Amber

Traffic & Transportation Direction

Deniliquin BESS

Deniliquin, NSW

Traffic Impact Assessment

July 2025

Reference: 987 rep02 250717 final

Deniliquin BESS

Deniliquin, NSW

Traffic Impact Assessment

Prepared for: NGH Consulting Pty Ltd (NGH)

Status: Final report

Date: 17 July 2025

Reference: 987 rep02 250717 final

Revision	Date	Description	Author	Reviewed	Approved
A	10/10/24	Preliminary Draft	S. Eduards	T. Dwyer	T. Dwyer
B	17/10/24	Updated Draft	S. Eduards	T. Dwyer	T. Dwyer
C	1/11/24	Final	S. Eduards	T. Dwyer	T. Dwyer
D	07/05/25	Response to TfNSW Submission	S. Eduards	T. Dwyer	T. Dwyer
E	15/05/25	Final	S. Eduards	T. Dwyer	T. Dwyer
E	03/07/25	Final (minor updates)	S. Eduards	T. Dwyer	T. Dwyer
F	17/07/25	Response to Submissions	S. Eduards	T. Dwyer	T. Dwyer

Contact

Website: www.amberorg.com.au E: info@amberorg.com.au Phone: 1800 022 363

Executive Summary

Amber Organisation Pty Ltd has been engaged by NGH Consulting Pty Ltd (NGH) to prepare a Traffic Impact Assessment of the proposed Deniliquin Battery Energy Storage System (BESS) (Project) for Avenis Energy on behalf of: AE BESS 4 Pty Ltd as Trustee for AE BESS 4 Unit Trust (the Applicant).

This report supports a State Significant Development (SSD) Development Consent application under Part 4, Division 4.7 of the Environmental Planning and Assessment Act 1979 (SSD-72258210), as an appendix to the Environmental Impact Statement (EIS) for the Project.

The Project includes the construction, operation and decommissioning of a BESS and associated infrastructure with a targeted electricity generation capacity of up to 120MW/480MWh (4 hours).

The Project Area is located on the southern side of Riverina Highway, approximately 8 kilometres southeast of Deniliquin. Access to the site is proposed via a direct connection to the Riverina Highway.

Traffic generated by the Project can be separated by construction, operation and decommissioning stages. The peak traffic generating potential is during construction which generates trips associated with the workforce accessing the Project Area and the delivery of materials and plant. During operation the Project is expected to generate up to 6 vehicle movements per day associated with 1-2 maintenance personnel accessing the Project Area with some deliveries. Decommissioning is anticipated to generate a similar level of traffic to the construction stage.

The construction period is expected to commence in mid-2027 and take approximately 12 months, with the peak construction period expected to take 6 months. A construction workforce of up to 75 full-time equivalent personnel would be on-site during the peak construction phase and would primarily be drawn from Deniliquin.

It is anticipated that during peak construction the Project could generate up to 80 light and 86 heavy vehicles trips per day. Construction of the BESS is expected to generate approximately 46 total vehicle trips per hour in the morning and evening peak hours during the peak construction period, which would reduce to 30 vehicle trips per peak hour during the average construction periods. A small proportion of the project traffic will be generated by works at the adjacent Deniliquin Substation.

In order to determine the traffic impact generated during the construction of the Project, a mid-block assessment has been undertaken for the operation of Riverina Highway. The assessment also included review of the cumulative traffic on the road network generated by other major projects in the surrounding area. Overall, the assessment shows that the construction traffic is expected to have a minimal impact on the operation of the road network and the Level of Service remains acceptable. Accordingly, it is concluded that the road network is able to accommodate the traffic generated by the development during the construction period.

Amber has undertaken an assessment of the expected access routes for construction traffic to the site which identified that Basic Left Turn and Basic Right Turn treatments should be provided at the main BESS site access onto Riverina Highway and to the existing Deniliquin Substation. Both access points have adequate sight distance to allow vehicles to safely enter the State Road network, noting a small amount of vegetation maintenance within the road reserve to the east.

