.
7: Use the existing road network to turn where safe to do so.
8: Locate advance warning vehicle and TMA to shadow sign installation vehicle.
9 to 12: Install advance warning signs in obstructed (affected) lane.
13: Install 'Flashing Arrow' and delineation devices on approach to start of taper.
14: Position TMA in travel lane to shadow installation of taper.
14 and 15: Install taper and delineation devices to form taper, safety buffer and past work area.
16: Install 'End Roadwork/speed reinstatement'.
17: Use the existing road network to turn where safe to do so.
18: TMA positioned to shadow work area.
19: ITCP qualified person completes drive around to confirm TGS is installed as designed.



Dimension "D" (Main Roads)	70,50,30	metres
Dimension "D" (Minor Roads)	30,15	metres

Taper Lengths

Approximate speed of traffic	Traffic control at beginning of taper	Lateral shift taper	Merge taper
45 or less	15	15	15
46 - 55	15	15	30
56 - 65	30	30	60
66 - 75	N/A	70	115
76 - 85	N/A	80	130
86 - 95	N/A	90	145
96 - 105	N/A	100	160
> 105	N/A	110	180

Speed (km/h)	Distance between tapers (m)
45 or less	10
46 to 55	25
56 to 65	70
Greater than 65	1.5 x Speed Limit (D)

Delineation Spacing

Purpose & Usage	Speed zone of device location km/h	Maximum Spacing m
On approach to a traffic controller position (center line or edge line)	All cases	4
Merge Tapers	55 to 75	9
	Greater than 76	12
Lateral shift tapers	55 to 75	12
	Greater than 76	18
Protecting freshly painted lines	56 to 75	24
	Greater than 76	60
All other purposes	less than or equal to 55	4
	26 to 75	12
	greater than 76	18

Sign spacing requirements

Number of signs	Approach Speed	
	less than 65 km/h	65 km/h or greater
One advanced sign	D	2D
Multiple advanced signs	D	D

ALTERNATE SIGN SPACING

Dimension 'D': AGTTM: A distance expressed in metres, determined in accordance with Table 2.2 and used for positioning of advance signs. To be considered if TCAWS dimension "D" cannot be provided due to site conditions.

Speed of Traffic - km/h	Dimension - m
55 or less	15
56 to 65	45
Greater than 65	speed of traffic, in Km/h

Issue	Desg	Appd	Date & Time	Amendment Description	TGS Name & Number:
01	PI	IS	19/06/2024 12:30	Original Issue	LGP - 111691 - GLC 192 - James Ruse Dr Rosehill
02	DK	KD	23/07/2024 13:00	Included additional lane take out as requested	Works Location: 29 James Ruse Drive, Rosehill (Racecourse Carpark)
03					Project Name: Sydney Metro Western Tunneling
04					Project Description: Kerb Side Barrier Installation
05					

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TGS Designed By:	PWZTMP:	Exp: N/A	Signature:	Date of Approval:	Page 1 / 7
TGS Approved By:	PWZTMP:	Exp: N/A	Signature:	23/07/2024	
Client Company:	Gamuda Australia		Client:		
Client Contact:			Contact Number:		

TGS Risk Assessment

Hierarchy of Controls

- Eliminate the hazard altogether.
eg. Road closures.
- Substitute the hazard with a safer alternative.
eg. Using PTCs instead of stop bats.
- Isolate the hazard from anyone who could be harmed.
eg. Drop zones for clients works in elevated work zones.
- Use engineering controls to reduce the risk.
eg. The use of traffic control devices to protect work area.
- Use administrative controls to reduce the risk.
eg. Ensure personnel are trained in their field.
- Use PPE.
eg. Wearing gloves while manual handling.



Step 1 - Consequence (impact)					Health & Safety & Fatality
Negligible (1)	Minor (2)	Moderate (3)	Major (4)	Severe (5)	
First Aid Treatment	Medical Treatment	Last Time Injury	Permanent Impairment Injury	Fatality	
Very minor injury that requires no treatment or simple first aid	Injury / illness, which requires medical treatment and may temporarily restrict a persons capacity to work	Injury / illness, which temporarily restricts a persons ability to work in any capacity	Injury / illness, which permanently alters a persons future (eg. Spinal injury, amputation or death)		
Short term damage	Limited but medium term damage	Significant but recoverable ecological damage	Heavy ecological damage, costly restoration	Permanent widespread ecological damage	
Brief delay / slight impact on service delivery	Local or worksite specific impact on service delivery or customer satisfaction	Temporary impact on service delivery or customer satisfaction at a local event / project level	Serious impact on service delivery or customer satisfaction at a state client or large project level	Long term or very severe impact on service delivery or customer satisfaction resulting in loss of business nationally	

Step 3 - The risk rating is where the consequence and the probability intersect

Step 2 - Probability	Step 3 - Risk Rating			
	Low (1)	Low (2)	Moderate (9)	High (16)
Almost Certain (5)	Moderate (8)	High (16)	High (18)	Extreme (25)
Likely (4)	Moderate (7)	Moderate (10)	High (17)	High (24)
Possible (3)	Low (3)	Moderate (9)	Moderate (12)	High (23)
Unlikely (2)	Low (2)	Low (5)	Moderate (11)	High (22)
Rare (1)	Low (1)	Low (4)	Low (6)	Moderate (13)

Item #	Worksite Component	Potential Hazard	Initial Risk	Present	Control Measures	Residual Risk			
			C	P	R	C	P	R	
1.0	TGS Drawn / implemented by unqualified person or organization	TGS Drawn / implemented by unqualified person or organization	5	3	23	Y	4	1	13
Departures									
2.0	Stop bat used instead of PTC	Traffic controller hit by vehicle	5	4	24	NA	4	2	14
Advanced Warning									
3.0	VMS	Motorist collides with VMS, motorist confused by VMS	4	4	20	N	3	2	11
3.1	Long Term Works	Confused motorist collides with worker	4	4	20	Y	3	3	12
3.2	Delays or Queue extends beyond advanced warning signs	Motorist collides with end of queue	4	4	20	Y	4	2	14
3.3	Changed traffic conditions (eg Slippery surface, no lines, changed line marking, banned turning movements, detours)	Motorist loses control, is confused, or attempts a banned manoeuvre causing MVA	4	4	20	Y	3	2	11

Item #	Worksite Component	Potential Hazard	Initial Risk			Present	Control Measures	Residual Risk		
			C	P	R			C	P	R
3.4	After care	Inadequate signage resulting in motorist losing control and crashing or motorist becomes frustrated due to inappropriate signage	4	4	20	N	Always: - Install RWA (T1-1) if diverting traffic along a sidetrack, detour, or unexpected conditions, such as loose stones or the absence of line marking - Cover any signs that are not applicable - Erect Condition signs in accordance with TCWS Manual - Provide delineation or temporary line marking - Aftercare speed limit to suit road conditions	3	3	12
3.5	Poor sight distance or speed compliance or Approach speed > 85km/h, or multi lane roads with traffic volume > 10,000vpd	Speeding vehicle doesn't have time to react and fails to negotiate merge taper	5	4	24	N	Always: - Install RW 1km Ahead if approach speed is > 85km/h or sight distance is less than 150m - Use 700mm cones where traffic speed is greater than 75km/h - Use 900mm cones on high speed to high volume roads (e.g., expressway) or on any work site where increased visibility is required - Duplicate Lane status sign. Consider: - Installing RWA (T1-1) - Increasing taper lengths - Increasing the number of advance warning signage installed - Increasing the size of signage installed - Need for duplication of signs.	4	2	14
3.6	Side Roads	Vehicles enters work site from a side road and collides with workers	3	4	17	Y	- Always install advance warning signage for vehicles entering from side road in advance of the work site.	3	2	11
3.7	Temporary Speed Zone	Motorist travelling too fast for the conditions causing MVA	5	4	24	Y	- Ensure speed zones are designed in accordance with TCAWS, AS1742.3 and AGTTM. - Ensure speed zoning is consistent with the work activity and road environment. - Consider the use of speed radar VMS to monitor traffic speeds and advise motorists. - Review the TGS and adjust where possible to enhance traffic calming through the work site.	4	2	14
Transition										
4.0	Lane closure	Motorist fails to negotiate taper and collides with worker, vehicle or plant	5	4	24	Y	Always: - Install taper lengths and cones in accordance with TCAWS Manual - Install & duplicate/repeat Lane Status Sign (T2-6-1 or 2) on multi lane roads - Use a minimum of 2 temporary hazard markers (T5-4 or 5) on tapers - Install a 30m minimum buffer zone at the end of tapers - Check setup before commencing work - Consider using a shadow vehicle (or vehicles) with flashing lights to protect workers - Ensure appropriate site distance to start of taper	4	2	14
Work Area										
5.0	Traffic Control	Motorist not concentrating or speeding collides with end of queue or traffic controller	5	4	24	Y	- Design and implement TGS in accordance with TCAWS, AS1742.3 and AGTTM. - Ensure all relevant traffic management personnel involved in the design and implementation of the TGS are certified as competent persons to perform the traffic management tasks they are required to undertake. - Conduct regular inspections in accordance with TCAWS, AS1742.3 and AGTTM. - Rectify any deficiencies as a matter of urgency. - Review traffic controls to suit changes in site conditions.	4	2	14
5.1	Working adjacent to travel lane	Motorist collides with worker, vehicle or plant	4	4	20	Y	Always: - Install workman T1-5 sign if workers on road - Space cones in accordance with TCAWS Manual - Check setup before commencing work - Reduce speed based on lateral clearance between the work area and travel lane Consider: - Using a shadow vehicle(s) with flashing lights to protect workers - Using spotters with workers - Using safety barriers	4	2	14
General										
6.0	Night work	Due to poor visibility motorist collides with end of queue, worker, vehicle or plant	5	4	20	Y	- Consider providing portable lighting to ensure traffic controllers are visible and ensure the positions of any temporary lighting are clearly shown on the TGS & always use applicable night PPE.	4	2	14
6.1	Wind / Rain / Fog / Obstructions	Rain/fog reduces visibility and causes road to be slippery increasing risk of a collision with workers, plant or other traffic Wind blows over signs Vehicle parks in front of sign	5	4	20	Y	- Always monitor weather and traffic - Always regularly check setup to ensure signs are visible. If visibility has been obstructed, consider shifting signs, duplication, or repetition. - Consider additional advance warning signage - Liaise with client to reconsider setup or continuation of works	3	3	12
6.2	Vehicle Movements	Plant collides with motorist, workers, or other plant	4	3	19	Y	Always: - Ensure positive communications Consider: - Using Traffic Control and/or Spotters to manage work vehicles - Installation of exclusion Zones - Preparing a VMP where required.	3	3	12
6.3	Pedestrians and Cyclists	Pedestrian and/or cyclist enters the work zone or travel lane and is hit by vehicle or plant	4	5	21	Y	- Ensure TGS design caters for all road users including pedestrians and cyclists. - Always clearly delineate the work area. - Do not obstruct pedestrian and cyclists travel paths with traffic control signs and devices. - Consider the use of additional warning and guidance signage for pedestrians, cyclists and motorists. - Comply with shoulder and lane width criteria in the design of the TGS. - Consider the use of traffic control at crossing points especially where contra-flow arrangements are in place. - Consider the use of additional traffic controllers to monitor and assist pedestrian and cyclist movements where required. - Ensure the use of existing or temporary ramps for crossing points. - Undertake consultation to determine existing travel paths, desire lines, volumes, and types of users.	4	2	14

