# CoA E132 – Local Roads Approval

## Western Harbour Tunnel and Warringah Freeway Upgrade

### Stage 1C Early and Enabling Works – Massey to Amherst Street (M2A) noise wall

**Transport for NSW**

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# Stage 1C Early and Enabling Works – Massey to Amherst Street (M2A) noise wall

# March 2022

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### Approval

| | |
|---|---|
| **Title** | Massey to Amherst Street (M2A) noise wall<br>Local Roads Approval |
| **Approved by SPA Environment Manager** | Richard Peterson |
| **Signed** |  |
| **Dated** | 01/03/2022 |
| **Approved by SPA Construction Manager** | Jason Nisbet |
| **Signed** |  |
| **Dated** | 01/03/2022 |

## Version control

The below document status table is for tracking the revisions of this Document, while the project is in construction. The version control table is to be used to track this Document revisions, including those incorporating changes following agency comments.

It may be modified where necessary to fit with requirements of the individual project.

| Revision | Date | Description | Approval |
|---|---|---|---|
| A | 5/10/21 | For internal review | DL |
| 1 | 7/10/21 | For DPIE Approval | DL |
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| 5 | 04/02/2022 | For DPIE Approval | RP |
| 6 | 01/03/2022 | For DPIE Approval | RP |

# Glossary / abbreviations

| Abbreviation | Expanded text |
|---|---|
| CCS | Community Communication Strategy |
| CoA | Condition of Approval |
| CPAS | Construction Parking and Access Strategy |
| CUT | Critical utilities installation, relocation and protection |
| Document, the | This local roads approval document |
| DPIE | Department of Planning, Industry and Environment |
| EIS | Environmental Impact Statement |
| HV | Heavy vehicle |
| Pedestrian desire line | An unplanned route or path that is used by numerous pedestrians to travel from one place to another. An example is a road crossing where there is no formal crossing facility |
| Project, the | Western Harbour Tunnel Warringah Freeway Upgrade |
| SPA | Sydney Program Alliance |
| TfNSW | Transport for NSW |
| WFU | Warringah Freeway Upgrade |
| WFUEW | Warringah Freeway Upgrade Early Works |
| WFUMW | Warringah Freeway Upgrade Main Works |
| WHT | Western Harbour Tunnel |
| WHTBL | Western Harbour Tunnel Beaches Link |
| WHTWFU | Western Harbour Tunnel Warringah Freeway Upgrade |

# 1 Introduction

## 1.1 Background

The Western Harbour Tunnel and Warringah Freeway Upgrade (WHTWFU) is shown in Figure 1-1. The project comprises two main components:

- A new crossing of Sydney Harbour involving twin tolled motorway tunnels connecting the M4-M5 Link at Rozelle and the Warringah Freeway at North Sydney (the Western Harbour Tunnel)
- Upgrade and integration works along the existing Warringah Freeway, including infrastructure required for connections to the Beaches Link and Gore Hill Freeway Connection project. Reconfiguration works as part of the Warringah Freeway Upgrade would optimise the road corridor and improve the performance of the Sydney Harbour Tunnel, the Sydney Harbour Bridge and the Western Harbour Tunnel.

Due to its importance, the WHTWFU project was declared to be Critical State Significant Infrastructure (CSSI) by the Minister for Planning and Public Space on 9 November 2020.

On 21 January 2021, the Department of Planning, Industry and Environment (DPIE) approved the construction and operation of the WHTWFU project (SSI 8863).

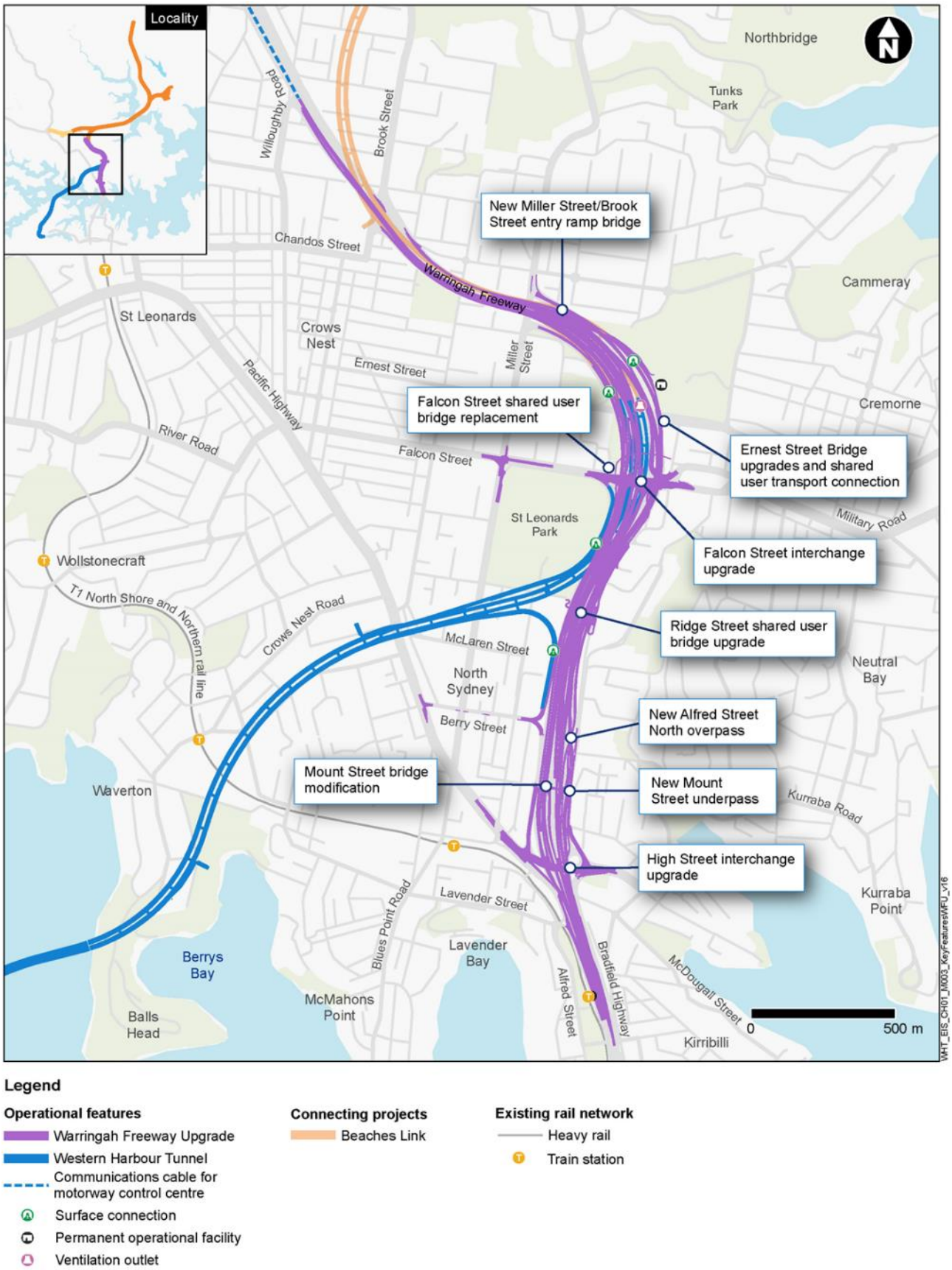
A detailed description of the project is provided in Chapter 5 of the Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement (EIS).

The WHTWFU project will be delivered in numerous stages:

- Stage 1 - Early and enabling works:
  - Stage 1A - Critical utility installation, relocation and protection (CUT)
  - Stage 1B - Cammeray Golf Course adjustment works (CGC)
  - Stage 1C - Massey to Amherst Street (M2A) noise wall (the subject of this local roads approval)
- Stage 2 - Warringah Freeway Upgrade project:
  - Stage 2A - Warringah Freeway Upgrade early works (WFUEW)
  - Stage 2B - Warringah Freeway Upgrade main works (WFUMW)
- Stage 3 - Western Harbour Tunnel project (WHT).

Further detail on each stage is provided in the WHTWFU project Staging Report.

These local roads approval document (this Document) applies only to Stage 1C Early and Enabling Works - Massey to Amherst Street (M2A) noise wall stage of the project (referred to herein as the ‘M2A noise wall’. The M2A noise wall will support the delivery of the wider WHTWFU program of works by undertaking these works prior to the commencement of the Stage 2 and Stage 3.




*(Reference: Western Harbour Tunnel and Warringah Freeway Upgrade Environmental Impact Statement, Figure 1-3)*

*Figure 1-1 Key features of the Warringah Freeway Upgrade component of the project*

## 1.2 Project description

The early and enabling works will support the delivery program of the Main Works of the project by undertaking these works prior to the commencement of the Main Works. This Document applies only to the M2A noise wall works (Stage 1C).

The existing M2A noise wall will be impacted by the widening of the Warringah Freeway. The removal of the existing noise wall and the installation of the new M2A noise wall must occur before the start of the construction of the Warringah Freeway Upgrade. The new noise wall is about 175 metres in length and is located on the eastern side of the Warringah Freeway. The works will include:

- Site establishment and installation of temporary site facilities
- Demolition of existing block wall
- Recessing rock face
- Piling and standing columns
- Pre-casting and installing concrete panels
- Landscaping
- Asphalting
- Site demobilisation.

The M2A noise wall works will commence in late 2021 and be completed in the second half of 2022. The program for the remaining stages of the WHTWFU project is included in the WHTWFU Project Staging Report.


*Figure 1-2 Location of the M2A noise wall works*

## 1.3 Purpose of this local roads approval

This Document has been prepared to describe how Sydney Program Alliance (SPA), during the M2A noise wall works, will comply with the requirements of the NSW Minister for Planning and Public Space's CoA E132. This Document will be lodged to DPIE for approval prior to heavy vehicles (HV) use of local roads that have not been identified, assessed and approval as part of the EIS.

In accordance with CoA E133, this Document will:

- Include swept path analyses for local roads that require DPIE approval
- Demonstrate that DPIE approval of local roads nominated in this Document will not compromise the safety of pedestrians and cyclists or the safety of two-way traffic flow on two-way roadways
- Provide details related to the date of road dilapidations that have been conducted for local roads that require DPIE approval
- Detail measures that will be implemented to avoid use of nominated local roads past schools, aged care facilities and childcare facilities during peak operation times
- Include advice from an appropriately qualified traffic engineer regarding the suitability of nominated local roads that require DPIE approval.

The requirements of CoA E132 and E133 and where they are addressed in this Document are shown in Table 1-1.

*Table 1-1 CoA E132 and E133 compliance*

| CoA | Requirement | Where addressed in Document |
|---|---|---|
| E132 | Local roads proposed to be used by heavy vehicles to directly access the construction boundary and ancillary facilities that are not shown in Figure 5-7 to 5-22 inclusive of Appendix F of the EIS must be approved by the Planning Secretary and included in the Traffic, Transport and Access Management CEMP Sub-plan. | This Document<br>Traffic, Transport and Access Management Sub-plan (TTAMP) |
| E133 | All requests to the Planning Secretary under Condition E132 must include the following: | |
| (a) | include a swept path analysis | Section 3.1 |
| (b) | demonstration that the use of local roads by heavy vehicles for the CSSI will not compromise the safety of pedestrians and cyclists or the safety of two-way traffic flow on two-way roadways | Section 3.2 |
| (c) | provide details as to the date of completion of the road dilapidation surveys for the subject local roads | Section 3.3 |
| (d) | measures that will be implemented to avoid where practicable the use of roads past schools, aged care facilities and childcare facilities during their peak operation times | Section 4 |
| (e) | written advice from an appropriately qualified professional on the suitability of the proposed heavy vehicle route which takes into consideration items (a), (b), (c), and (d) of this condition | Appendix A1 |

# 2 Local roads proposed for approval

## 2.1 Identification of local roads

As required by CoA E132, DPIE approval is required for any local roads that have not been identified and assessed in the EIS. Local roads requiring DPIE approval under CoA E132 are detailed in Table 2-1.