Port Botany and the Port of Melbourne have been identified as the ports where the BESS plant will be imported. The access route utilises roads that are designated for B-Double vehicles as outlined within

the National Heavy Vehicle Regulator (NHVR) Restricted Access Vehicle Map. The designated routes will ensure that all B-Double vehicles approach the Project Area from the east on Riverina Highway.

The preferred access route for the oversize/overmass vehicle transporting the largest BESS component is from Glen Waverley, Victoria. The Route Assessment has identified some minor road works such as temporary removal of traffic signs in order to allow the vehicles to access the Project Area. The Route Assessment is provided within Appendix A of this document.

In order to mitigate the impacts of the Project during construction a Traffic Management Plan would be prepared which outlines a range of traffic management measures in order to ensure the construction traffic would have a minimal impact to the capacity and safety of the surrounding road network. The Traffic Management Plan would be prepared post-approval and prior to the construction of the Project.

Based on the assessment, it is concluded that the road network is able to accommodate the expected vehicle types and traffic volumes during the construction, operation, and decommissioning phases of the Project subject to the proposed site access upgrades and traffic management measures. Further, the site access location has been suitably designed to allow vehicles to safely enter and exit the Project Area.

Table of Contents

1. Background 7
   1.1 Introduction 7
   1.2 Environmental Assessment Requirements 9
   1.3 Road/Rail Authority Consultation 10
   1.4 Purpose of Document 15

2. Existing Conditions 17
   2.1 Site Location 17
   2.2 Road Network 18
   2.3 Traffic Volumes 18
   2.4 Public Transport Services 19
   2.5 Restricted Vehicle Access 20
   2.6 Crash History 23

3. Project Description 25
   3.1 Proposed Works 25
   3.2 Construction Information 25

4. Traffic Assessment 26
   4.1 Definitions 26
   4.2 Construction Phase 27
   4.3 Operational Phase 35
   4.4 Decommissioning Phase 36
   4.5 Summary 36

5. Heavy Vehicle Route Assessment 37
   5.1 General Access Vehicles 37
   5.2 B-Double Access Route 38
   5.3 Mitigation Measures 40

6. High-Risk OSOM Vehicles 41
   6.1 Load and Vehicle Configurations 41
   6.2 Transformer Vehicle 41
   6.3 Access Route 42
   6.4 Bridge and Rail Infrastructure 44
   6.5 Summary 45

7. Site Access 47
   7.1 Turn Treatments 47
   7.2 Design 48
   7.3 Sight Distance 49
   7.4 Emergency Access 51

8. Traffic Management Plan 53
8.1 Information and Communication 53
8.2 Signage 54
8.3 Shuttle Buses 54
8.4 On-Site Mitigation Measures 54
8.5 Site Specific Measures 54
8.6 Driver Protocols 55
9. Mitigation Measure Summary 56
9.1 Schedule of Road Upgrades 56
10. Conclusion 57

Appendices

Appendix A

OSOM Route Assessment

Appendix B

Response to TfNSW Agency Advice

Appendix C

Traffic Survey Data

Appendix D

Site Access Design and Swept Path Assessment

Appendix E

Sight Distance Assessment – Site Accesses / Riverina Highway

Definitions

Term	Definition
Project	A Battery Energy Storage System (BESS) as described within the EIS to which this Application applies.
Project Area	Boundary shown on Figure 1 to which the Application applies (unless otherwise stipulated).
Applicant	Avenis Energy on behalf of AE BESS 4 Pty Ltd as Trustee for AE BESS 4 Unit Trust
Application	Application for Development Consent under Part 4.7 of the EP&A Act; and Determination under Part 9 of the EPBC Act.

1. Background

1.1 Introduction

Amber Organisation Pty Ltd has been engaged by NGH Consulting Pty Ltd (NGH) to prepare a Traffic Impact Assessment of the proposed Deniliquin BESS.

The Project includes the construction, operation and decommissioning of a Battery Energy Storage System (BESS) and associated infrastructure with a targeted storage capacity of up to 120MW / 480MWh (4 hours). The project also includes connection works to the adjacent Deniliquin Transgrid Substation which are to be undertaken by Transgrid.