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					Kerb Side Barrier Installation						
Scale: 1 : 750											
Original Size A3											
Lack Group acknowledges the traditional owners of country throughout Australia and recognises their continuing connection to land, waters and community. We pay our respect to them and their cultures; and to elders both past and present.											

Item #	Worksite Component	Potential Hazard	Initial Risk			Present	Control Measures	Residual Risk		
			C	P	R			C	P	R
6.4	Bus stops	Bus unable to pull up safely causing MVA	3	3	12	N	- Consider notifying bus companies that operate in the area - Always provide adequate provision for buses or carry out work at night when buses aren't operating - Where temporary bus stops are created, ensure buses are able to meet the curb - Ensure TGS clearly shows affected stops - Traffic controllers to manage and assist where safe and possible	2	2	5
6.5	Property accesses - commercial or private	Collisions due to property access restrictions	3	4	17	Y	- Consider staging work outside of business hours - Create physical barrier to prevent traffic entering site & driveways	2	2	5
6.6	Excavations within work area	Errant vehicle drives into excavation	5	4	25	N	- For excavations shallower than 0.5m and within 3m of the edge of traffic lane, delineate the excavation with plastic mesh fencing, barrier boards placed perpendicular to the traffic flow or cones/bollards. - For excavations deeper than 0.5m and within 3m of the edge of traffic lane, a temporary safety barrier must be installed. When traffic is greater than 3m from the excavation, the requirement for a temporary safety barrier should be considered based on a documented risk assessment. - Where the excavation is deeper than 200mm, is open for more than 2 weeks and the distance from the edge of traffic lane is less than 3m for 60km/h, 6m for 80km/h and 9m for 100km/h, a temporary safety barrier must be installed.	4	2	14
6.7	Parking	Parked vehicle or worker exiting vehicle hit by passing vehicle	4	4	20	Y	- Always check adequate parking is available for workers and visitors - Consider providing safe parking within the work area	4	2	14
6.8	Concurrent Works	Motorist confused by conflicting signs causing MVA	3	4	17	Y	- Always establish communication with other site if possible - Always cover any conflicting signs and adjust TGS as necessary - Complete conflict checks where required	3	3	12
6.9	Heavy Vehicles and OSOM Vehicles	HV cannot travel past work site without knocking over delineation	4	4	20	Y	- Comply with shoulder and lane width criteria in the design of the TGS. - During the design of the TGS, check vehicle swept path where necessary to ensure the largest known vehicle travelling through the work site can negotiate the changed traffic conditions. - Traffic controllers to communicate with heavy vehicle and OSOM drivers to warn and guide them through the work site as required. - Traffic control to monitor heavy vehicle movements and if required, make adjustments to the signs and devices within approved tolerances. If more significant changes are required, liaise with Client/Supervisor and arrange for TGS to be reviewed and modified by the designer.	4	2	14
Dynamic Works										
7.0	General Traffic	Motorists speeding / not concentrating / tired / distracted. Not having enough time to merge causing MVA	5	5	25	N	- Always use a minimum 1 AWW and consider the use of a 2nd AWW. - Consider use of TMA on higher speed roads >85km - Use speed reduction best suited to work activity and road environment - Use applicable AW signage displayed on AWW - Ensure sight distances between AWW, shadow vehicles are clearly labelled on TGS - Ensure 20-40m buffer zone between shadow vehicle and work vehicle. No less than 40m when using a TMA as a shadow vehicle - Positive communications to be held at all times - Workers to remain shadowed at all times - Monitor traffic queues on all road configurations, convoy to clear roadway if required until traffic has cleared	4	2	14

Item	Additional Control Measures
8.0	
9.0	
10.0	
11.0	
Item	Departures: State the departure and reason for departure
12.0	
13.0	
14.0	
Departures Sign Off (CLIENT):	
Client Name:	
Client Signature:	
Date:	

NOTES:
GENERAL NOTES

- This Traffic Guidance Scheme (TGS) is to be used in conjunction with the Traffic Management Plan (TMP) and associated road authority permits and management plans, including Road Occupancy Licence (ROL), vehicle movement plan (VMP) and pedestrian movement plan (PMP) where applicable.
- This TGS has been produced by a Prepare Work Zone Traffic Management Plan (PWZTMP) qualified person in accordance with the requirements of the TNSW Traffic Control at Work Sites manual, Issue 6.1 dated 28 February 2022 (TCAWS 6.1) and with reference to AS1742.3 and AUSTRROADS Guide to Temporary Traffic Management Parts 1 – 10, version 1.1 dated September 2021 (AGTTM).
- This TGS is suitable for ~~short term~~ / ~~long term~~ works.
- Lack Group does not accept responsibility for this TGS if it is implemented or modified by external parties.

APPROVALS

- The TGS must be approved for use before implementation.
- Ensure all road authority approvals and associated conditions of approval are met prior to implementing the TGS.

TGS VERIFICATION

- Prior to use on site, the selected or designed TGS must be verified to ensure it is suitable for the works and location by undertaking an inspection of the work site where the TGS will be implemented. The TGS verification must be completed in accordance with TCAWS 6.1, Section 8.1.2 by an Implement Traffic Control Plan (ITCP) or PWZTMP qualified person. Refer Page 1 of this TGS for Site Verification sign-off.

RISK ASSESSMENT

- A desktop risk assessment has been undertaken in developing this TGS. However, when implementing this TGS on site, the site supervisor should undertake a site specific risk assessment to ensure that the TGS has considered and mitigated all identified hazards and risks.

INSTALLATION AND REMOVAL OF SIGNS AND DEVICES

- All traffic management signs and devices prescribed for use in this TGS are in accordance with TCAWS 6.1 with reference to AS1742.3 and AGTTM.
- The TGS must be installed, maintained and removed in a planned and safe manner. The implementation must only be undertaken by an ITCP qualified person.
- All signage shown on this TGS is not to conflict with any long-term existing signage arrangements in the area. If this occurs, cover all conflicting road signage where required.

PLACEMENT OF SIGNS AND DEVICES

- Signs must be properly displayed and securely mounted at all times and within the line of sight of the intended road user. Regulatory and detour signs must be located nearest to the travel edge of the lane. Signs must not be obscured from view, such as by vegetation or parked cars. Obscure other devices from the line of sight of the intended road users; Create a hazard for road workers and road users, including pedestrians and cyclists; Be a hazard that deflects traffic into an undesirable path; Restrict sight distance for drivers entering from side roads or streets, or private driveways; and Be installed using supports that could be a hazard if struck by a vehicle.
- Signs mounted on frames for short-term works should be mounted a minimum 200mm from the ground to the lower edge of the sign.
- Signs mounted on posts for long-term works in open road situations, the underside of the sign must be at least 1.5m above the level of the nearest edge of the travelled path. When installed on a kerb or footpath, the underside of the sign must be at least 2.2m above the level of the nearest edge of the travelled path.