*Table 2-1 Local roads requiring DPIE approval under CoA E132*

| Local road | Direction of movement | Description of use during construction | Description of potential impacts |
|---|---|---|---|
| Amherst Street (between West Street and Miller Street) | Eastbound<br>Westbound | Access to and egress from work site | Use by construction traffic<br>Period of use: up to nine months |
| West Street (between Amherst Street and Jenkins Street) | Northbound<br>Southbound | Access to and egress from work site | Use by construction traffic<br>Period of use: up to nine months |
| Jenkins Street | Eastbound<br>Westbound | Access to and egress from work site | Use by construction traffic<br>Period of use: up to nine months |
| Armstrong Street | Northbound<br>Southbound | Access to and egress from work site | Use by construction traffic<br>Period of use: up to nine months |
| Massey Street | Eastbound<br>Westbound | Access to and egress from work site | Use by construction traffic<br>Period of use: up to nine months |
| Palmer Street (between Armstrong Street and Miller Street) | Eastbound<br>Westbound | Access to and egress from work site | Use by construction traffic<br>Period of use: up to nine months |

Figure 2-1 presents local roads requiring DPIE approval for use during the M2A noise wall works.

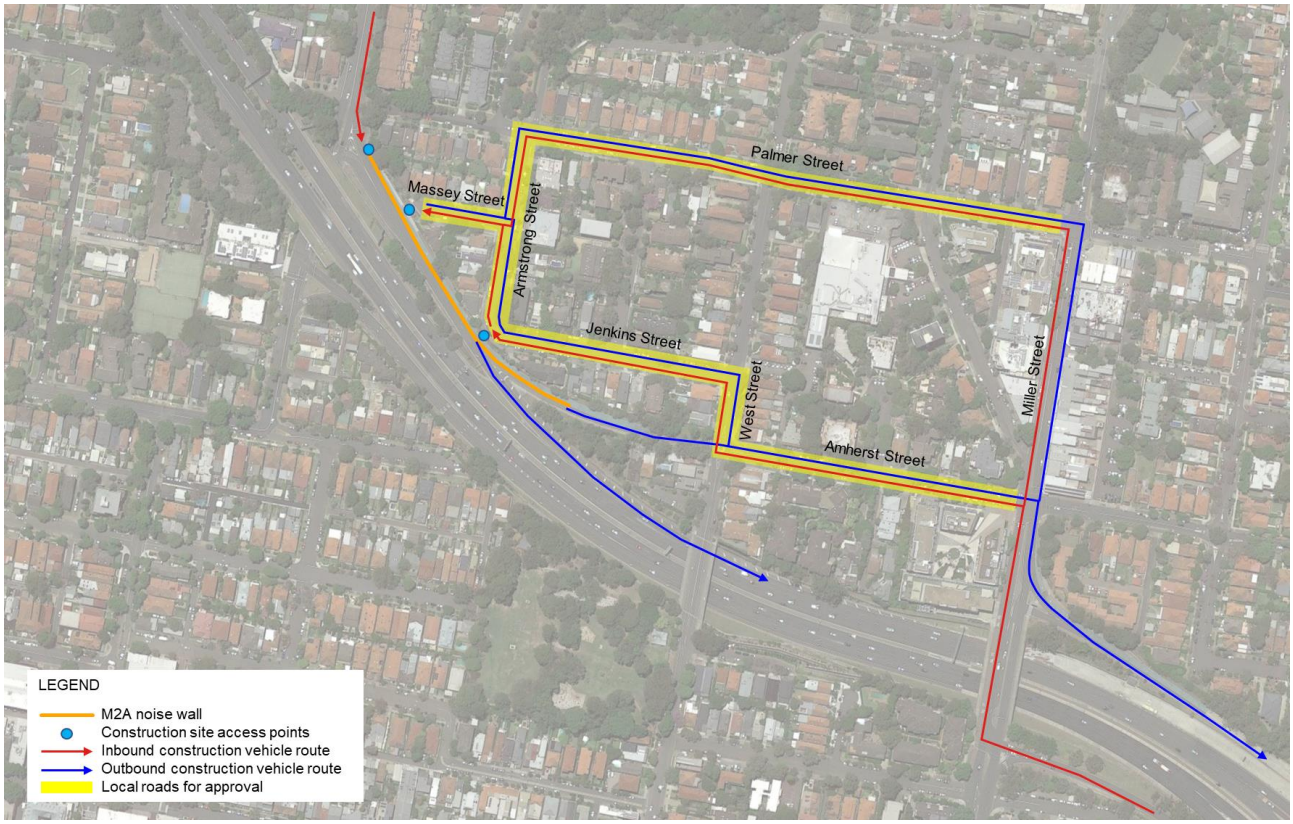



*Figure 2-1 Local roads requiring approval*

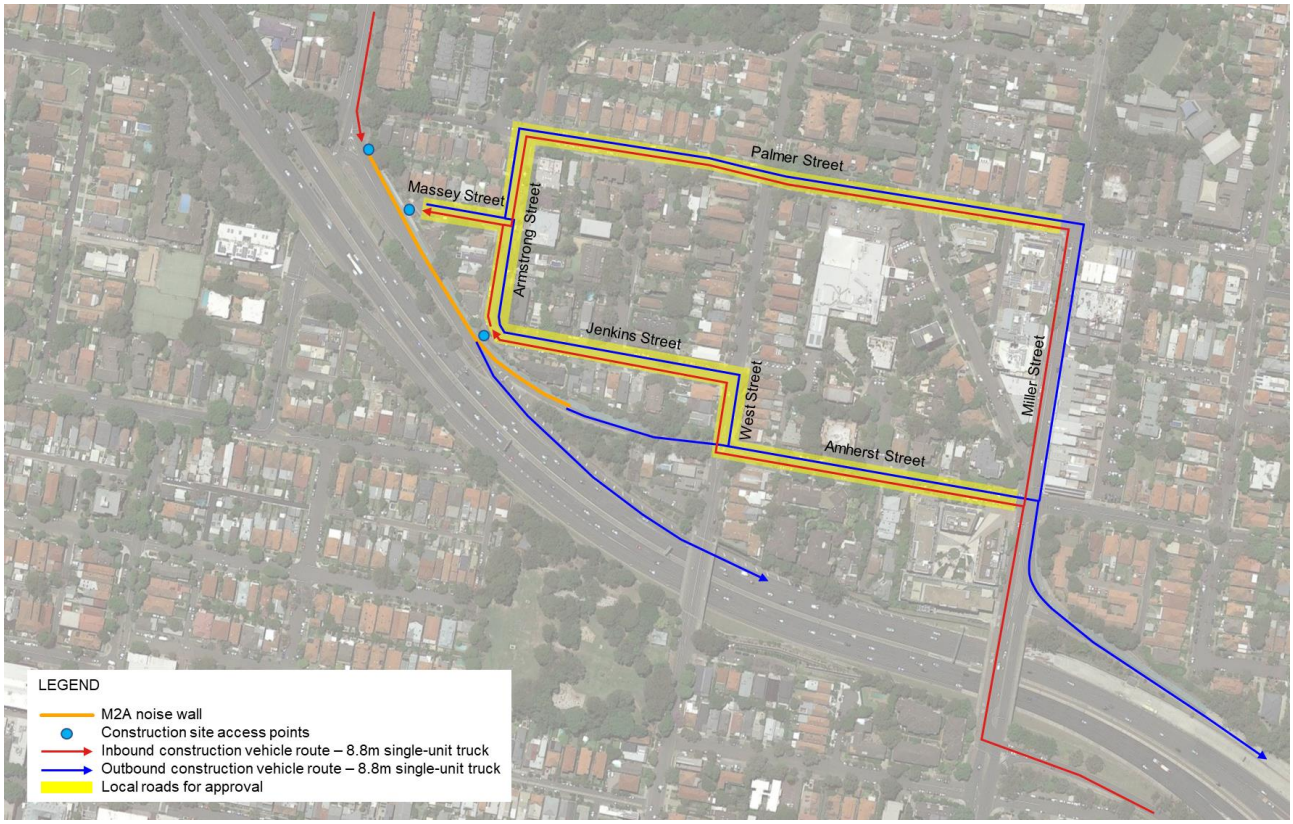



*Figure 2-2 Heavy vehicle routes – 8.8-metre single unit truck*


*Figure 2-3 Heavy vehicle routes – 12.5-metre single unit truck and 19-metre semi-trailer*

## 2.2 Proposed volumes of heavy vehicles on local roads

Proposed volumes of heavy vehicles on local roads that are assessed in this Document (shown in Figure 2-1) are detailed in Table 2-2.

*Table 2-2 Proposed volumes of heavy vehicles on local roads*

| Local road | Peak vehicle movements per day (two-way movements) | Morning peak vehicle movements (6 am to 10 am) (two-way movements) | Evening peak vehicle movements (3 pm to 7 pm) (two-way movements) |
|---|---|---|---|
| | Heavy | Heavy | Heavy |
| Amherst Street (between West Street and Miller Street) | 40 (combination of 8.8m and 12.5m single unit trucks, both directions)<br>8 (19m semi-trailers, eastbound direction only) | 20 (combination of 8.8m and 12.5m single unit trucks, both directions)<br>4 (19m semi-trailers, eastbound direction only) | 20 (combination of 8.8m and 12.5m single unit trucks, both directions)<br>4 (19m semi-trailers, eastbound direction only) |
| West Street (between Amherst Street and Jenkins Street) | 20 (8.8m single unit trucks, both directions) | 10 (8.8m single unit trucks, both directions) | 10 (8.8m single unit trucks, both directions) |
| Jenkins Street | 20 (8.8m single unit trucks, both directions) | 10 (8.8m single unit trucks, both directions) | 10 (8.8m single unit trucks, both directions) |
| Armstrong Street | 20 (8.8m single unit trucks, both directions) | 10 (8.8m single unit trucks, both directions) | 10 (8.8m single unit trucks, both directions) |
| Massey Street | 20 (8.8m single unit trucks, both directions) | 10 (8.8m single unit trucks, both directions) | 10 (8.8m single unit trucks, both directions) |
| Palmer Street (between Armstrong Street and Miller Street) | 20 (8.8m single unit trucks, both directions) | 10 (8.8m single unit trucks, both directions) | 10 (8.8m single unit trucks, both directions) |

## 2.3 Justification for the use of local roads

Justification for the selection of local roads that are assessed in this Document (shown in Figure 2-1) is provided in Table 2-3.

*Table 2-3 Justification for the selection of local roads*

| Local road | Justification |
|---|---|
| • Amherst Street, Cammeray | • Forms part of the shortest route between the eastern egress point from the main M2A noise wall work site (located on the Brook Street entry ramp / Amherst Street) and the Miller Street entry ramp to the Warringah Freeway<br>• Forms part of the shortest route between the secondary construction site access points, located on Jenkins Street / Armstrong Street and Massey Street, and the Miller Street entry and exit ramps to / from the Warringah Freeway<br>• The use of Amherst Street in the eastbound direction is required for semi-trailers as direct access onto the Warringah Freeway from the main M2A noise wall work site is not supported by Transport for NSW during the morning peak (6 am to 10 am) and evening peak (3 pm to 7 pm) periods |
| • West Street, Cammeray<br>• Jenkins Street, Cammeray<br>• Armstrong Street, Cammeray<br>• Massey Street Cammeray | • Form part of the shortest route between the secondary construction site access points, located on Jenkins Street / Armstrong Street and Massey Street, and the Miller Street entry and exit ramps to / from the Warringah Freeway<br>• There is no alternative route available to / from the secondary construction site access points located on Jenkins Street / Armstrong Street and Massey Street |
| • Palmer Street, Cammeray | • Provides a route to the secondary construction site access points located on Jenkins Street / Armstrong Street and Massey Street from the Miller Street exit ramp from the Warringah Freeway for 12.5 m single unit trucks which cannot negotiate the right turn from Amherst Street westbound to West Street northbound (refer to Table 3-1)<br>• Provides an alternative route from the secondary construction site access points, located on Jenkins Street / Armstrong Street and Massey Street, to the Miller Street entry ramp to the Warringah Freeway in the event of an incident at the Miller Street / Amherst Street intersection |

# 3 Local roads assessment

## 3.1 Swept path analysis

As required by CoA E133(a), swept paths have been prepared for all local roads requiring DPIE approval. Swept path diagrams are provided in Appendix A2 for 8.8-metre single unit trucks, 12.5-metre single unit trucks and 19-metre semi-trailers (where applicable), which will be used during the M2A noise wall works. The swept paths provided in Appendix A2 are detailed in Table 3-1.