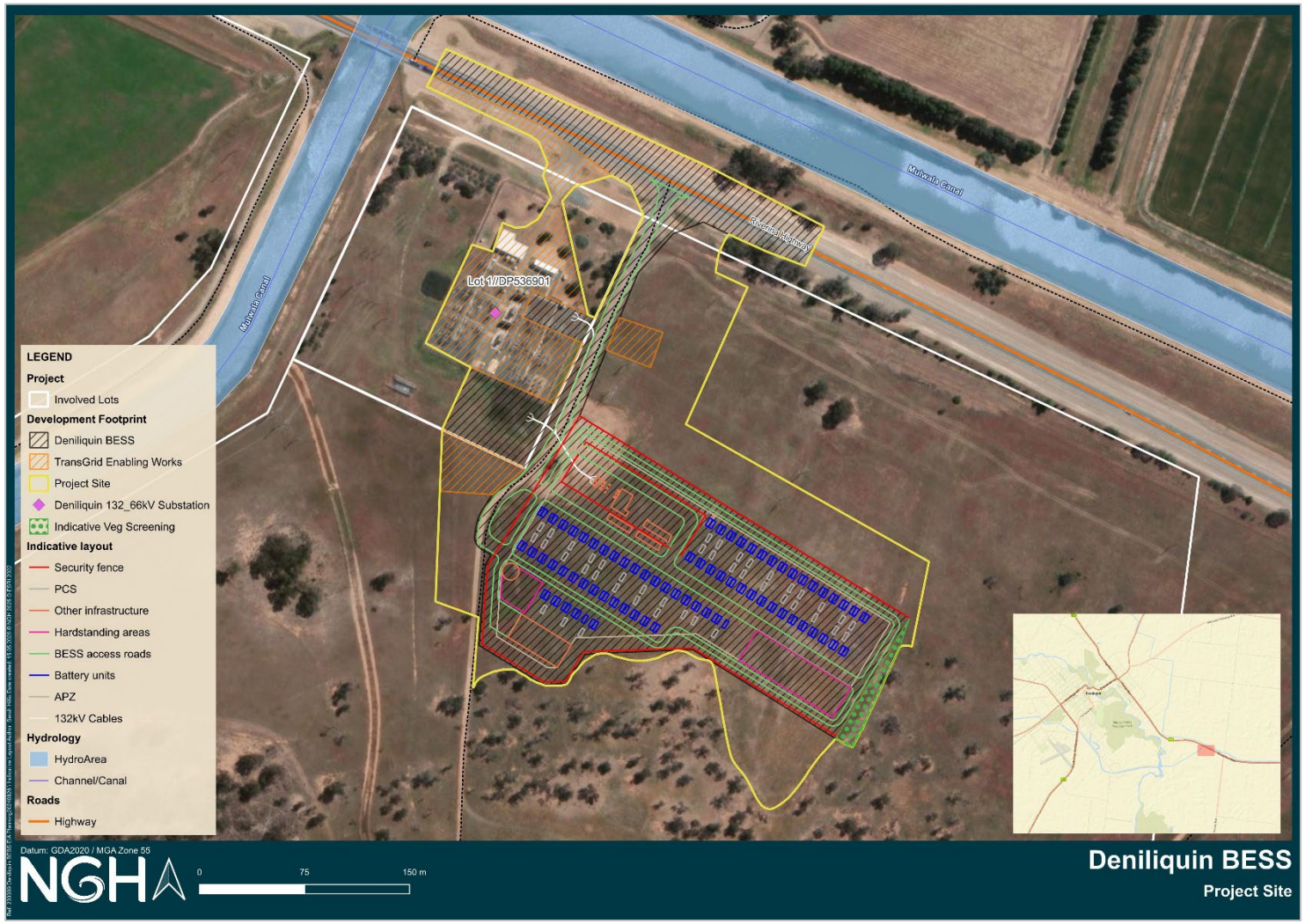
The site is located on the southern side of Riverina Highway, approximately 8 kilometres southeast of Deniliquin within the Edward River Local Government Area (LGA). Figure 1 shows the proposed layout of the site in relation to the road network, access locations and existing infrastructure. It is also noted that the site is directly adjacent to the existing Deniliquin Electrical Substation. Main access to the site is proposed directly from Riverina Highway on the northern boundary of the site, approximately 70 metres east of the Transgrid Substation access.