ORIENTATION OF SIGNS

- On the outside of a curve, the sign face must be at 0 degrees, or 'normal to traffic'. On a straight, the sign face must be angled at approximately 5 degrees normal to oncoming traffic and on the inside of a curve, the sign face must be angled at approximately 5 degrees normal to oncoming traffic at 200m preceding the sign.

TOLERANCES

- Local constraints may not allow signage and devices to be placed in accordance with this TGS. Unless stated otherwise on the TGS, the tolerances on the positioning of signs, length of tapers or pavement markings detailed in the TGS is a minimum 10% less and a maximum 25% more than the distances or lengths stated and for the spacing of delineation devices a maximum 10% more than the spacing detailed in the TGS.
- Any variation to the positioning of signs and devices within the approved tolerances must be marked and installed on the TGS held on site, with the name of the person making the changes shown on the TGS.

MODIFYING TGS

- Modifications to a Site Specific or Site Suitable TGS must be approved by a person holding the PWZTMP qualification and must be supported by a TMP or risk assessment to ensure that the TGS has considered and mitigated all identified site specific conditions and risks.
- If it is identified that by implementing the TGS with modifications outside of the approved tolerances it will generate risks, then the works must be stopped (including the implementation of the TGS), the site must be made safe and an updated TGS must be provided by a PWZTMP qualified person prior to works recommencing. Any concerns regarding the suitability of the TGS must be raised with the Site Manager and your immediate Supervisor.

TRAFFIC CONTROLLERS

- The implementation of traffic control must be conducted in line with the hierarchy of controls with the elimination of harm to workers and the travelling public considered in the first instance.
- Where traffic control is required, a portable traffic control device (PTCD) must be used rather than using a manual traffic controller when the existing permanent speed limit is greater than 45 km/h.
- TCAWS 6.1, Section 5.4 provides the conditions under which a manual traffic controller may be used.
- Where PTCDs or traffic controllers are used, approach speeds of traffic must be reduced to less than 65 km/h.
- All persons operating a portable traffic control device or performing manual traffic control must be qualified with 'Traffic Control' training; and authorised by the relevant road authority.

ROAD USER MANAGEMENT

- The needs of specific road users, including travel paths and desire lines, must be considered and managed for the extent of the works to ensure safety and access is maintained. Specific road user groups to be considered include: Pedestrians including high-risk pedestrians such as persons with a disability, children, the elderly or persons using mobility aid devices; Cyclists; Motorcyclists; Heavy Vehicles, including oversized overmass vehicles; Public transport; and Emergency services. The needs of these specific road users have been considered in the design of this TGS, however the needs of all road users should be considered in the site specific risk assessment before implementing the TGS to ensure the TGS is appropriate.
- Road users are to be monitored for the duration of the works. If additional signage and/or devices are required to manage the needs of specific road users, such as pedestrians and cyclists, this would be subject to following the procedure for modifying a TGS.

ACCESS MANAGEMENT

- Access to properties located within the extent of works must be maintained at all times.
- Property access impacted by the works should be identified and addressed in the TGS. Consultation with the property owner/resident must be undertaken prior to implementing the TGS if required.

INCIDENT MANAGEMENT

- The site contractor is to determine the appropriate procedure for incident management where appropriate.
- If an incident occurs within the extent of the traffic control arrangement: Call for assistance if incident requires (emergency services 000 or 112); Notify the work site supervisor or Team Leader immediately of any incident; Maintain effective traffic control, if necessary, relocate the traffic control station to a suitable location clear of any further danger; and Record sufficient notes of the incident, including observations, to complete an incident report.

INSPECTIONS

- Temporary traffic management monitoring activities must be undertaken in all instances where work is being performed or aftercare is in place. This includes day and night times as required. The type of inspections and frequency are to be in accordance with TCAWS 6.1, Section 8.1.1.

REVIEW OF TGS

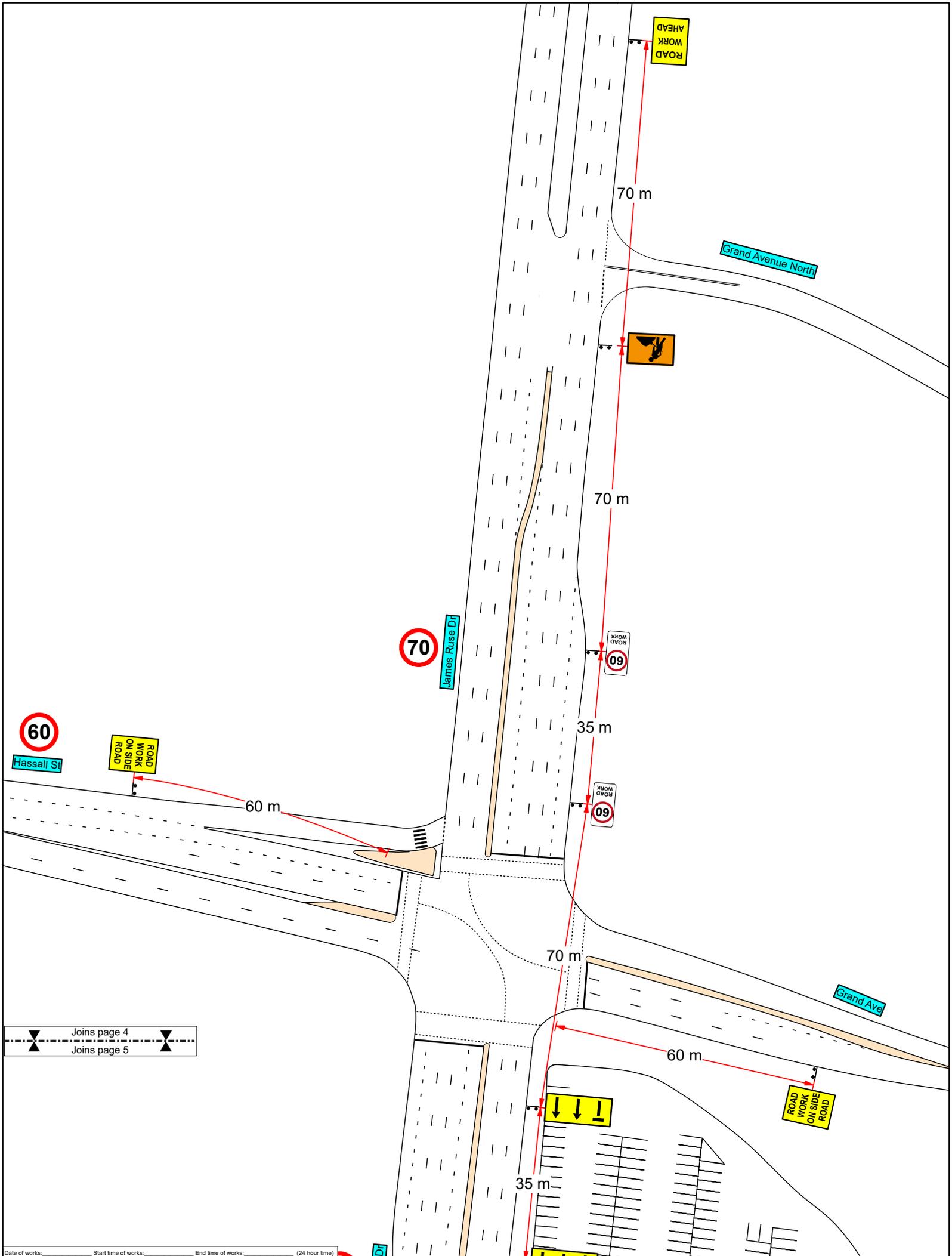
- Generic TGSs must be reviewed by a PWZTMP qualified person every 12 months so that they remain appropriate. Once reviewed the date and details of the PWZTMP person must be updated on the TGS to ensure persons selecting can confirm currency.
- All active site specific and site suitable TGS are designed for the nominated work activity and are only valid for the time period of works specified on the TGS. They must be reviewed as part of the weekly inspections as detailed in TCAWS 6.1, Section 8.1. If the work activity is intended to be longer than 12 months, then the TGS must be formally reviewed by a PWZTMP qualified person at least every 12 months and issued with the review date and the details of the person undertaking the review.

RECORD KEEPING

- Supervisory personnel are to keep daily records of the TGS implementation including: Site specific risk assessments; Approved TGS used, including versions where modifications or updates have been made; Completed inspection checklists that have been undertaken; Records of traffic related incidents that occurred during the works; and Any other relevant document generated by the process of completing the temporary traffic management works.

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Scale: 1 : 750			Original Size A3		Lack Group acknowledges the traditional owners of country throughout Australia and recognises their continuing connection to land, waters and community. We pay our respect to them and their cultures; and to elders both past and present.						