*Table 3-1 Summary of swept path analysis*

| Local road | Drawing number in Appendix A2 | Can truck make movement without encroaching on existing kerbs, traffic management / traffic control devices or on-street parking spaces? | | | Additional comments |
|---|---|---|---|---|---|
| | | 8.8 m single unit truck | 12.5 m single unit truck | 19 m semi-trailer | |
| Left turn from Miller Street northbound to Amherst Street westbound | Appendix A-1 | Yes | N/A | N/A | N/A |
| Right turn from Amherst Street eastbound to Miller Street southbound | Appendix A-2, Appendix A-3, Appendix A-4 | Yes | Yes | Yes | A 19m semi-trailer is required to transport large-sized plant and materials to the main M2A noise wall work site (located on the Brook Street entry ramp / Amherst Street). The use of Amherst Street in the eastbound direction is required for semi-trailers as direct access onto the Warringah Freeway from the main M2A noise wall work site is not supported by Transport for NSW during the morning peak (6 am to 10 am) and evening peak (3 pm to 7 pm) periods |

| Local road | Drawing number in Appendix A2 | Can truck make movement without encroaching on existing kerbs, traffic management / traffic control devices or on-street parking spaces? | | | Additional comments |
|---|---|---|---|---|---|
| | | 8.8 m single unit truck | 12.5 m single unit truck | 19 m semi-trailer | |
| Right turn from Amherst Street westbound to West Street northbound | Appendix A-5 | Yes | N/A | N/A | N/A |
| Left turn from West Street southbound to Amherst Street eastbound | Appendix A-6 | Yes | N/A | N/A | N/A |
| Left turn from West Street northbound to Jenkins Street westbound | Appendix A-7 | Yes | N/A | N/A | N/A |
| Right turn from Jenkins Street eastbound to West Street southbound | Appendix A-8 | Yes | N/A | N/A | N/A |
| Left turn from Armstrong Street northbound to Massey Street westbound | Appendix A-9 | Yes | N/A | N/A | N/A |
| Right turn from Massey Street eastbound to Armstrong Street southbound | Appendix A-10 | Yes | N/A | N/A | N/A |

| Local road | Drawing number in Appendix A2 | Can truck make movement without encroaching on existing kerbs, traffic management / traffic control devices or on-street parking spaces? | | | Additional comments |
|---|---|---|---|---|---|
| | | 8.8 m single unit truck | 12.5 m single unit truck | 19 m semi-trailer | |
| Right turn from Armstrong Street southbound to Massey Street westbound | Appendix A-11 | Yes | N/A | N/A | N/A |
| Left turn from Massey Street eastbound to Armstrong Street northbound | Appendix A-12 | Yes | N/A | N/A | N/A |
| Left turn from Palmer Street westbound to Armstrong Street southbound | Appendix A-13 | Yes | N/A | N/A | N/A |
| Right turn from Armstrong Street northbound to Palmer Street eastbound | Appendix A-14 | Yes | N/A | N/A | N/A |
| Left turn from Miller Street northbound to Palmer Street westbound | Appendix A-15 | Yes | N/A | N/A | N/A |
| Right turn from Palmer Street eastbound to Miller Street southbound | Appendix A-16 | Yes | N/A | N/A | N/A |

## 3.2 Pedestrian, cyclist and two-way traffic flow safety risk assessment

As required by CoA E133(b), a pedestrian, cyclist and two-way traffic flow safety risk assessment has been undertaken to demonstrate that the use of local roads by heavy vehicles will not compromise pedestrian, cyclist and two-way traffic flow safety.

Existing potential hazards to pedestrians, cyclists and two-way traffic were identified during site inspections. These were assessed against a risk matrix. The risks of these potential hazards were then reassessed, taking into consideration the use of local roads by heavy vehicles.

The methodology of identifying hazards and assessing their level of risk is similar to that undertaken for road safety audits. The risk assessment system is the easiest means of identifying the level of risk associated with any given hazard. The risk assessment system is outlined in Appendix A3.

The pedestrian, cyclist and two-way traffic flow safety risk assessment is detailed in Table 3-2 below. Potential hazards to cyclists have been identified where there is an existing designated cycle route (Amherst Street, West Street and Palmer Street). The risk assessment does not consider interactions between cyclists and vehicles on Jenkins Street, Armstrong Street and Massey Street as these roads are not designated cycle routes and therefore carry negligible volumes of cyclists. The results of the safety risk assessment demonstrate that the use of local roads by heavy vehicles will not have an impact on pedestrian, cyclist and two-way traffic flow safety as indicated by the revised level of risk being the same as the existing level of risk for all identified potential hazards. In addition, it is considered that the safety of pedestrians, cyclists and two-way traffic flow would not be compromised given the following factors:

- Low numbers of proposed heavy vehicle movements on local roads (refer to Table 2-2), therefore reducing the potential for conflict between heavy vehicles and pedestrians / cyclists / two-way traffic flow
- Swept path analysis shows heavy vehicles undertaking turning manoeuvres would not encroach on footpaths (refer to Appendix A2), therefore reducing the potential for conflict between heavy vehicles and pedestrians
- Existing low numbers of cyclists, therefore reducing the potential for conflict between heavy vehicles and cyclists
- Two heavy vehicles travelling on local roads would be able to pass each other in a safe manner without impacting adjacent parked vehicles (refer to Appendix A5).

*Table 3-2 Pedestrian, cyclist and two-way traffic flow safety risk assessment*

| Location | Description of existing hazard | Existing conditions | | | Use of local roads by heavy vehicles | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crash frequency | Crash severity | Level of risk | Mitigating factors | Revised crash frequency | Revised crash severity | Revised level of risk |
| Amherst Street westbound approach to West Street, Cammeray | There is the potential for conflict between cyclists and vehicles where the cycle lane and traffic lane converge on approach to the roundabout | Occasional | Minor | Medium | • Existing low numbers of cyclists<br>• Signage to warn cyclists (and other vehicles) of the presence of heavy vehicles<br>• Driver induction process to include safety awareness in relation to all road users | Occasional | Minor | Medium |
| Amherst Street, Cammeray | There is the potential for conflict between cyclists and vehicles travelling in the same direction on Amherst Street as they share the same road space | Improbable | Serious | Medium | • Existing low numbers of cyclists<br>• Signage to warn cyclists (and other vehicles) of the presence of heavy vehicles<br>• Existing 50 km/h posted speed limit<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |

| Location | Description of existing hazard | Existing conditions | | | Use of local roads by heavy vehicles | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crash frequency | Crash severity | Level of risk | Mitigating factors | Revised crash frequency | Revised crash severity | Revised level of risk |
| Amherst Street, Cammeray | There is the potential for conflict between pedestrians crossing Amherst Street and vehicles travelling on Amherst Street | Improbable | Serious | Medium | • Presence of a pedestrian refuge island at West Street<br>• Presence of signalised pedestrian crossing at Miller Street<br>• Existing 50 km/h posted speed limit<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |
| Amherst Street, Cammeray | There is the potential for conflict between heavy vehicles undertaking turning manoeuvres and pedestrians using Amherst Street | Improbable | Serious | Medium | • Swept path analysis shows heavy vehicles undertaking turning manoeuvres would not encroach on footpaths<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |

| Location | Description of existing hazard | Existing conditions | | | Use of local roads by heavy vehicles | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crash frequency | Crash severity | Level of risk | Mitigating factors | Revised crash frequency | Revised crash severity | Revised level of risk |
| West Street, Cammeray | There is the potential for conflict between cyclists and vehicles travelling in the same direction on West Street as they share the same road space | Improbable | Serious | Medium | • Existing low numbers of cyclists<br>• Signage to warn cyclists (and other vehicles) of the presence of heavy vehicles<br>• Existing 50 km/h posted speed limit<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |
| West Street, Cammeray | There is the potential for conflict between pedestrians crossing West Street and vehicles travelling on West Street | Improbable | Serious | Medium | • Existing lack of pedestrian desire lines across West Street<br>• Existing low numbers of pedestrians<br>• Existing 50 km/h posted speed limit<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |

| Location | Description of existing hazard | Existing conditions | | | Use of local roads by heavy vehicles | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crash frequency | Crash severity | Level of risk | Mitigating factors | Revised crash frequency | Revised crash severity | Revised level of risk |
| West Street, Cammeray | There is the potential for conflict between heavy vehicles undertaking turning manoeuvres and pedestrians using West Street | Improbable | Serious | Medium | • Swept path analysis shows heavy vehicles undertaking turning manoeuvres would not encroach on footpaths<br>• Existing low numbers of pedestrians<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |
| Jenkins Street, Cammeray | There is the potential for conflict between pedestrians crossing Jenkins Street and vehicles travelling on Jenkins Street | Improbable | Serious | Medium | • Existing lack of pedestrian desire lines across Jenkins Street<br>• Existing low numbers of pedestrians<br>• Existing 50 km/h posted speed limit<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |

| Location | Description of existing hazard | Existing conditions | | | Use of local roads by heavy vehicles | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crash frequency | Crash severity | Level of risk | Mitigating factors | Revised crash frequency | Revised crash severity | Revised level of risk |
| Jenkins Street, Cammeray | There is the potential for conflict between heavy vehicles undertaking turning manoeuvres and pedestrians using Jenkins Street | Improbable | Serious | Medium | • Swept path analysis shows heavy vehicles undertaking turning manoeuvres would not encroach on footpaths<br>• Existing low numbers of pedestrians<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |
| Armstrong Street, Cammeray | There is the potential for conflict between pedestrians crossing Armstrong Street and vehicles travelling on Armstrong Street | Improbable | Serious | Medium | • Existing lack of pedestrian desire lines across Armstrong Street<br>• Existing low numbers of pedestrians<br>• Existing 50 km/h posted speed limit<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |

| Location | Description of existing hazard | Existing conditions | | | Use of local roads by heavy vehicles | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crash frequency | Crash severity | Level of risk | Mitigating factors | Revised crash frequency | Revised crash severity | Revised level of risk |
| Armstrong Street, Cammeray | There is the potential for conflict between heavy vehicles undertaking turning manoeuvres and pedestrians using Armstrong Street | Improbable | Serious | Medium | • Swept path analysis shows heavy vehicles undertaking turning manoeuvres would not encroach on footpaths<br>• Existing low numbers of pedestrians<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |
| Massey Street, Cammeray | There is the potential for conflict between pedestrians crossing Massey Street and vehicles travelling on Massey Street | Improbable | Serious | Medium | • Existing lack of pedestrian desire lines across Massey Street<br>• Existing low numbers of pedestrians<br>• Existing 50 km/h posted speed limit<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |

| Location | Description of existing hazard | Existing conditions | | | Use of local roads by heavy vehicles | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crash frequency | Crash severity | Level of risk | Mitigating factors | Revised crash frequency | Revised crash severity | Revised level of risk |
| Massey Street, Cammeray | There is the potential for conflict between heavy vehicles undertaking turning manoeuvres and pedestrians using Massey Street | Improbable | Serious | Medium | • Swept path analysis shows heavy vehicles undertaking turning manoeuvres would not encroach on footpaths<br>• Existing low numbers of pedestrians<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |
| Palmer Street, Cammeray | There is the potential for conflict between cyclists and vehicles travelling in the same direction on Palmer Street as they share the same road space | Improbable | Serious | Medium | • Existing low numbers of cyclists<br>• Signage to warn cyclists (and other vehicles) of the presence of heavy vehicles<br>• Existing 50 km/h posted speed limit (40 km/h during school zone times)<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |

| Location | Description of existing hazard | Existing conditions | | | Use of local roads by heavy vehicles | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crash frequency | Crash severity | Level of risk | Mitigating factors | Revised crash frequency | Revised crash severity | Revised level of risk |
| Palmer Street, Cammeray | There is the potential for conflict between pedestrians crossing Palmer Street and vehicles travelling on Palmer Street | Improbable | Serious | Medium | • Existing lack of pedestrian desire lines across Palmer Street<br>• Existing low numbers of pedestrians<br>• Existing 50 km/h posted speed limit<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |
| Palmer Street, Cammeray | There is the potential for conflict between heavy vehicles undertaking turning manoeuvres and pedestrians using Palmer Street | Improbable | Serious | Medium | • Swept path analysis shows heavy vehicles undertaking turning manoeuvres would not encroach on footpaths<br>• Existing low numbers of pedestrians<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |

| Location | Description of existing hazard | Existing conditions | | | Use of local roads by heavy vehicles | | | |
|---|---|---|---|---|---|---|---|---|
| | | Crash frequency | Crash severity | Level of risk | Mitigating factors | Revised crash frequency | Revised crash severity | Revised level of risk |
| All local roads | There is the potential for side-swipe and head-on crashes between two vehicles travelling in opposite directions on two-way roads | Improbable | Serious | Medium | • Road widths are sufficient for two heavy vehicles to pass each other<br>• Existing 50 km/h posted speed limit<br>• Driver induction process to include safety awareness in relation to all road users | Improbable | Serious | Medium |

## 3.3 Details of road dilapidation surveys undertaken

As required by CoA E133(c), road dilapidation surveys have been undertaken on all local roads requiring DPIE approval. In accordance with CoA E136, the dilapidation reports have been completed and provided to North Sydney Council and Willoughby Council.

# 4 Mitigation measures

As required by CoA E133(d), measures are required to be implemented to avoid where practicable the use of roads past schools, aged care facilities and childcare facilities during their peak operation times. To mitigate any potential impacts:

- 12.5-metre single unit trucks and 19-metre semi-trailers will not be able to travel to or from the secondary construction site access points located on Jenkins Street / Armstrong Street and Massey Street. Travel to and from these secondary construction site access points will be restricted to 8.8-metre single unit trucks
- Regular consultation with Happy Kids Family Day Care on Massey Street to ensure heavy vehicle management measures are appropriate. It is noted that given Happy Kids Family Day Care is family-run, it may have different peak operation hours to other day care facilities. Heavy vehicle movements on Massey Street will be minimised during the peak operation hours of Happy Kids Family Day Care where possible
- A road dilapidation report will be prepared, in consultation with North Sydney Council, identifying existing conditions of local roads and mechanisms to repair damage to the road network caused by heavy vehicle movements associated with the project (REMM CTT1)
- Construction road traffic will be managed to minimise movements during peak periods (where possible) (REMM CTT6)
- Vehicle movements to and from construction sites will be managed to ensure pedestrian, cyclist and motorist safety. This may require manual supervision or physical barriers (REMM CTT7)
- Vehicle movement plans showing approved routes and vehicle sizes to and from each origin and destination will be issued to all subcontractors as part of contract documentation upon engagement. Signage will also be installed along approved routes to guide heavy vehicle drivers
- Signage will be installed on cyclist routes to warn cyclists (and other vehicles) of the presence of heavy vehicles
- Implementation of a Driver's Code of Conduct (refer to Appendix A4)
- The driver induction process will include safety awareness in relation to all road users (including pedestrians and cyclists) and the strict requirement to obey all road rules and to travel only on approved roads (refer to Section 3.5 of the CEMP)
- Community consultation will be undertaken in accordance with the Community Communication Strategy (CCS). This will include engagement activities such as:
    - Fact sheets showing overall impacts in the area which will include traffic detours, loss of on-street parking
    - Maps showing traffic diversions/parking impacts
    - Property access plans to discuss impacts of detours on individual properties
    - Detour specific notifications
    - Doorknocks for impacted properties to understand access requirements
- Coordination meetings between SPA, TfNSW, Transport Management Centre and Customer Journey Planning – Operations will occur on a regular basis throughout the delivery of the CSSI. Key issues for discussion at the coordination meetings will include road occupancy licences and any other transport network changes or impacts resulting from construction of the CSSI

- Continuous review and improvement will be undertaken (refer to Section 3.12 of the CEMP). This CoA E132 local roads approval document will be reviewed and updated as required:
    - Following reportable environmental incidents
    - Upon identification of new ‘significant’ risks, including risks identified during risk register updates
    - When non-compliances are identified
    - When the root cause of incident or non-conformance is identified as part of the investigation
    - In response to significant project change (including modifications to the CSSI)
    - Within one month of any of the above occurrences
    - As part of a continuous improvement process
    - The effect of changes in standards and legislation.
- Regular monitoring of mitigation measures for compliance and effectiveness will be undertaken (refer to Section 3.9 of the CEMP). Further detail on regular inspections is detailed in Section 4.1 below.

## 4.1 Inspections

In accordance with the TTAMP, SPA will undertake regular inspections to ensure the safety of all traffic movements, as well as the wellbeing of pedestrians, cyclists, drivers and property through and surrounding all worksites. The responsibility and frequency of inspections is stipulated in section 6.1 of the TfNSW Traffic Control at Worksites Manual.

These regular inspections will also verify the on-street parking commitments established by the ‘Driver Code of Conduct’.

Three main types of inspections and records will occur:

- Inspections of short-term (single shift) traffic controls during the shift
- Regular daytime inspections of long-term traffic controls after implementation
- Regular night time inspections of long-term traffic controls after implementation.

Pre-opening inspections will be carried out by the Traffic Manager before the start of each new temporary roadwork site or major modification.

Any signage or devices identified during the checks or audits requiring attention will either be rectified at the time or advised to the Traffic Manager during that shift for follow-up action.

# Appendix A1 Advice regarding the suitability of local roads as proposed heavy vehicle routes

| | |
|---|---|
| **Memo Title** | Suitability of proposed heavy vehicle routes on local roads |
| **Recipient** | Sydney Program Alliance |
| **Prepared by** | Phillip Truong |
| **Revision** | E |
| **Date** | 4 February 2022 |

# 1. Introduction

This memo provides advice on the suitability of proposed heavy vehicle routes for the Stage 1C Early and Enabling Works – Massey to Amherst (M2A) noise wall in accordance with the NSW Minister for Planning and Public Space's Conditions of Approval (CoA) E133(e). The advice is based on Revision 5 of the CoA E132 – Local Roads Approval document, which has been updated to include responses to comments from Department of Planning and Environment.

# 2. Assessment

The following local roads were assessed for their suitability as proposed heavy vehicle routes:

- Amherst Street (between West Street and Miller Street)
- West Street (between Amherst Street and Jenkins Street)
- Jenkins Street
- Armstrong Street
- Massey Street
- Palmer Street (between Armstrong Street and Miller Street).

Items that were considered in the assessment include:

- CoA E133: All requests to the Planning Secretary under Condition E132 must include the following:
    - CoA E133(a): include a swept path analysis
    - CoA E133(b): demonstration that the use of local roads by heavy vehicles for the CSSI will not compromise the safety of pedestrians and cyclists or the safety of two-way traffic flow on two-way roadways
    - CoA E133(c): provide details as to the date of completion of the road dilapidation surveys for the subject local roads
    - CoA E133(d): measures that will be implemented to avoid where practicable the use of roads past schools, aged care facilities and child care facilities during their peak operation times.

Taking into account CoA E133(a), CoA E133(b), CoA E133(c) and CoA E133(d), it is considered that all local roads that were assessed are suitable as proposed heavy vehicle routes.

# 3. Formal statement

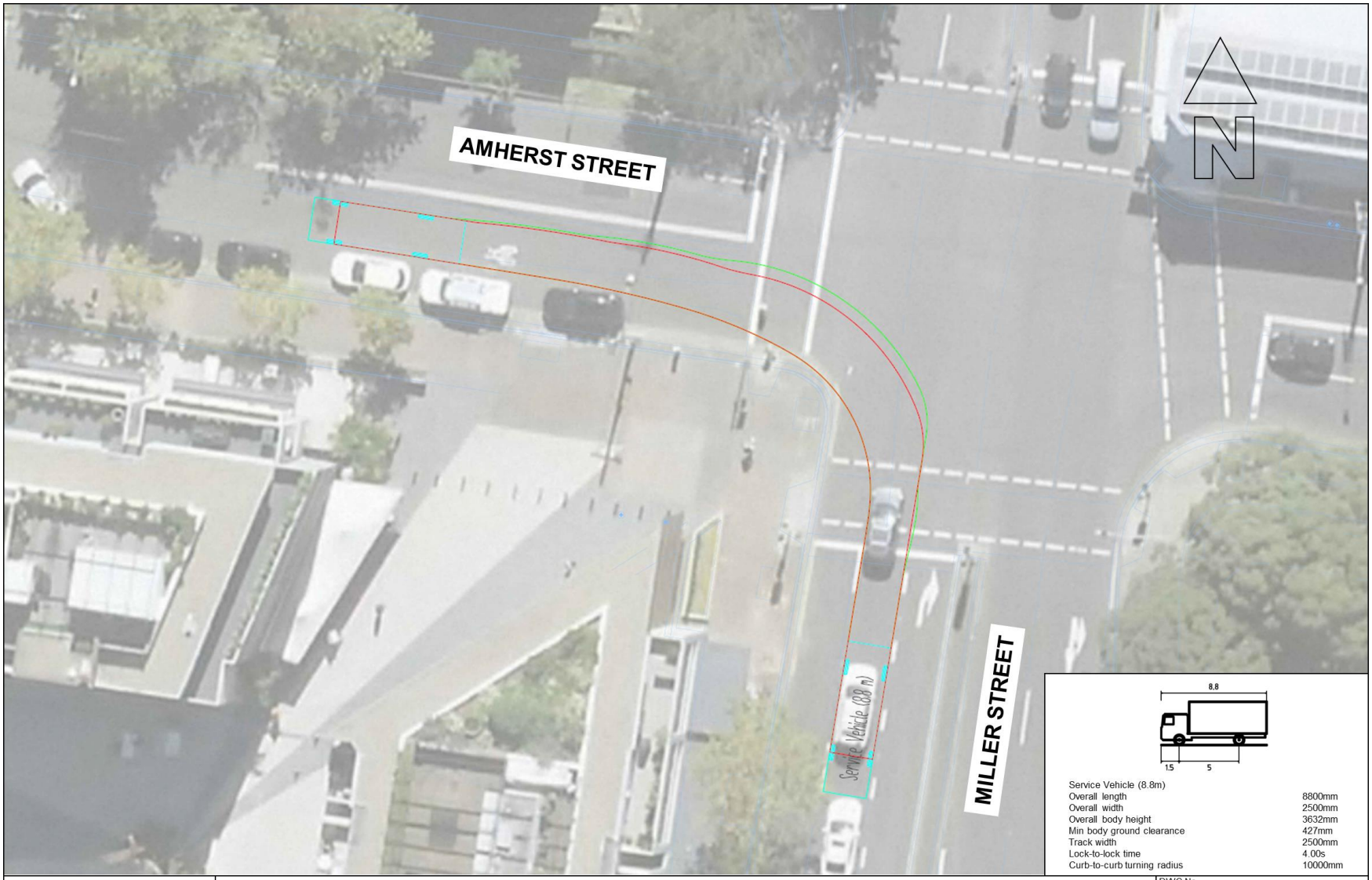
This assessment has been undertaken by Phillip Truong, who is an appropriately qualified professional from Turnbull Engineering.