Construction is expected to commence in mid-2027 and take approximately 12 months, with the peak construction period expected to take 6 months. A maximum workforce of 75 people would be on-site during peak construction periods with the workforce expected to be primarily located in Deniliquin.

Project plant is expected to be delivered from Port Botany or Port of Melbourne. More general construction materials and equipment will be sourced from within Deniliquin or the surrounding area.

The impacts and proposed mitigation for traffic generated by the proposed construction, operation and decommissioning phases of the Project are addressed in this report in accordance with relevant regulatory requirements and guidelines.

Figure 1: Site Layout



Source: NGH

1.2 Environmental Assessment Requirements

This report supports a State Significant Development (SSD) Development Consent application under Part 4, Division 4.7 of the Environmental Planning and Assessment Act 1979 (SSD-72258210), as an appendix to the Environmental Impact Statement (EIS) for the Project. NSW Department of Planning, Housing and Infrastructure have issued Secretary's Environmental Assessment Requirements (SEARs) for the Project, with the traffic and transport matters listed within Table 1 along with the relevant response to each matter.

Table 1: Traffic and Transport SEARs and Responses

SEARs	Response
An assessment of the peak and average traffic generation, including over-dimensional vehicles and construction worker transportation.	The assessment presented within Section 4 indicates the road network is expected to continue to operate with acceptable conditions during peak and average construction periods. The highest level of traffic is expected to be generated during the peak construction period when staff arrive and depart the site at the start and end of the day. A mid-block assessment at the Site accesses on Riverina highway indicates the road network is able to accommodate the Project traffic and would continue to operate with a good level of service. During the middle of the day the traffic movements are expected to be predominantly associated with heavy vehicles with approximately 12 vehicles per hour. This increase in traffic can be readily accommodated on the road network given the existing low traffic volumes and the road network would operate with less vehicles than during the peak hour. It is anticipated that 3 high-risk oversize/overmass vehicles would access the site during construction. The vehicles would travel outside of the peak periods and would be able to be accommodated on the road network with minimal impacts subject to the proposed road upgrades identified within Section 6. Suitable road management strategies would also be adopted as part of specific permits that would be applied for prior to construction.
An assessment of the likely transport impacts to the site access route(s) including for over-dimension vehicles, site access point(s), any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance.	The Applicant has advised that the transformer could be manufactured and delivered from *Wilson Transformer Company* in Glen Waverley, Victoria, and as such is to be utilised as the origin point for the largest OSOM vehicles. In order to determine whether any civil works are required to accommodate the OSOM vehicle on the road network a route assessment has been undertaken and is provided in Appendix A. The assessment identified that the vehicle is able to access the site with minor civil works, signage relocation and suitable traffic management measures. Further information on OSOM vehicles is provided in Section 6. The site access arrangements are assessed within Section 7. The access has been designed for heavy vehicle movement and provides suitable sight distance in accordance with the Austroads Guide, subject to minor pruning of roadside vegetation which is proposed to occur prior to the commencement of the construction phase of the Project. The haulage route for heavy vehicles arriving from Port Botany and Port of Melbourne is assessed within Section 5. The access route for B-Doubles utilises roads that are designated for B-Double vehicles as outlined within the NHVR Restricted Access Vehicle Map. A review of the existing road safety data and casualty crash history is provided within Section 2.6 which indicates that the road network is operating in a relatively safe manner.