60

Hassall St

ROAD WORK ON SIDE ROAD

60 m

70

James Ruse Dr

70 m

ROAD WORK AHEAD

Grand Avenue North

70 m

60

35 m

60

70 m

Grand Ave

60 m

ROAD WORK ON SIDE ROAD

35 m

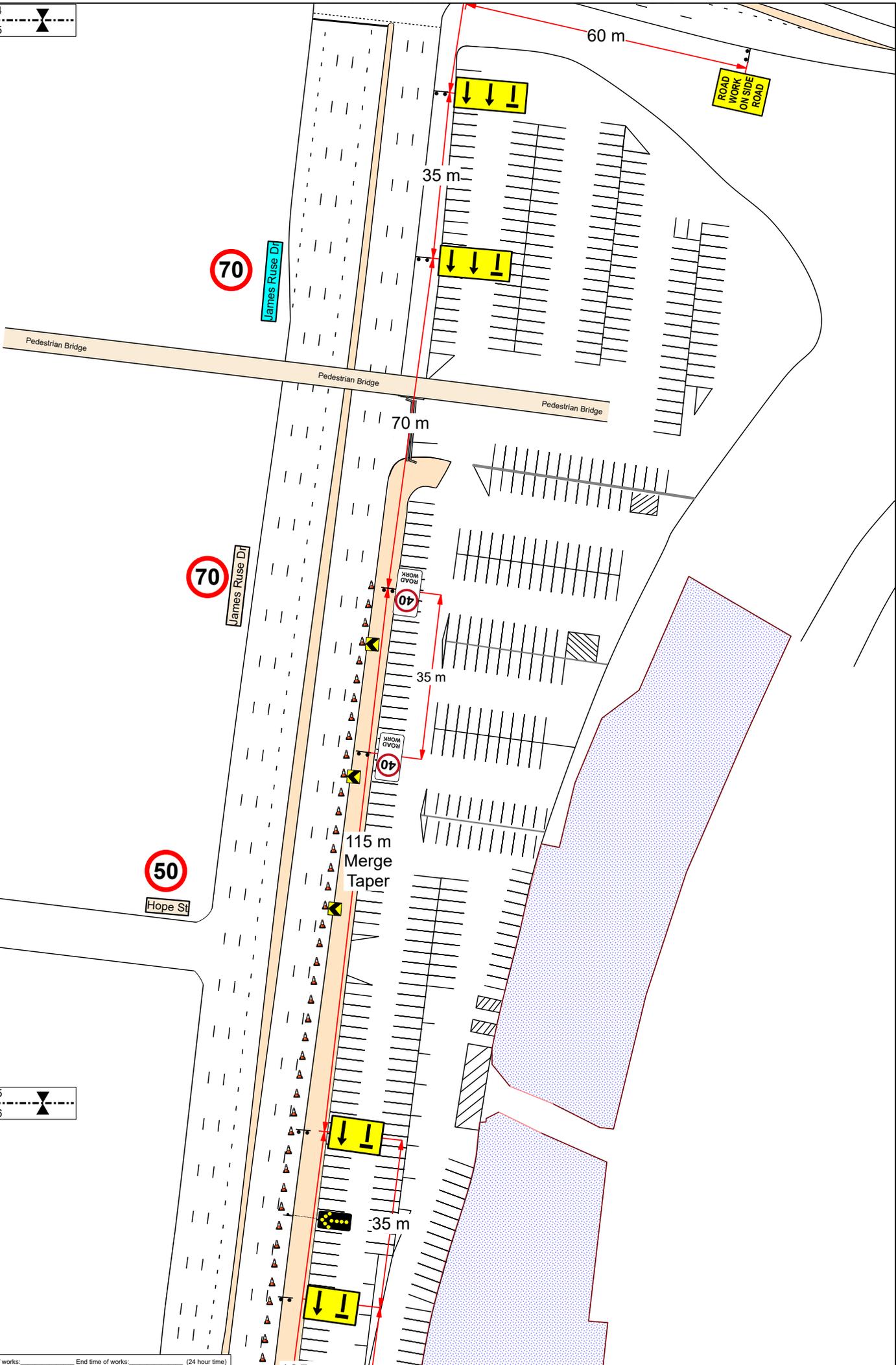
ROAD WORK

Joins page 4
Joins page 5

Date of works: Start time of works: End time of works: (24 hour time)

<table border="1"> <thead> <tr> <th>Issue</th> <th>Desg</th> <th>Appd</th> <th>Date & Time</th> <th>Amendment Description</th> </tr> </thead> <tbody> <tr> <td>01</td> <td>PI</td> <td>IS</td> <td>19/06/2024 12:30</td> <td>Original Issue</td> </tr> <tr> <td>02</td> <td>DK</td> <td>KD</td> <td>23/07/2024 13:00</td> <td>Included additional lane take out as requested</td> </tr> <tr> <td>03</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>04</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>05</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Issue	Desg	Appd	Date & Time	Amendment Description	01	PI	IS	19/06/2024 12:30	Original Issue	02	DK	KD	23/07/2024 13:00	Included additional lane take out as requested	03					04					05					<p>TGS Name & Number: LGP - 111691 - GLC 192 - James Ruse Dr Rosehill</p> <p>Works Location: 29 James Ruse Drive, Rosehill (Racecourse Carpark)</p> <p>Project Name: Sydney Metro Western Tunneling</p> <p>Project Description: Kerb Side Barrier Installation</p>				<p>TGS Designed By: TGS Approved By:</p> <p>Client Company: Gamuda Australia</p> <p>Client Contact: Contact Number:</p>				<p>PWZTMP: Exp: N/A Signature</p> <p>PWZTMP: Exp: N/A Signature</p> <p>Client: GAMUDA Australia</p>				<p>Date of Approval: 23/07/2024</p> <p>Page 4 / 7</p>			
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Date of works: _____ Start time of works: _____ End time of works: _____ (24 hour time)