Phillip Truong is a project manager and traffic and transport engineer / planner with over 12 years of experience. He has a broad range of skills that enable him to analyse complex problems and develop innovative solutions. He has demonstrated these skills in major projects involving public transport planning, traffic engineering, traffic and transport management, traffic impact assessments, road user safety and road safety auditing. He has also undertaken environmental assessments as the traffic and transport technical lead for projects including Sydney Metro City & Southwest, Sydney Metro West, WestConnex Stage 1A, M1 Pacific Motorway Extension to Raymond Terrace and Sydney International Speedway.

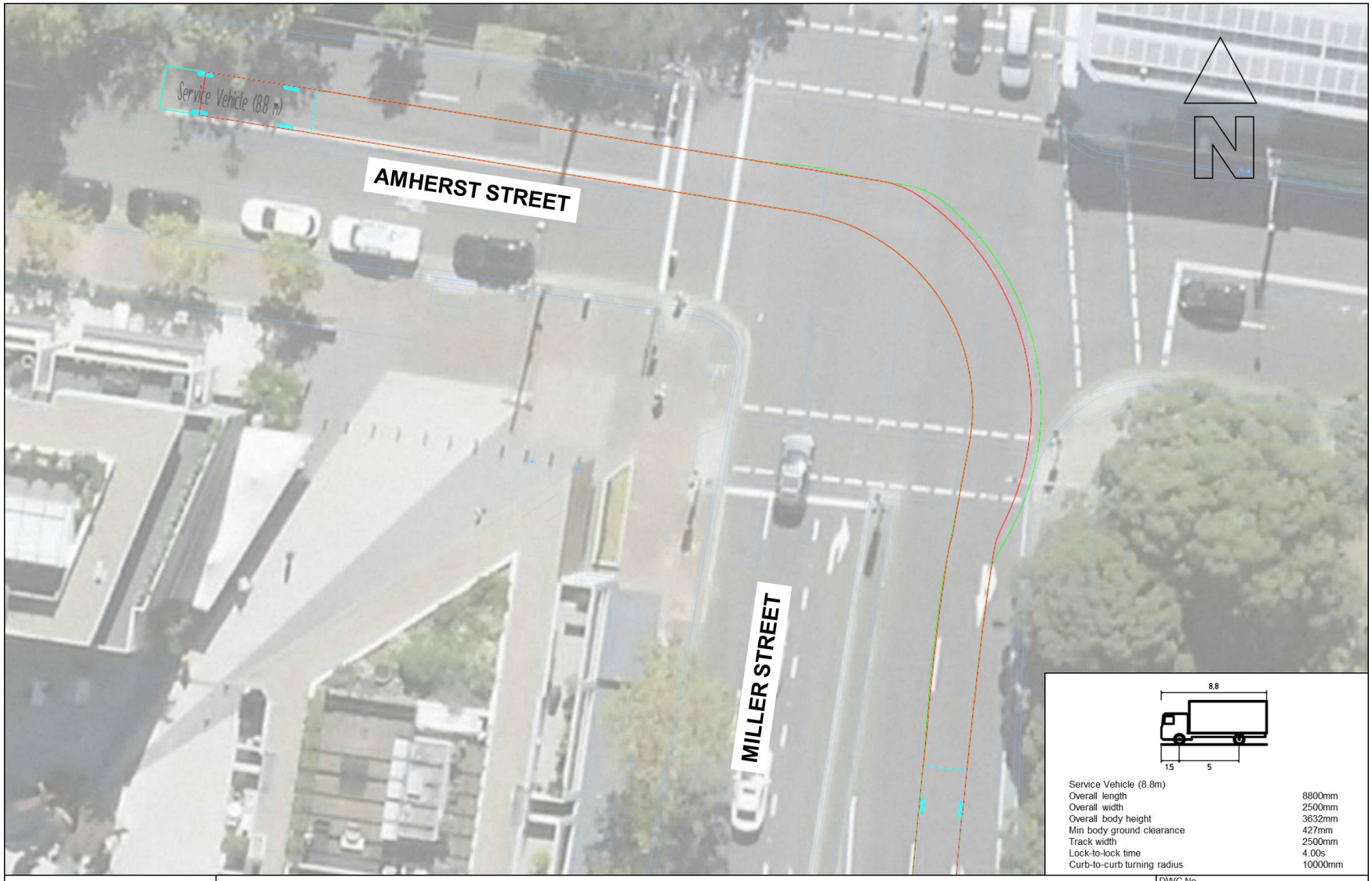
This assessment has been undertaken for the sole purpose of providing advice on the suitability of proposed heavy vehicle routes for the Stage 1C Early and Enabling Works – Massey to Amherst (M2A) noise wall in accordance with the NSW Minister for Planning and Public Space's Conditions of Approval (CoA) E133(e). The findings are the opinion and judgement of Phillip Truong:

Phillip Truong
Senior Transport Engineer
04.02.2022

# Appendix A2 Swept path diagrams




| | | |
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-1 |
| | SWEPT PATH ANALYSIS – MILLER STREET AND AMHERST STREET<br>8.8m SINGLE UNIT TRUCK | DATE STAMP<br>5 OCTOBER 2021 |

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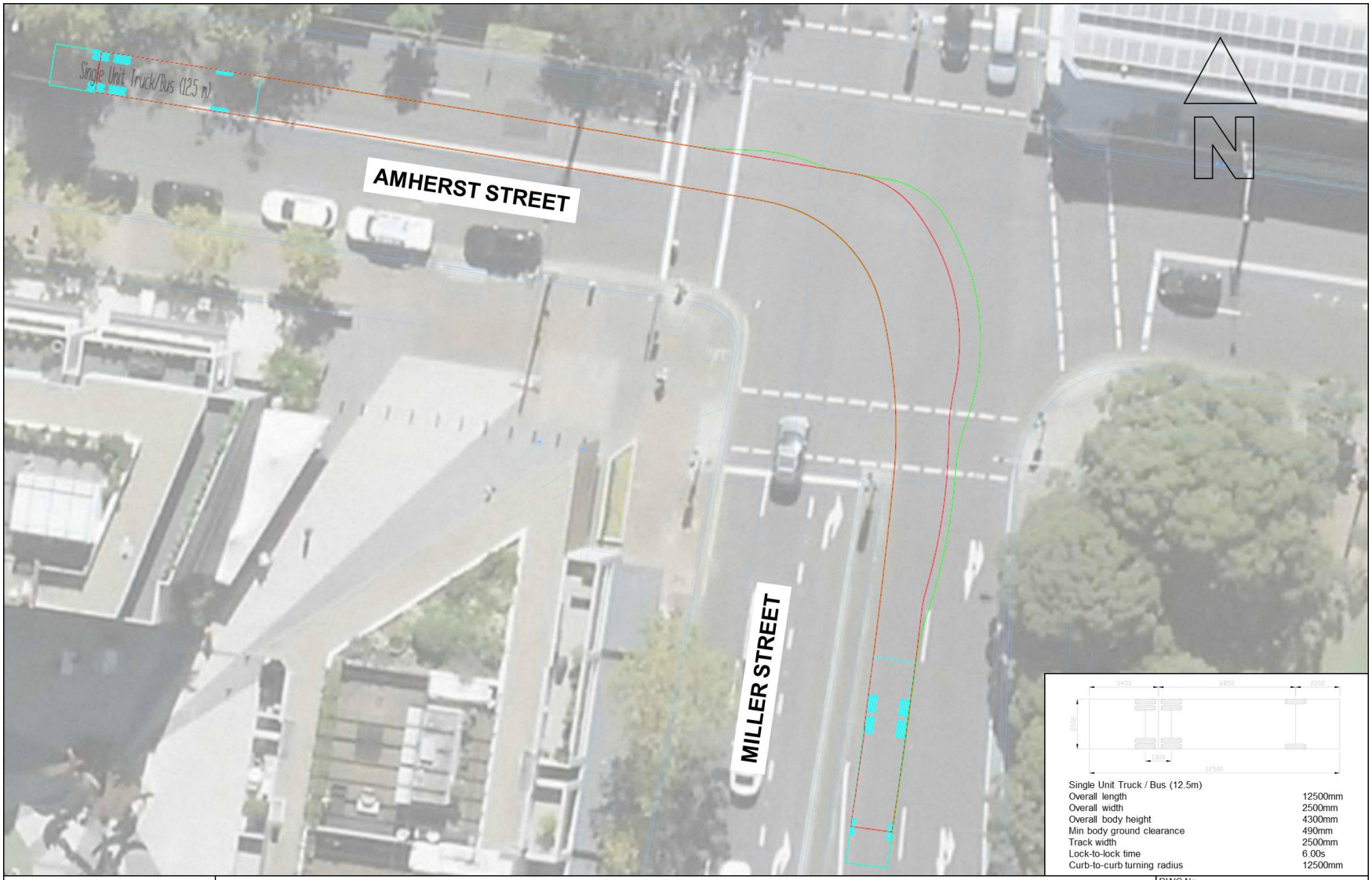
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-2 |
| | SWEPT PATH ANALYSIS – MILLER STREET AND AMHERST STREET<br>8.8m SINGLE UNIT TRUCK | DATE STAMP<br>5 OCTOBER 2021 |