SEARs	Response
A cumulative impact assessment of traffic from nearby developments.	The assessment presented within Section 4.2.5 provides a review of the cumulative impacts of the Project along with other major Projects within the surrounding area. The assessment identifies some projects are expected to generate additional vehicle movements within Deniliquin. These vehicle movements would be distributed on the surrounding road network and are expected to have a minimal cumulative impact on the operation of the local road network. The review also indicates that there are four projects that have potential to use Riverina Highway at the Site access location. The timing of construction is unknown with these projects, but traffic generation has been estimated based on available reports and assessment and assuming these projects would be constructed concurrently. These traffic volumes were included in the mid-block assessment at the Site access on Riverina highway which indicates the road network would continue to operate with a good level of service. The traffic assessment also considers the traffic generated by the project to the existing access at the Deniliquin Substation. As a result of this assessment it is proposed to upgrade the existing Transgrid Substation access as outlined in Section 7.
Provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authority.	A Traffic Management Plan (TMP) is to be developed prior to construction of the Project which should include the recommendations provided within this document. The adoption of the mitigation measures outlined within the TMP would ensure construction traffic has a minimal impact on the capacity and safety of the surrounding road network. In addition to the traffic management measures, it is proposed to provide minor road upgrades as part of the Project which are to be constructed prior to construction commencing. A schedule of the road upgrades is provided in Section 9.1.

This Traffic Impact Assessment has also been prepared in response to the Agency Advice provided by Transport for New South Wales (TfNSW). Responses to each of the comments provided within the Agency Advice are outlined within Appendix B.

1.3 Road/Rail Authority Consultation

This Traffic Impact Assessment has been undertaken in consultation with TfNSW, Edward River Council and V/Line with a summary provided in Table 2.

Table 2: Road Authority Consultation

Road Authority	Method	Correspondence
Transport for NSW	Phone and Email	Advised to utilise growth rate of 1.5% per annum for traffic forecasts. TfNSW representatives from the region were also contacted via phone and email on 13 September 2024 on the site access design and the proximity to new guardrail on the opposite side of the road. Thy provided photos on 8 October 2024 showing the drop at the road edge which confirmed the need for the guardrail. They were provided the site access design which proposes modifications to the guardrail (minor realignment and extension, refer Appendix D) on 24 October 2024 for comment.
Edward River Council	Phone and Email	Council is unaware of any future road upgrades, or major projects, in this area that would coincide with the BESS construction.
V/Line	Website	Required to obtain permission in order to take OSOM loads across V/Line infrastructure. Once received the Heavy Vehicle Access Permit (HVAP) from VicRoads and determine that you are required to transport the load across V/Line railway crossings, you need to apply for an access permit from V/Line.

1.3.1 TfNSW Response to EIS

TfNSW provided a submission to the EIS related to a previous revision of this Traffic Impact Assessment (Rev. C, dated 1 November 2024) in a letter dated 4 March 2025.

The matters raised and to be addressed in a revised Traffic Impact Assessment (this document) are summarised in Table 3 along with a response and reference location.

Table 3: TfNSW Comments and Response

TfNSW Comment	Response	Reference Location
Key Issues		
The impact on the State Road network, particularly to the intersection with the Riverina Highway has not been adequately addressed and use of existing substation access. The revised TIA should clarify discrepancies and ensure identification of the worst-case scenario for the background traffic and turning traffic volumes.	Revised turn warrant assessments have been undertaken which include the use of the Deniliquin Transgrid Substation access for project traffic. The assessment represents a worst-case scenario including consideration to the cumulative impacts of surrounding projects and are based on average weekday traffic volumes for a survey undertaken over seven days.	**Section 7.1**
Further information is required to be included within revised strategic concept designs and must include, assessment of the flooding impacts to the Riverina Highway.	Suitable revisions have been made to the strategic concept designs as a result of this update. However, detailed flood modelling	**Appendix D**