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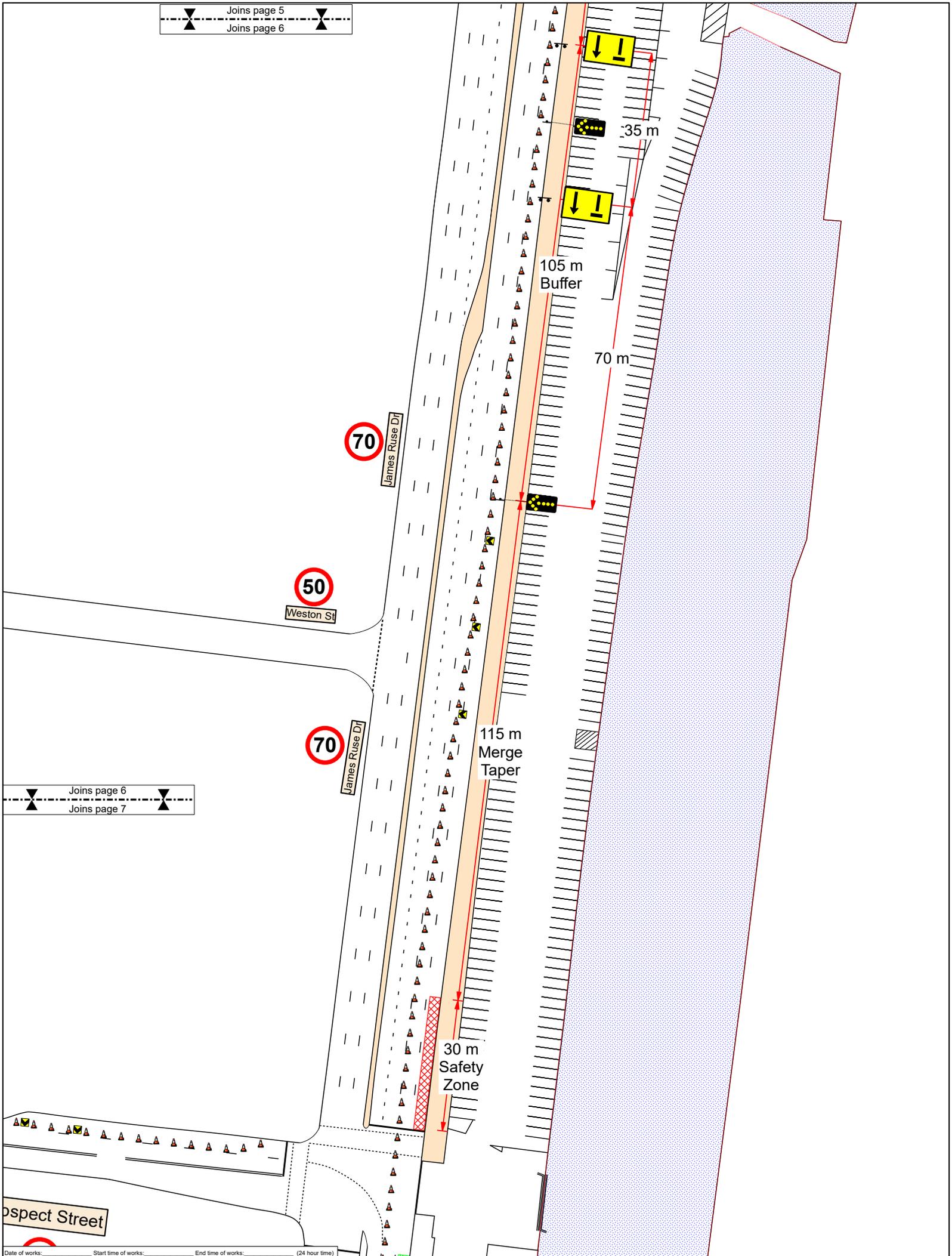
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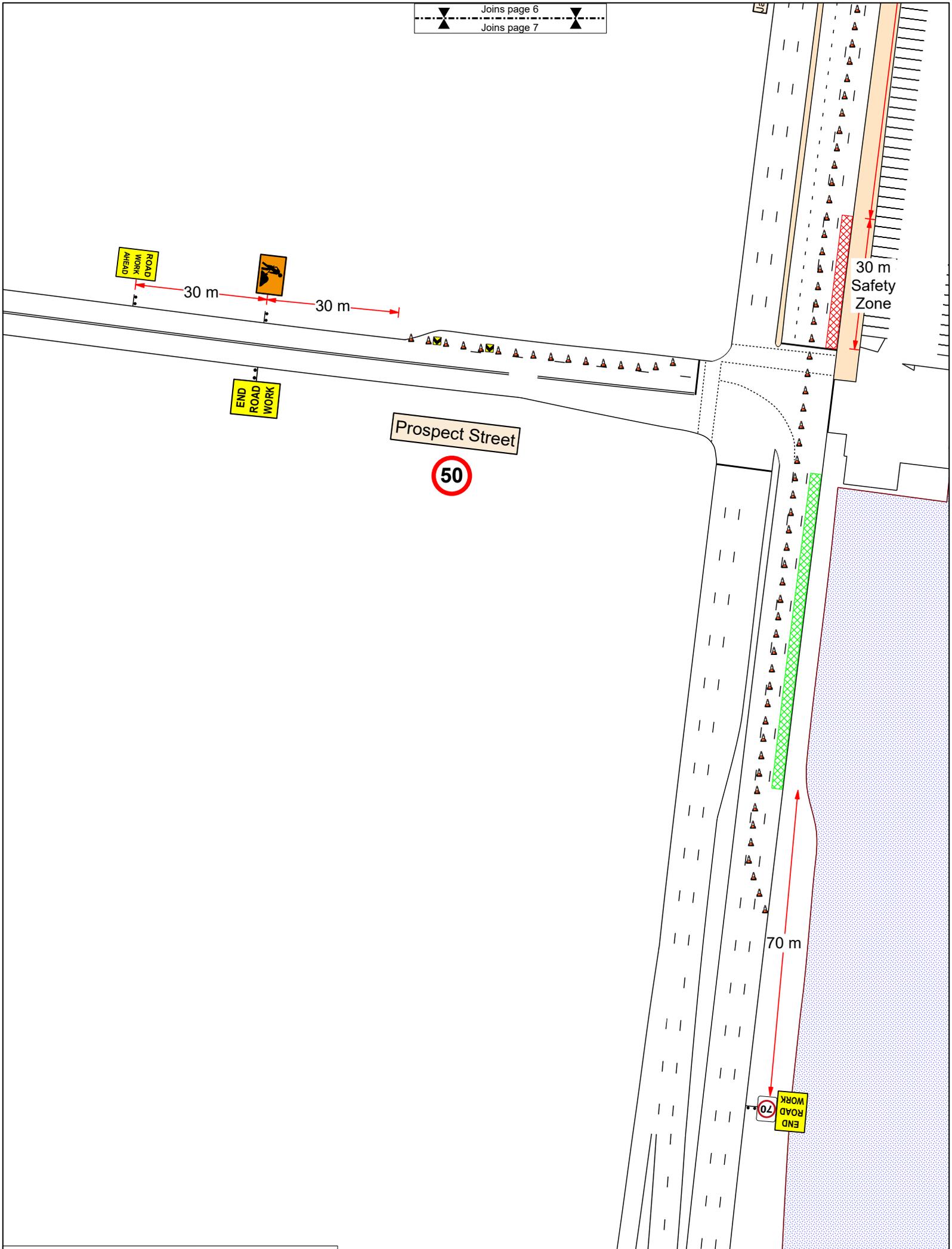
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TGS Approved By:	PWZTMP:	Exp: N/A	Signature:	23/07/2024	
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Client Contact:			Contact Number:	Lack Group	



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Issue	Desg	Appd	Date & Time	Amendment Description	TGS Name & Number:	TGS Designed By:	PWZTMP:	Exp: N/A	Signature:	Date of Approval:	Page 6 / 7
01	PI	IS	19/06/2024 12:30	Original Issue	LGP - 111691 - GLC 192 - James Ruse Dr Rosehill	TGS Approved By:	PWZTMP:	Exp: N/A	Signature:	23/07/2024	
02	DK	KD	23/07/2024 13:00	Included additional lane take out as requested	Works Location:	Client Company:	Gamuda Australia	Client:	GAMUDA		
03					Project Name:	Client Contact:	Contact Number:				
04					Sydney Metro Western Tunneling						
05					Project Description:						
					Kerb Side Barrier Installation						



Date of works: _____ Start time of works: _____ End time of works: _____ (24 hour time)

Issue	Desg	Appd	Date & Time	Amendment Description	TGS Name & Number:	TGS Designed By:	PWZTMP:	Exp: N/A	Signature:	Date of Approval:	Page 7 / 7
01	PI	IS	19/06/2024 12:30	Original Issue	LGP - 111691 - GLC 192 - James Ruse Dr Rosehill	TGS Approved By:	PWZTMP:	Exp: N/A	Signature:	23/07/2024	
02	DK	KD	23/07/2024 13:00	Included additional lane take out as requested	Works Location:	Client Company:	Gamuda Australia	Client:	GAMUDA		
03					Project Name:	Client Contact:	Contact Number:				
04					Sydney Metro Western Tunneling						
05					Project Description:						
					Kerb Side Barrier Installation						



6 APPENDIX 2 – Road Safety Audit

REVISION NO: B
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23/10/2024
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PRE-CONSTRUCTION – DETAILED DESIGN ROAD SAFETY AUDIT

GAMUDA AND LAING O'ROURKE CONSORTIUM
JAMES RUSE DRIVE BARRIER INSTALLATION



Civlink Consulting Pty Ltd
ABN 64 633 194 948



**PRE-CONSTRUCTION – DETAILED DESIGN –
ROAD SAFETY AUDIT**

GAMUDA AND LAING O’ROURKE CONSORTIUM
JAMES RUSE DRIVE BARREIR INSTALLATION



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PRE-CONSTRUCTION – DETAILED DESIGN – ROAD SAFETY AUDIT



GAMUDA AND LAING O'ROURKE CONSORTIUM

JAMES RUSE DRIVE BARREIR INSTALLATION

Document Control

Title:	Description
Ref No.:	20240725 – GLC – WTP – RSA 0007 - 00
Description:	Pre-construction road safety audit on the changes in Rosehill Racecourse area along James Ruse Drive. Works will include installation of temporary concrete barriers to protect Rosehill Site Compound Offices at the Clyde Drive Site.

Role	Name	Position	Date	Signed
Author:	[REDACTED]	Level 3 Road Safety Auditor	25.07.2024	[REDACTED]

Document Revisions

No.	Date	Issue / Description
00	25.07.2024	ORIGINAL ISSUE

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PRE-CONSTRUCTION – DETAILED DESIGN – ROAD SAFETY AUDIT

GAMUDA AND LAING O’ROURKE CONSORTIUM
JAMES RUSE DRIVE BARREIR INSTALLATION



Executive Summary

Audited Project:	Sydney Metro – Western Tunnel Package
Audit for:	Gamuda Australia and Laing O'Rourke Consortium (Western Tunnel Package)
Email Address:	[REDACTED]
Clients Contact:	[REDACTED]
Auditors:	[REDACTED] (Level 3 Road Safety Auditor – ID:0908), Director / Senior Civil Engineer – Civlink Consulting Pty Ltd [REDACTED] (Level 2 Road Safety Auditor). Traffic Manager – Civlink Consulting Pty Ltd [REDACTED] (Level 0 Road Safety Auditor) Traffic Engineer – Civlink Consulting Pty Ltd
Audit Type:	Pre-construction Detailed Design - Road Safety Audit
Commencement Meeting:	23 rd July 2024
Site Visit:	The day inspection was approximately 4pm on Monday the 12 th of July, with the night inspection being undertaken at approximately 9pm on Friday the 12 th of July
Completion Meeting:	To be advised
Previous Audit:	15 th July 2024 – Unwin Street Permanent Diversion Completion

PRE-CONSTRUCTION – DETAILED DESIGN – ROAD SAFETY AUDIT

GAMUDA AND LAING O'ROURKE CONSORTIUM
JAMES RUSE DRIVE BARREIR INSTALLATION



1. Introduction

1.1 Purpose of Audit

This report presents findings of a detailed design road safety audit. The audit involved reviewing the design documentation provided for the planned changes to Rosehill Racecourse area of works as part of the Western Tunnel Package construction works for the Sydney Metro West projects.