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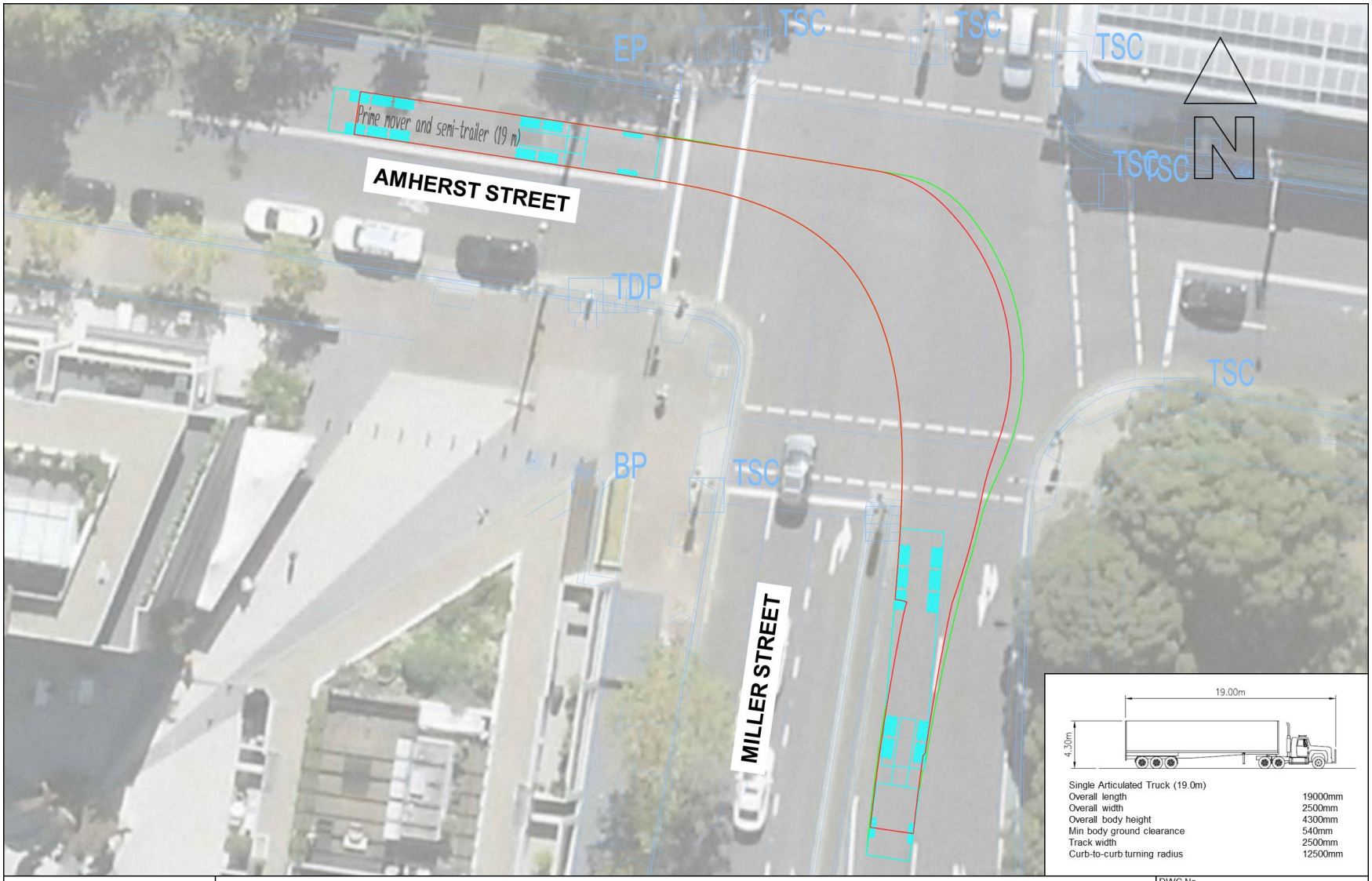
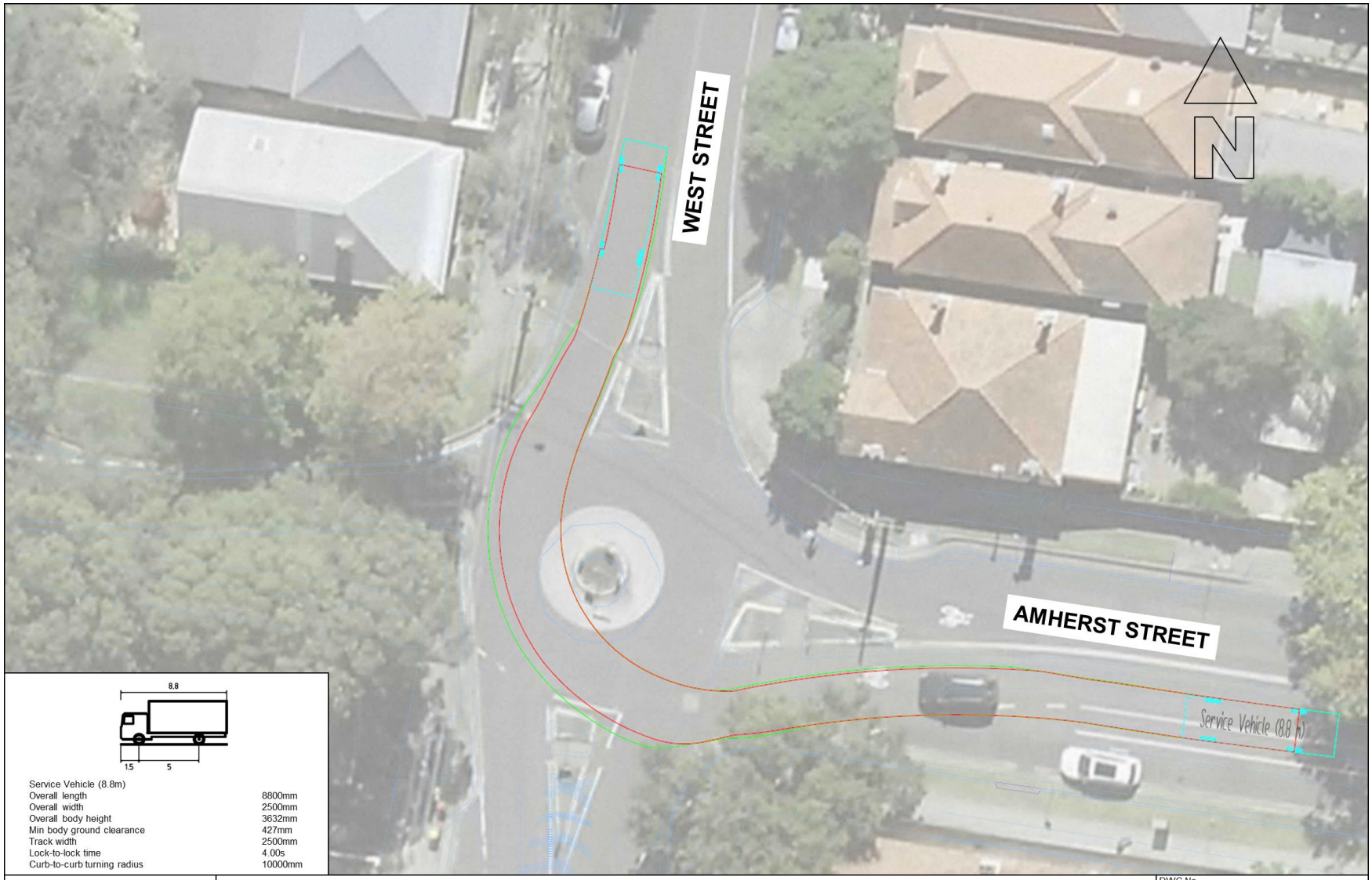
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-3 |
| | SWEPT PATH ANALYSIS – MILLER STREET AND AMHERST STREET<br>12.5m SINGLE UNIT TRUCK / BUS | DATE STAMP<br>5 OCTOBER 2021 |




| | | |
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-4 |
| | SWEPT PATH ANALYSIS – MILLER STREET AND AMHERST STREET<br>19m SEMI-TRAILER | DATE STAMP<br>23 NOVEMBER 2021 |







| Service Vehicle (8.8m) | |
|---|---|
| Overall length | 8800mm |
| Overall width | 2500mm |
| Overall body height | 3632mm |
| Min body ground clearance | 427mm |
| Track width | 2500mm |
| Lock-to-lock time | 4.00s |
| Curb-to-curb turning radius | 10000mm |

SYDNEY PROGRAM ALLIANCE

WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE
STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL

SWEPT PATH ANALYSIS – AMHERST STREET AND WEST STREET
8.8m SINGLE UNIT TRUCK

DWG No. APPENDIX A-5

DATE STAMP 5 OCTOBER 2021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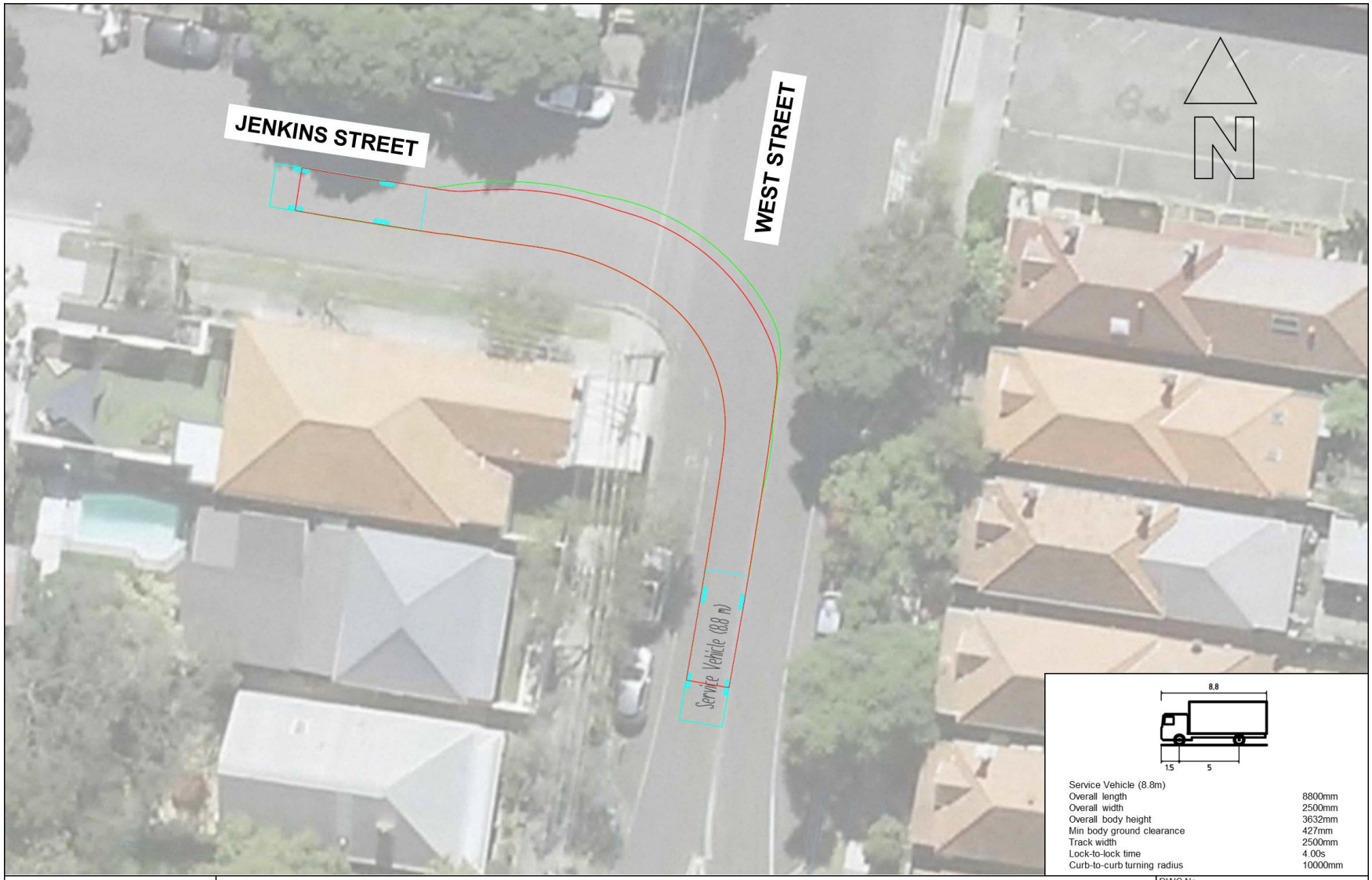
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-6 |
| | SWEPT PATH ANALYSIS – AMHERST STREET AND WEST STREET<br>8.8m SINGLE UNIT TRUCK | DATE STAMP<br>5 OCTOBER 2021 |

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|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-7 |
| | SWEPT PATH ANALYSIS – WEST STREET AND JENKINS STREET<br>8.8m SINGLE UNIT TRUCK | DATE STAMP<br>1 DECEMBER 2021 |


| | | |
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-8 |
| | SWEPT PATH ANALYSIS – WEST STREET AND JENKINS STREET<br>8.8m SINGLE UNIT TRUCK | DATE STAMP<br>1 DECEMBER 2021 |


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|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-9 |
| | SWEPT PATH ANALYSIS – ARMSTRONG STREET AND MASSEY STREET<br>8.8m SINGLE UNIT TRUCK | DATE STAMP<br>5 OCTOBER 2021 |


SYDNEY PROGRAM ALLIANCE

WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE
STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL

DWG No. APPENDIX A-10

SWEPT PATH ANALYSIS – ARMSTRONG STREET AND MASSEY STREET
8.8m SINGLE UNIT TRUCK

DATE STAMP 5 OCTOBER 2021


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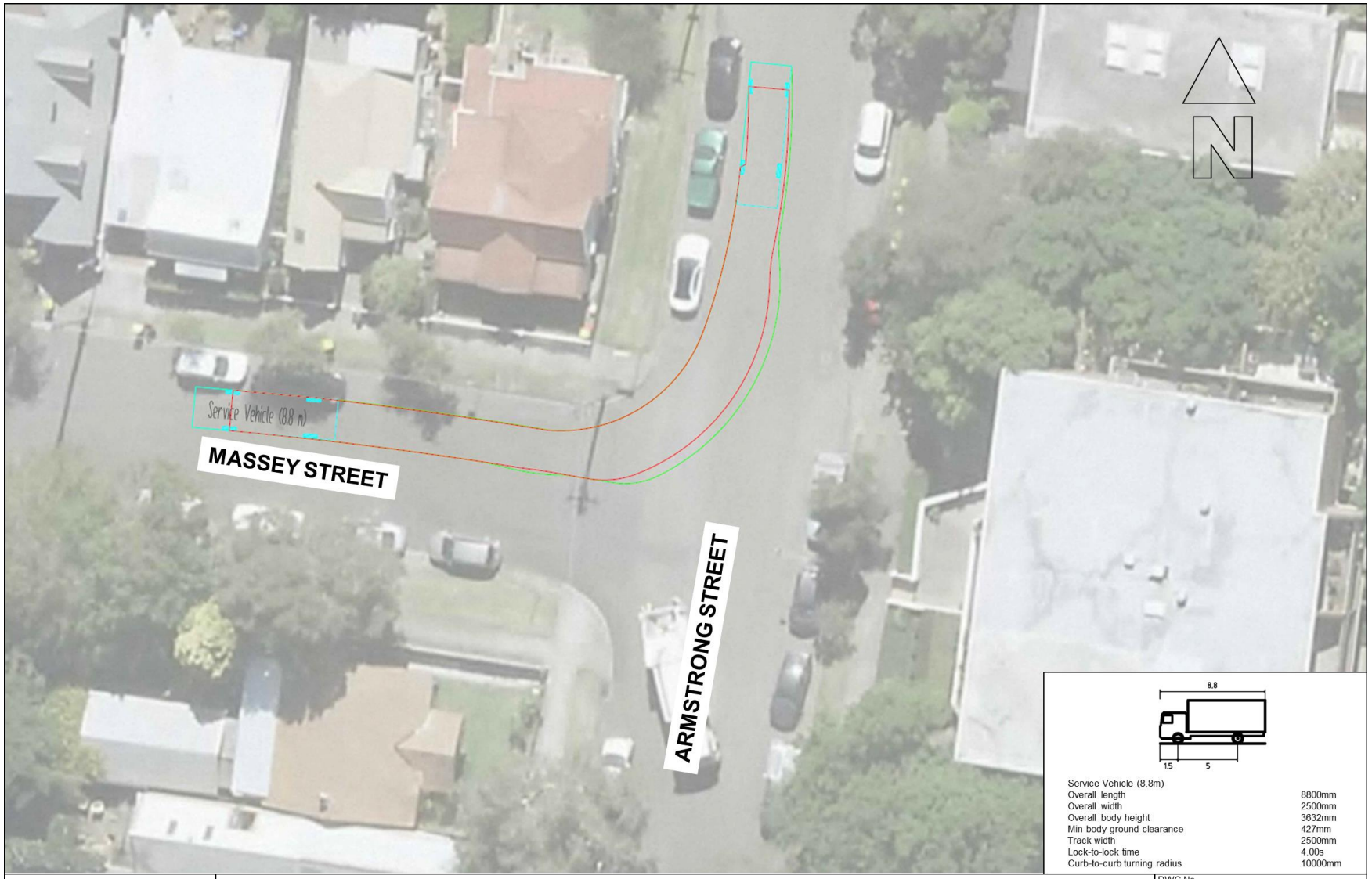
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-11 |
| | SWEPT PATH ANALYSIS – ARMSTRONG STREET AND MASSEY STREET<br>8.8m SINGLE UNIT TRUCK | DATE STAMP<br>5 OCTOBER 2021 |



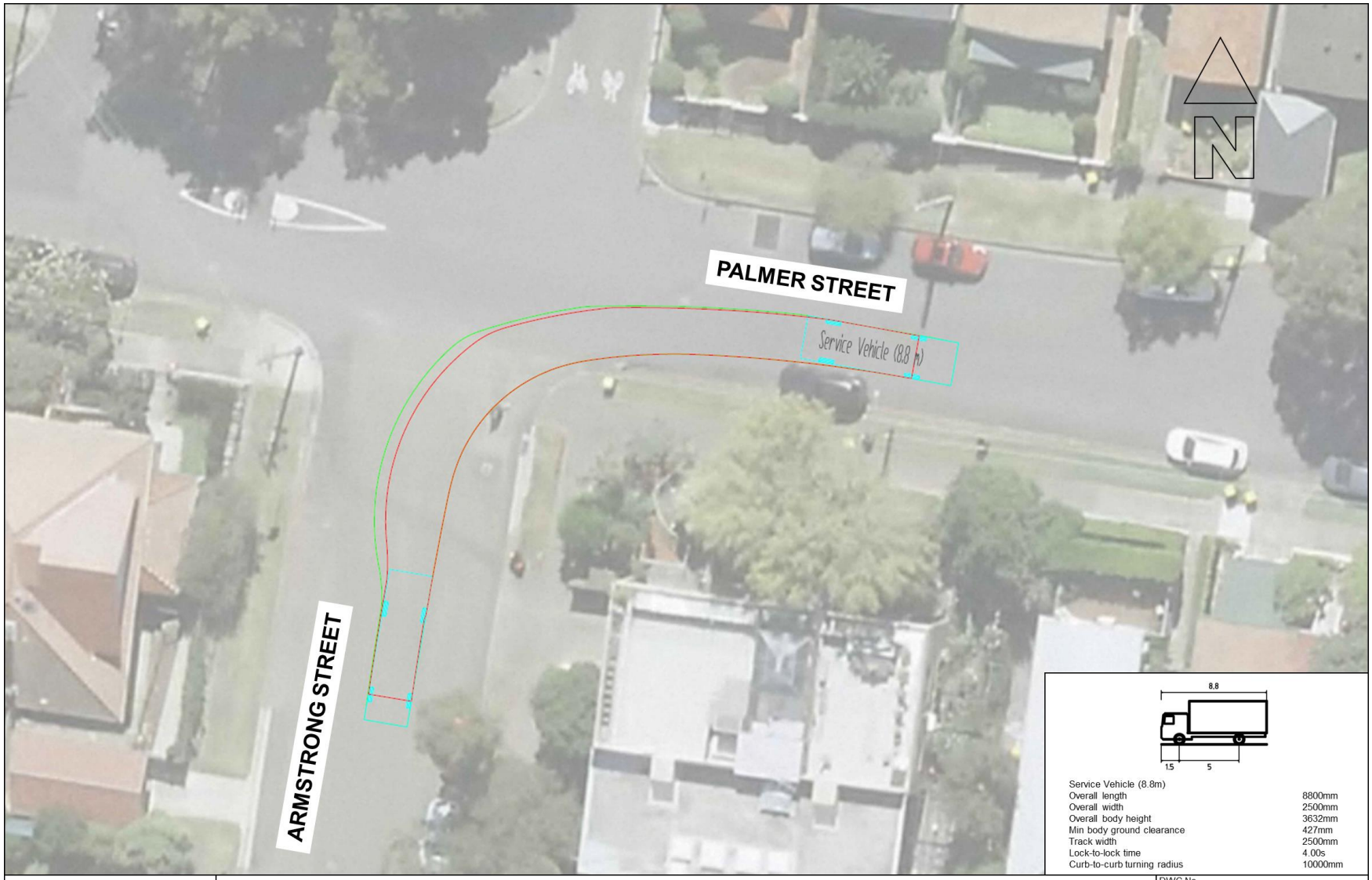

SYDNEY PROGRAM ALLIANCE

WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE
STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL

DWG No. APPENDIX A-12

SWEPT PATH ANALYSIS – ARMSTRONG STREET AND MASSEY STREET
8.8m SINGLE UNIT TRUCK

DATE STAMP 5 OCTOBER 2021

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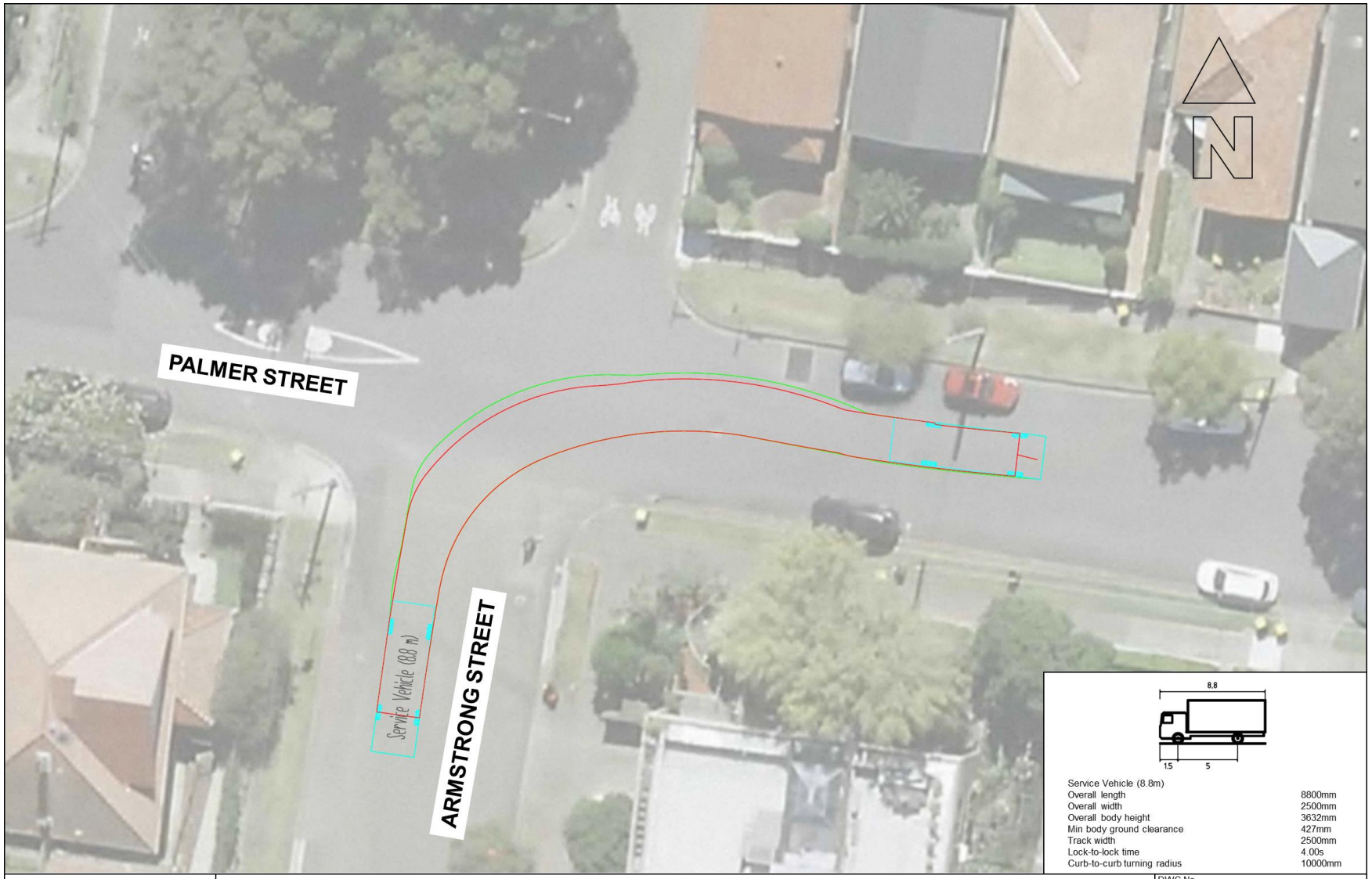
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-13 |
| | SWEPT PATH ANALYSIS – PALMER STREET AND ARMSTRONG STREET<br>8.8m SINGLE UNIT TRUCK | DATE STAMP<br>5 OCTOBER 2021 |