The audit is conducted to verify the manifestation of the documentation and planning for works within road related areas, and within the specified area affected by the project works. The audit scrutinizes the 'safe system' approach to road design and the traffic management planning, targeting roadside hazards including (but not limited to) signage and pavement marking, pedestrian & cyclists' facilities, delineation, sight distances, intersection controls and safety barriers.

The site being audited covers the areas affected by changes, including the placement of temporary concrete barriers along James Ruse Drive. The area that is the subject of this audit is the red area shown in Figure 1, below;

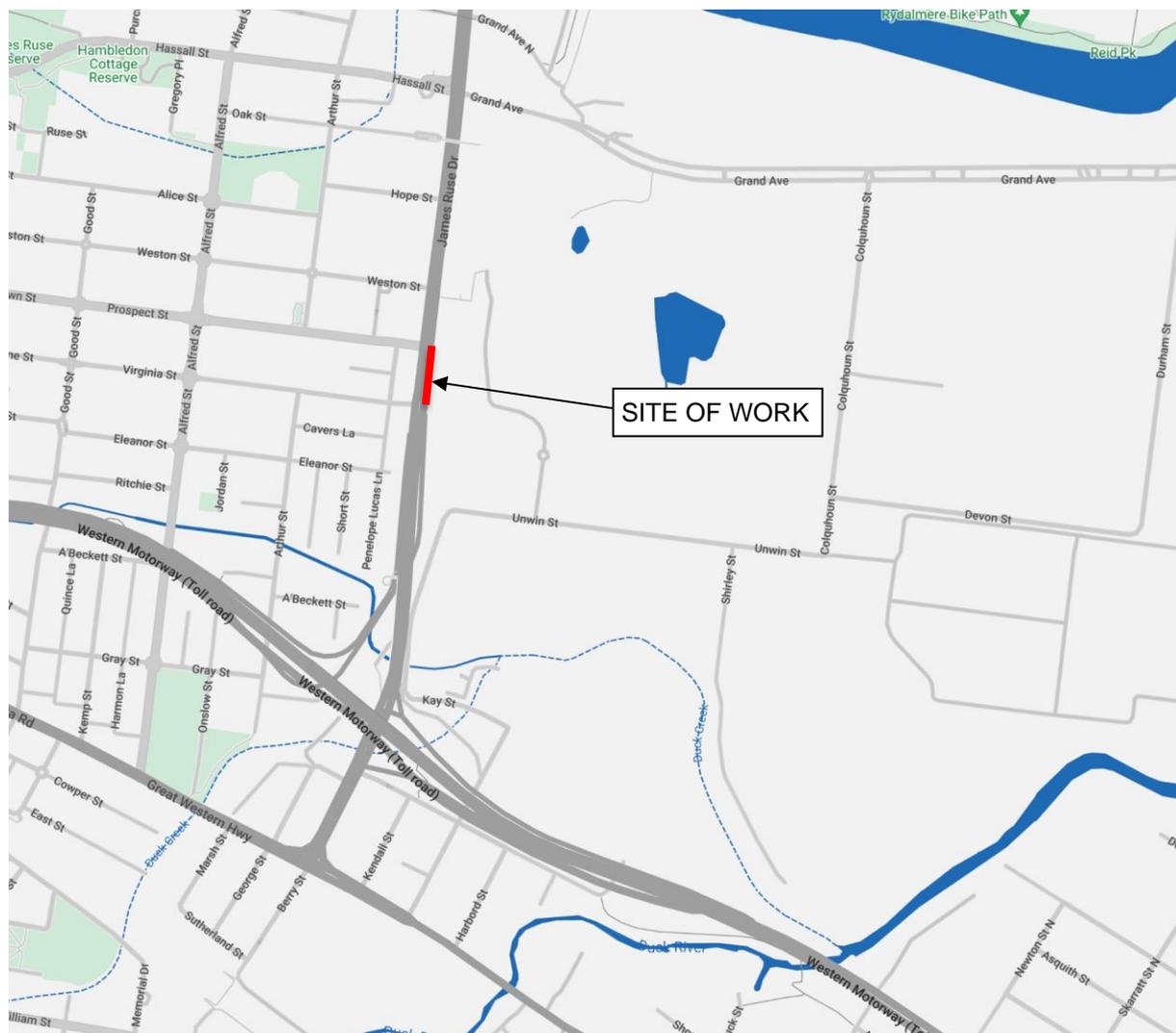


Figure 1: Road Safety Audit Scope [Google.com]

PRE-CONSTRUCTION – DETAILED DESIGN – ROAD SAFETY AUDIT

GAMUDA AND LAING O'ROURKE CONSORTIUM

JAMES RUSE DRIVE BARREIR INSTALLATION



1.2 Audit Objectives

The objective of this road safety audit was to identify relevant road safety deficiencies in the site which, if addressed, would improve safety for road users.

The other objectives of this Roadworks Road Safety Audit were to:

- Check the compatibility between the traffic management's safety features and the functional classification of the roads.
- Identify any design feature's that can, either now or with time, create a traffic safety issue.
- identify additional design's features at the site that pose a safety hazard or risk to any of the road users
- Determine the extent of the deficiencies in the design, considering all road user groups.

1.3 Procedures and reference material

The procedures used are those in the Austroads Guide to Road Safety Part 6: Road Safety Audit (2022) and RTA Guidelines for Road Safety Audit Practices 2011.

Technical reference documents for Traffic Guidance Schemes is the Traffic Control at Worksites Manual (TCAWS) Version 6.1, 2021.

1.4 Audit Team

This Audit Team consisted of:

- a) [REDACTED] Consulting Director / Traffic Manager / Senior Civil Engineer). [REDACTED] is a registered Road Safety Auditor with the Institute of Public Works Engineers Australia, NSW and Senior auditor in both VIC & QLD. [REDACTED] is a registered Level 3 Road Safety Auditor in NSW.
- b) [REDACTED] Consulting / Traffic Manager.) [REDACTED] has worked in the traffic management sector across Qld and NSW for 17 years with experience in civil design and temporary traffic management. [REDACTED] is registered Level 2 road safety auditor in NSW
- c) [REDACTED] Consulting / Traffic Engineer). [REDACTED] has 5 years construction and traffic experience on Australian major construction projects including the M4-M8 Link Tunnels and Warringah Freeway Upgrade. [REDACTED] has completed Road Safety Auditor training is working towards level one accreditation.

1.5 Statement of Independence

The audit team are independent from the design team and have not been involved in the development of the traffic strategies selected for implementation on this project and site. The audit has been carried out independently of the design team in accordance with Austroads Guide to Road Safety; Part 6 – Road Safety Audit and NSW Centre for Road Safety: Guidelines for Road Safety Audit Practices.

2. Road Safety Audit Program

2.1 Commencement Meeting

On Monday the 23rd of July 2024 an email requesting an audit be conducted on the proposed changes to James Ruse Drive in Rosehill Racecourse area.

The email was received from [REDACTED] requesting a pre-construction audit be conducted on the provided design for barrier installation along James Ruse Drive in Rosehill Racecourse area in

PRE-CONSTRUCTION – DETAILED DESIGN – ROAD SAFETY AUDIT

GAMUDA AND LAING O'ROURKE CONSORTIUM

JAMES RUSE DRIVE BARREIR INSTALLATION

Parramatta as part of the Western Tunnel Package construction works. The audit was to be conducted by [REDACTED] Lead Road Safety Auditor (Civlink Consulting) with the assistance of [REDACTED]



2.2 Completion meeting

Project representatives are to advise of the need for a Completion meeting.

2.3 Responding to the audit report

The responsibility for the design and implementation of this project rests with the client's project management team, not with the auditors. The project manager is under no obligation to accept the audit findings. Also, it is not the role of the auditor to agree or to approve the project manager's responses to the audit. Rather, the audit provides the opportunity to highlight potential road safety problems and have them formally considered by the project manager or design manager in conjunction with all other project considerations.

2.4 Corrective action response

The road safety audit is a formal process. The road safety audit report is by no means the end of the audit process. The audit report documents the audit teams' identified concerns made to improve the safety of the roads. This report must be responded to by the client with a written response to each audit finding.

2.5 Disclaimer

The findings and opinions in the report are based on the examination of the site and might not address all concerns existing at the time of the audit. The auditors have endeavoured to identify features of the site that could be modified or removed in order to improve safety, although it must be recognised that safety cannot be guaranteed since no road can be regarded as safe.

The problems identified have been noted in this report and should be considered for improving road safety. Where corrective actions are not taken, this should be reported in writing, providing the reason for the decision. Readers are urged to seek specific advice on matters and not to rely solely on this report. While every effort has been made to ensure the accuracy of this report, it is made available strictly on the basis that everyone relying on it does so at their own risk without any liability to the Auditors.

PRE-CONSTRUCTION – DETAILED DESIGN – ROAD SAFETY AUDIT

GAMUDA AND LAING O’ROURKE CONSORTIUM
JAMES RUSE DRIVE BARREIR INSTALLATION



3. Risk Assessment Approach

This audit identified and rated risks per the Austroads recommendation using the assessment process below. Potential safety hazards were identified and categorised based on the frequency of occurrence and severity (consequence of crash). A preliminary risk rating for each identified issue has been assigned in Section 4 which were determined via a subjective judgement by the Auditor guided by the Austroads “*Guide to Road Safety, Part 6: Road Safety Audit*”.

Austroads’ provides an indication of the level of risk and what response may be appropriate – refer to the tables below.

3.1 Likelihood

Description	
Almost Certain	Occurrence once per quarter
Likely	Occurrence once per quarter to once per year
Possible	Occurrence once per year to once every three years
Unlikely	Occurrence once every three years to once every seven years
Rare	Occurrence less than once every seven years

3.2 Severity

Description	
Insignificant	Property damage
Minor	Minor first aid
Moderate	Major first aid and/or presents to hospital (not admitted)
Serious	Admitted to hospital
Fatal	At scene or within 30 days of the crash

3.3 Risk Rating

		Severity				
		Insignificant	Minor	Moderate	Serious	Fatal
Likelihood	Almost Certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	Extreme	Extreme
	Possible	Low	Medium	High	High	Extreme
	Unlikely	Negligible	Low	Medium	High	Extreme
	Rare	Negligible	Negligible	Low	Medium	High

3.4 Treatment

Risk	Suggested treatment approach
Negligible	No action required
Low	Should be corrected or the risk reduced if the treatment cost is low
Medium	Should be corrected or the risk significantly reduced, if the treatment cost is moderate but not high
High	Should be corrected or the risk significantly reduced, even if the treatment cost is high
Extreme	Must be corrected regardless of cost

PRE-CONSTRUCTION – DETAILED DESIGN - ROAD SAFETY AUDIT

GAMUDA AND LAING O’ROURKE CONSORTIUM
 JAMES RUSE DRIVE BARREIR INSTALLATION



4. Audit Findings

No.	Location	Description of Deficiency / Observation	Risk level
1	Design Report – SMWSTWTP-GLO-CLJ- TF-PLN-	Barrier setout and detail shown within CTMP nomimate short lengths of barriers that do not meet the minimum barrier length as setout in Austroads Safety Barrier Technical Conditions for Use. Failing to meet minmum requirements as setout by the manufacture or a condition of there use may see the barrier perform in an unexpectde way and potentially increasing the severfity of an incident if struck by a vehicle during an incident.	Likelihood – Unlikely Severity – Minor Risk Rating – Low
2	Design Report – SMWSTWTP-GLO-CLJ- TF-PLN-	Table 4 Barreir design statement outlines design variations that include an increased dynamic deflection with barrier lenghts less then that setout in Austroads Safety Barrier Technical Conditions for Use. It is unclear how this adjustment was completed and no risk assessment attached for changes to barrier dynamic defelction.	<u>Note Only</u>
3	Design Report – SMWSTWTP-GLO-CLJ- TF-PLN-	Trailing run of barriers described as 30.0m ending opposite Virginia St are setout 1.5m from the back of existing kerb on James Ruse Drive. An errant vehicle during an incident may strike the existing barrier kerb and be vaulted into the air striking the barrier much higher then expected or not in a way expected during testing. The barrier may perform poorly, fail to a catch errant vehilce or push the barrier over following a strike much higher than original testing may have allowed for.	Likelihood – Unlikely Severity – Minor Risk Rating – Low
4	Design Report – SMWSTWTP-GLO-CLJ- TF-PLN-	The above situation is repeated at the start of the initial barrier run.	<u>Note Only</u>
5	Design Report – SMWSTWTP-GLO-CLJ- TF-PLN-	Figure 5 – Temporary Safety Barrier Design shows ABSORB M terminal been installed. Austroads Safety Barrier Technical Conditions for Use states as a system condition Installation on tob of a kerb is not recommended. Installation of end terminals outside of manufacturers specification and not inline with acceptance documents may see the severity on an incident increase if it was to occur.	Likelihood – Unlikely Severity – Minor Risk Rating – Low

PRE-CONSTRUCTION – DETAILED DESIGN - ROAD SAFETY AUDIT

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6 Design Report –
SMWSTWTP-GLO-CLJ-
TF-PLN-

Figure 5 – Temporary Safety Barrier Design shows ABSORB M terminal been installed. Austroads Safety Barrier Technical Conditions for Use states as a system condition that a 18.5m x 6m that a clear run-out area is required. It noted during the onsite inspection the existing barriers installed at compound area are not protected with an appropriate end terminal. Installation of end terminals outside of manufacturers specification and not inline with acceptance documents may see the severity on an incident increase if it was to occur.

Likelihood – Unlikely

Severity – Minor

Risk Rating – Low

PRE-CONSTRUCTION – DETAILED DESIGN – ROAD SAFETY AUDIT

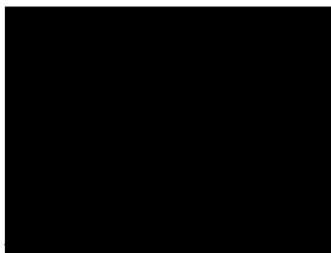
GAMUDA AND LAING O'ROURKE CONSORTIUM
JAMES RUSE DRIVE BARREIR INSTALLATION



5. Conclusion

The report outlines where potential deficiencies have been identified for consideration by the project manager, designer and/or engineer.

The findings and opinions in the report are based on the examination of the site at Rosehill Racecourse as part of the Sydney Metro West construction project. The Auditors have endeavoured to identify features of the design that could be modified or removed to improve safety, although it must be recognised that safety cannot be guaranteed since no road can be regarded as safe. While every effort has been made to ensure the accuracy of this report, it is made available strictly on the basis that anyone relying on it does so at their own risk without any liability to the Auditors.