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|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-14 |
| | SWEPT PATH ANALYSIS – PALMER STREET AND ARMSTRONG STREET<br>8.8m SINGLE UNIT TRUCK | DATE STAMP<br>1 DECEMBER 2021 |

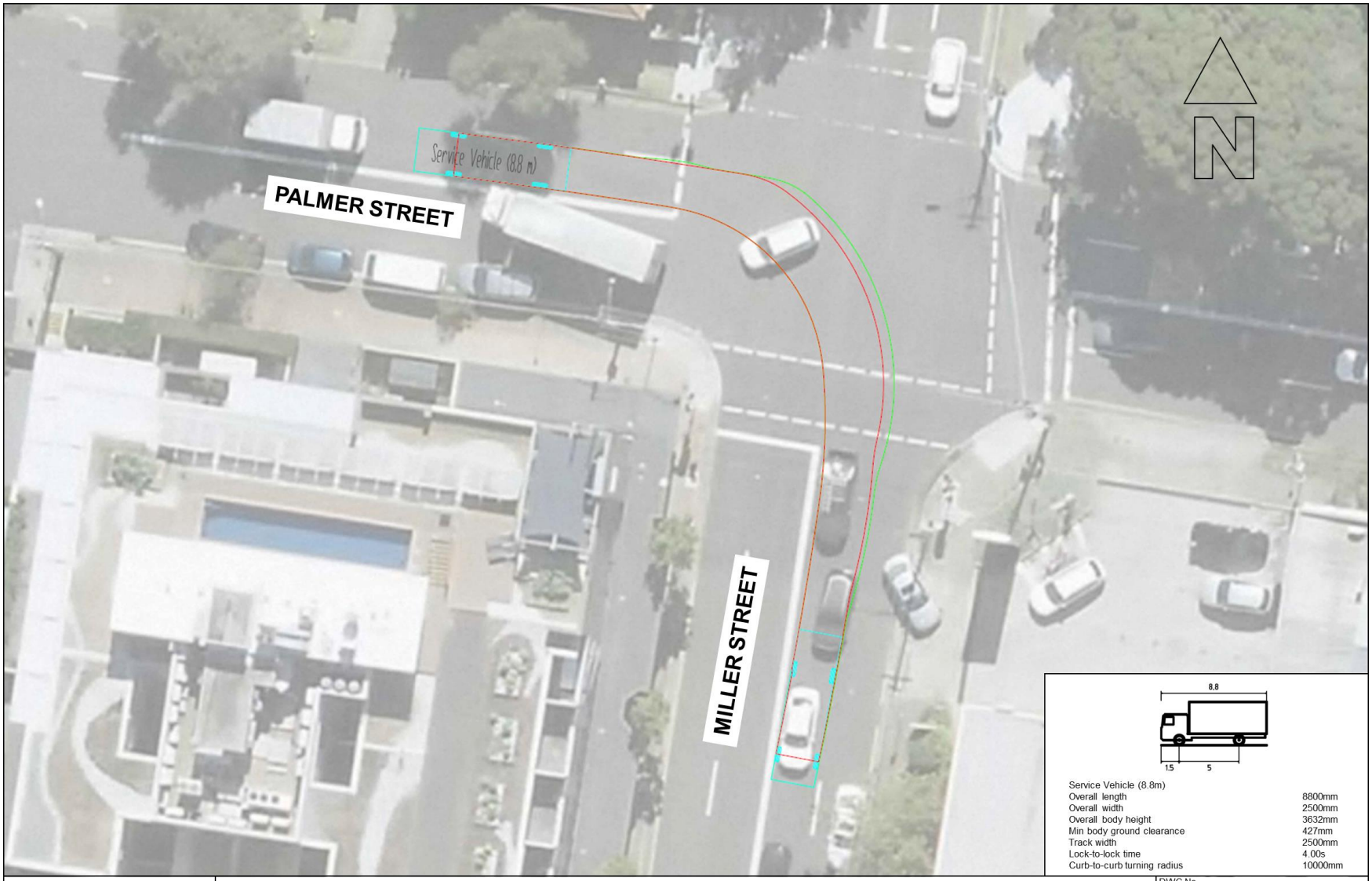

SYDNEY PROGRAM ALLIANCE

WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE
STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL

DWG No. APPENDIX A-15

SWEPT PATH ANALYSIS – MILLER STREET AND PALMER STREET
8.8m SINGLE UNIT TRUCK

DATE STAMP 5 OCTOBER 2021




SYDNEY PROGRAM ALLIANCE

WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE
STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL

SWEPT PATH ANALYSIS – MILLER STREET AND PALMER STREET
8.8m SINGLE UNIT TRUCK

DWG No. APPENDIX A-16

DATE STAMP 5 OCTOBER 2021

# Appendix A3 The risk assessment system

Each identified hazard has been recorded and assessed in accordance with the Austroads *Guide to Road Safety Part 6: Managing Road Safety Audits* (Edition 1.0), 2019. The guide recommends a risk matrix be used to determine the level of risk associated with each hazard. This risk matrix is described below.

**Estimated crash frequency:** the probable frequency of an incident occurring as a direct result of the hazard was determined using the scale displayed in Table A3-1.

*Table A3-1 Estimated crash frequency*

| Frequency | Description |
|---|---|
| Frequent | Once or more per week |
| Probable | Once or more per year (but less than once a week) |
| Occasional | Once every five or ten years |
| Improbable | Less often than once every ten years |

**Estimated crash severity:** the likely severity of the incident which occurred as a direct result of the hazard was determined using the scale displayed in Table A3-2.

*Table A3-2 Estimated crash severity*

| Severity | Description | Examples |
|---|---|---|
| Catastrophic | Likely multiple deaths | • High-speed, multi-vehicle crash on freeway<br>• Car runs into crowded bus stop<br>• Bus and petrol tanker collide<br>• Collapse of a bridge or tunnel |
| Serious | Likely death or serious injury | • High or medium-speed vehicle/vehicle collision<br>• High or medium-speed collision with a fixed roadside object<br>• Pedestrian or cyclist struck by a car |
| Minor | Likely minor injury | • Some low-speed vehicle collisions<br>• Cyclists falls from bicycle at low speed<br>• Left-turn rear-end crash in a slip lane |
| Limited | Likely trivial injury or property damage only | • Some low speed vehicle collisions<br>• Pedestrian walks into object (no head injury)<br>• Car reverses into post |

**Deemed level of risk:** the risk matrix displayed in Table A3-3 was used to assess the level of risk for each hazard. The risk matrix uses the frequency / severity determined above to determine the likely level of risk for each hazard.

*Table A3-3 Deemed level of risk*

| | | Frequency | | | |
|---|---|---|---|---|---|
| | | **Frequent** | **Probable** | **Occasional** | **Improbable** |
| **Severity** | **Catastrophic** | Intolerable | Intolerable | Intolerable | High |
| | **Serious** | Intolerable | Intolerable | High | Medium |
| | **Minor** | Intolerable | High | Medium | Low |
| | **Limited** | High | Medium | Low | Low |

# Appendix A4 Driver's Code of Conduct

# Driver Code of Conduct

This Driver Code of Conduct applies to all Sydney Program Alliance personnel and any other person undertaking work for the Sydney Program Alliance, whether they are a direct employee of Sydney Program Alliance or employed by another organisation providing a service or product to Sydney Program Alliance.

All drivers must:

- Drive courteously.
- Obey all road rules, including posted speed limits and other traffic signage within work sites and site compounds.
- Take extreme care when driving past other vehicles travelling in the opposite direction on local roads including Amherst Street, West Street, Jenkins Street, Armstrong Street, Massey Street and Palmer Street.
- Report any incidents or near misses to your supervisor immediately.
- Hold a current and valid driving licence for the class of vehicle that you operate. Additionally, you must always carry your current driver licence with you while you are on duty. If your licence is cancelled or suspended, you must let your supervisor know immediately.
- Maintain and operate your vehicle in accordance with the vehicle manufacturer's recommended standards (refer to the vehicle manufacturer's handbook and service schedule).
- Not use engine brakes in residential areas.
- Try to avoid reversing whenever possible. If you cannot avoid it, use extreme caution.
- Ensure your vehicle is fitted with audible reversing alarms.
- Always follow posted signs as they provide vital clues to road conditions and characteristics.
- Always be aware of the following:
    - Reduce your speed in wet conditions
    - Drive cautiously in fog or heavy rain
    - Descend hills at signposted heavy vehicle speeds, or in the lowest gear to suit the conditions
    - Observe road work speed limits
    - Do not exceed the posted speed limit
    - Do not drive at speed past schools, school buses, playgrounds, shopping areas etc.
- Follow Vehicle Movement Plans that specify approved routes to and from work sites and site compounds. Only roads that are shown on the Vehicle Movement Plans may be used. The use of roads that are not shown on the Vehicle Movement Plans is strictly prohibited.
- Follow directions provided by a Sydney Program Alliance employee.
- Park within work sites and site compounds where possible. Parking on public roads is to be avoided. Where this is not possible, contact your Sydney Program Alliance contact to seek alternative arrangements.

SYDNEY PROGRAM ALLIANCE

# DRIVER CODE OF CONDUCT

This Driver Code of Conduct is applicable 24 hours per day, seven days per week. Failure to comply with this Driver Code of Conduct will lead to either the issue of a non-conformance notice or disciplinary action if the offender is an employee of Sydney Program Alliance. If the offending person is employed by another organisation providing a service or product to Sydney Program Alliance, then a suspension or cancellation of a service contract or arrangement with that organisation may be considered.

# Appendix A5 Safety of two-way heavy vehicle movements on local roads


| | | |
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-17 |
| | TWO-WAY HEAVY VEHICLE MOVEMENT ANALYSIS – AMHERST STREET | DATE STAMP<br>17 JANUARY 2022 |


| | | |
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-18 |
| | TWO-WAY HEAVY VEHICLE MOVEMENT ANALYSIS – WEST STREET | DATE STAMP<br>17 JANUARY 2022 |


| | | |
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-19 |
| | TWO-WAY HEAVY VEHICLE MOVEMENT ANALYSIS – JENKINS STREET | DATE STAMP<br>17 JANUARY 2022 |


| | | |
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-20 |
| | TWO-WAY HEAVY VEHICLE MOVEMENT ANALYSIS – JENKINS STREET / ARMSTRONG STREET | DATE STAMP<br>17 JANUARY 2022 |


| | | |
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-21 |
| | TWO-WAY HEAVY VEHICLE MOVEMENT ANALYSIS – ARMSTRONG STREET | DATE STAMP<br>17 JANUARY 2022 |


| | | |
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-22 |
| | TWO-WAY HEAVY VEHICLE MOVEMENT ANALYSIS – MASSEY STREET | DATE STAMP<br>17 JANUARY 2022 |


| | | |
|---|---|---|
| SYDNEY PROGRAM ALLIANCE | WESTERN HARBOUR TUNNEL AND WARRINGAH FREEWAY UPGRADE<br>STAGE 1C EARLY AND ENABLING WORKS – MASSEY TO AMHERST STREET (M2A) NOISE WALL | DWG No.<br>APPENDIX A-23 |
| | TWO-WAY HEAVY VEHICLE MOVEMENT ANALYSIS – PALMER STREET | DATE STAMP<br>17 JANUARY 2022 |