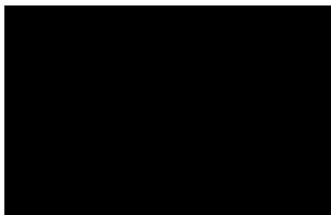
Date: 25.07.2024

Director | Level 3 Road Safety Auditor



Date: 25.07.2024

Traffic Manager | Level 2 Road Safety Auditor



Date: 25.07.2024

Traffic Engineer



Item	Reference	Comment	Client's Response/Action for Resolution	Close out Date																																		
1	Design Report -SMWSTWTP-GLO- CLJ-TF-PLN-	Barrier setout and detail shown within CTMP nominate short lengths of barriers that do not meet the minimum barrier length as setout in Austroads Safety Barrier Technical Conditions for Use. Failing to meet minimum requirements as setout by the manufacture or a condition of their use may see the barrier perform in an unexpected way and potentially increasing the severity of an incident if struck by a vehicle during an incident.	Noted. Site constraints with light poles and negative grade behind kerb dictate placement. Having all barriers at least 1.5m behind kerb creates possible pinch point between lighting post and barriers and any potential impact with pole and barrier may result in lighting poles not collapsing as required if impacted. Barriers will be constantly monitored.	30/07/2024																																		
2	Design Report -SMWSTWTP-GLO- CLJ-TF-PLN-	Table 4 Barrier design statement outlines design variations that include an increased dynamic deflection with barrier lengths less than that setout in Austroads Safety Barrier Technical Conditions for Use. It is unclear how this adjustment was completed and no risk assessment attached for changes to barrier dynamic deflection.	Noted. Table 4 updated to include assessment from Austroads Technical Advice SBTA 23-003 (Working Width for Lower Impact Speeds) <table border="1"> <caption>Table 1: Modification factors for speed-specific working width</caption> <thead> <tr> <th rowspan="2">Barrier Type</th> <th colspan="6">Operating Speed (km/h)</th> </tr> <tr> <th>100</th> <th>90</th> <th>80</th> <th>70</th> <th>60</th> <th>50</th> </tr> </thead> <tbody> <tr> <td>Post and Rail Systems</td> <td>-</td> <td>-</td> <td>0.8</td> <td>0.7</td> <td>0.6</td> <td>0.5</td> </tr> <tr> <td>Temporary Pinned Systems</td> <td>-</td> <td>-</td> <td>0.8</td> <td>0.7</td> <td>0.6</td> <td>0.5</td> </tr> <tr> <td>Temporary Freestanding Systems</td> <td>-</td> <td>-</td> <td>0.8</td> <td>0.85</td> <td>0.5</td> <td>0.35</td> </tr> </tbody> </table> <p>Note: Modification factors based on a 2270 kg vehicle, an impact angle of 25 degrees and an impact speed of 10 km/h more than the posted speed.</p>	Barrier Type	Operating Speed (km/h)						100	90	80	70	60	50	Post and Rail Systems	-	-	0.8	0.7	0.6	0.5	Temporary Pinned Systems	-	-	0.8	0.7	0.6	0.5	Temporary Freestanding Systems	-	-	0.8	0.85	0.5	0.35	30/07/2024
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3	Design Report -SMWSTWTP-GLO- CLJ-TF-PLN-	Trailing run of barriers described as 30.0m ending opposite Virginia St are setout 1.5m from the back of existing kerb on James Ruse Drive. An errant vehicle during an incident may strike the existing barrier kerb and be vaulted into the air striking the barrier much higher than expected or not in a way expected during testing. The barrier may perform poorly, fail to catch errant vehicle or push the barrier over following a strike much higher than original testing may have allowed for.	Noted. TfNSW TCaWS 6.2.3 Use of temporary safety barriers on kerbs - requirements state that installation should be greater than 1.5m behind kerb. The absolute minimum of 1.5m can be met due to negative grade of verge behind kerb.	30/07/2024																																		
4	Design Report -SMWSTWTP-GLO- CLJ-TF-PLN-	The above situation is repeated at the start of the initial barrier run.	As above	30/07/2024																																		
5	Design Report -SMWSTWTP-GLO- CLJ-TF-PLN-	Figure 5 – Temporary Safety Barrier Design shows ABSORB M terminal been installed. Austroads Safety Barrier Technical Conditions for Use states as a system condition installation on top of a kerb is not recommended. Installation of end terminals outside of manufacturer's specification and not inline with acceptance documents may see the severity on an incident increase if it was to occur.	Noted.	30/07/2024																																		
6	Design Report -SMWSTWTP-GLO- CLJ-TF-PLN-	Figure 5 – Temporary Safety Barrier Design shows ABSORB M terminal been installed. Austroads Safety Barrier Technical Conditions for Use states as a system condition that a 18.5m x 6m clear run-out area is required. It is noted during the onsite inspection the existing barriers installed at compound area are not protected with an appropriate end terminal. Installation of end terminals outside of manufacturer's specification and not inline with acceptance documents may see the severity on an incident increase if it was to occur.	Noted. Clear run out areas are not possible due to existing site constraints. Area at start of barriers will be clear of any hazards. As per Austroads SBTA 21-003 (table 1 below) a crash cushion run out area at 70km/h is not required. <table border="1"> <caption>Table 1: Recommended run-out area by terminal type</caption> <thead> <tr> <th>Terminal type</th> <th>Run-out area at 100 km/h</th> <th>Run-out area at 70 km/h</th> </tr> </thead> <tbody> <tr> <td>Guardrail terminal</td> <td>18.5 m x 6 m from PoR</td> <td></td> </tr> <tr> <td>Crash cushion</td> <td>8 m x 12 m from nose</td> <td>Not required</td> </tr> <tr> <td>Wire Rope Safety Barrier</td> <td>18.5 m x 6 m from PoR</td> <td></td> </tr> <tr> <td>Plastic water filled terminal</td> <td>18.5 m x 6 m from nose</td> <td>10 m x 6m from PoR</td> </tr> </tbody> </table>	Terminal type	Run-out area at 100 km/h	Run-out area at 70 km/h	Guardrail terminal	18.5 m x 6 m from PoR		Crash cushion	8 m x 12 m from nose	Not required	Wire Rope Safety Barrier	18.5 m x 6 m from PoR		Plastic water filled terminal	18.5 m x 6 m from nose	10 m x 6m from PoR	30/07/2024																			
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7 APPENDIX 3 – Consultation and Communication

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CONTRACT NO.	DOCUMENT NO.	TITLE	VER	STATUS	NO.	DATE	COMPANY	RAISED BY	REVIEW DOC. NO.	DOCUMENT REF	DEED REF	COMMENTS / RESPONSE	COMMENT CATEGORY	LINKED ITEM NO	CLOSED OUT
WTP	SMWSTWTP-GLO-RSH-TF-PLN-000001	Sydney Metro West - WTP - Construction Traffic Management Plan - James Ruse Drive Barrier Installation, Rosehill	A.01	S3	01	3/09/2024	SKB	[REDACTED]	SMWSTWTP-GLO-RSH-TF-PLN-000001	Appendix 1 - LGP-111691-GLC192-James Ruse Dr (Page 5 of 6)	SM-W-WTP-PS-2647	The requirement SM-W-WTP-PS-2647 states "The Tunnelling Contractor must ensure road works including geometry, pavement, barriers, cycle lanes, kerbs and gutters, footpaths, markings, signage and traffic controls, and layout design comply with the relevant Authorities standards, specifications and guidelines, including: Austroads (internal and external roads)" and has not been met. The indication of traffic cone is missing on TGS Appendix 1 - LGP-111691-GLC192-James Ruse Dr (Page 5 of 6).	Actual Non-Compliance		N
						10/09/2024	GLC		SMWSTWTP-GLO-RSH-TF-PLN-000001	Appendix 1 - LGP-111691-GLC192-James Ruse Dr (Page 5 of 6)	SM-W-WTP-PS-2647	Traffic cones are indicated on the TGS. PDF issue rectified and TGS reattached.	Actual Non-Compliance		N
					02	3/09/2024	SKB		SMWSTWTP-GLO-RSH-TF-PLN-000001	Appendix 1 - LGP-111691-GLC192-James Ruse Dr (REV1)(pg 6of7)	SM-W-WTP-PS-2647	The requirement SM-W-WTP-PS-2647 states "The Tunnelling Contractor must ensure road works including geometry, pavement, barriers, cycle lanes, kerbs and gutters, footpaths, markings, signage and traffic controls, and layout design comply with the relevant Authorities standards, specifications and guidelines, including: Austroads (internal and external roads)" and has not been met. The indication of traffic cone is missing on TGS Appendix 1 - LGP-111691-GLC192-James Ruse Dr (Page 6 of 6).	Actual Non-Compliance		N
						10/09/2024	GLC		SMWSTWTP-GLO-RSH-TF-PLN-000001	Appendix 1 - LGP-111691-GLC192-James Ruse Dr (REV1)(pg 6of7)	SM-W-WTP-PS-2647	Traffic cones are indicated on the TGS. PDF issue rectified and TGS reattached.	Actual Non-Compliance		N
					03	3/09/2024	SKB		SMWSTWTP-GLO-RSH-TF-PLN-000001	Section 3.3	SM-W-WTP-GS-684	The requirement SM-W-WTP-GS-684 states "The Tunnelling Contractor must plan and execute the Tunnelling Contractor's Activities to ensure conditions for safe and efficient road based public transport services and operations are maintained at all times during the Tunnelling Contractor's Activities" and has potentially not been met. Please ensure the implementation of the traffic management plan has no impact on existing bus stop on James Ruse Drive near Prospect Street and Oak Street.	Minor Non-Compliance		N
						10/09/2024	GLC		SMWSTWTP-GLO-RSH-TF-PLN-000001	Section 3.3	SM-W-WTP-GS-684	Noted. Bus stop will always remain accessible	Minor Non-Compliance		N
					04	3/09/2024	SKB		SMWSTWTP-GLO-RSH-TF-PLN-000001	Section 3.6	SM-W-WTP-GS-683	The requirement SM-W-WTP-GS-683 states "The Tunnelling Contractor must plan traffic and transport management associated with the Tunnelling Contractor's Activities to avoid delays and detours that will inconvenience the Affected Public, including Road Users, and Vulnerable Road Users (as defined in the Construction Traffic Management Framework (CTMF)), particularly during periods of heavy traffic flows" and has potentially not been met. Please ensure the traffic management plan has no conflict with the parking entrance for Rosehill Garden.	Minor Non-Compliance		N
						10/09/2024	GLC		SMWSTWTP-GLO-RSH-TF-PLN-000001	Section 3.6	SM-W-WTP-GS-683	Noted. Works to occur at night under approved ROLS. No conflicts present at parking entrance according to events calendars.	Minor Non-Compliance		N
					05	3/09/2024	SKB		SMWSTWTP-GLO-RSH-TF-PLN-000001	Table 4, Figure 5	SM-W-WTP-GS-688	The requirement SM-W-WTP-GS-688 states "The Tunnelling Contractor must comply with the Planning Approvals and the following: TfNSW (formerly RMS) Traffic Control at Worksites Manual" and has potentially not been met. The existing speed limit (i.e. 70 km/hr) is assumed on James Ruse Drive with the proposed safety barrier. According to TS 05492 - Traffic Control at Work Sites Technical Manual, Table 6.1 a minimum 1m edge clearance is required for a road safety barrier system. However, in Figure 5, a setback of only 0.2m from the face of the kerb is indicated, which does not meet the required clearance.	Potential Non-Compliance		N
						10/09/2024	GLC		SMWSTWTP-GLO-RSH-TF-PLN-000001	Table 4, Figure 5	SM-W-WTP-GS-688	TCAWS 6.2.3 "Use of temporary safety barriers on kerbs" further states that barriers should be greater than 1.5m behind kerb or within 0.2m of kerb to assist in preventing pitch and/or roll. Barrier design has also been done by an experienced road designer.	Potential Non-Compliance		N

CONTRACT NO.	DOCUMENT NO.	TITLE	VER	STATUS	NO.	DATE	COMPANY	RAISED BY	REVIEW DOC. NO.*	DOCUMENT REF*	DEED REF*	COMMENTS / RESPONSE	COMMENT CATEGORY*	LINKED ITEM NO	CLOSED OUT