TfNSW Comment	Response	Reference Location
	is not considered suitable given the design is at a strategic concept stage. Detailed flood modelling and mitigation works (as required) would be designed and approved as part of future detailed design development as a post-approval requirement.	
The route study does not provide enough information to assess the impacts on TfNSW assets and the compliance of possible road upgrades and mitigation measures in accordance with Austroads Guide to Road Design, Austroads Guide to Temporary Traffic Management and TfNSW supplements.	The high-level route assessment provides sufficient information to demonstrate that a High-Risk OSOM vehicle is able to access site subject to some minor road works such as temporary removal of traffic signs. Specifically, there were only two identified pinch points in NSW on the proposed access route, in Tocumwal and Finley (aside from the site access). Once the delivery vehicle and load are confirmed, relevant permits will be sought from all relevant road authorities as part of a National Heavy Vehicle Regulator (NHVR) application as a post-approval requirement.	**Section 6, Appendix A**
Requirements for revised Strategic Concept Designs. flood assessments and swept paths		
The updated TIA and strategic concept designs must be updated to consider flooding requirements appropriately. This should consider: *The flood modelling (including afflux) within the EIS (Figure 6.32) must be extended to include an assessment of the proposed BAR intersection treatment. This is to ensure the construction, which will reduce the effective waterway area will not have an adverse impact to the Riverina Highway flood immunity and the surrounding afflux. The proponent is required to identify the current flood immunity based on their modelling and the future modelling post construction.* *Figure 6.28 and Figure 6.32 of the EIS demonstrate localised flooding within the road reserve and table drains. The updated TIA and strategic concept designs must provide the requirements for longitudinal culverts under the intersection to ensure that the culverts can convey flows under the intersection and side road.*	As outlined above, detailed flood modelling is not considered suitable given the design is at a strategic concept stage. Detailed flood modelling and mitigation works (as required) would be designed and approved as part of future detailed design development. Updated strategic designs have been prepared which do show indicative drainage design as part of a road cross-section which would be further developed as part of detailed design.	**Appendix D**
The strategic designs must include modifications to the safety barrier and offset requirements for the proposed rural basic right-turn intersection treatment. It is recommended that the safety barrier be further offset by 0.5m beyond the BAR widening.	An updated strategic design has been prepared which includes an additional offset to the safety barrier.	**Appendix D**
The provided Safe Intersection Sight distance identifies tree trimming required to achieve eastbound sight distance eastbound when a vehicle is positioned at the	The environment impacts of the trimming of the vegetation are being considered as part of the	**Section 8.5**

TfNSW Comment	Response	Reference Location
intersection. The extent of the trimming and maintenance measures to maintain the required SISD are to be included within the revised strategic designs and TIA. It is required to be clarified at the environmental planning stage to ensure this impact is considered and avenues explored with the Department of Planning, Housing and Infrastructure.	Biodiversity Development Assessment Report. The maintenance of the vegetation is considered best addressed as a site-specific measure of a future Traffic Management Plan.	
The swept paths shown on strategic designs for the intersection appear to demonstrate the check vehicle travelling outside of the area delineated for the upgraded intersection. The design is be reviewed to ensure that lane width and shoulder width can accommodate the check vehicles turning arc within the existing pavement.	The swept paths have been revised as part of the refinements to the strategic concept designs and remain the on proposed pavement.	**Appendix D**
Typical sections must be included within the revised drawing set for the proposed intersection upgrade and must include batters and drainage requirements, these details are requested to ensure that the footprint captures the extents of the scope of road upgrades.	Typical sections have been included as part of the updates to the strategic concept designs.	**Appendix D**
Strategic concept designs are to identify that a 3.5m wide shoulder will be maintained at the proposed access. This requirement must also be included on any strategic concept design if the existing substation access is to be used as a part of the project.	The revised strategic design plans include 3.5m wide shoulders.	**Appendix D**
Existing Substation access and emergency access assessment requirements		
Confirm if additional access is required for the work proposed at the existing substation or if all access will be via the proposed new access to the Riverina Highway. *If access is needed from the substation access, then a turn warrants assessment (see figure 3.25 Austroads Guide to Traffic Management Part 6) will be required to assess the required intersection treatments for this access. The turn warrant assessment is to be based on the project AM/PM peak traffic volumes entering the substation access applied to the network peak hour and include the cumulative background traffic volumes from projects at EIS or that are approved that will have the same timeframes for construction and use the same routes.* *Based on the turn warrant assessment outcome, a strategic concept design will be required to be prepared and must including swept paths for the largest heavy vehicle, drainage and typical sections.*	The existing Transgrid Substation access is to be used by a small proportion of vehicles (up to a total of six) associated with the project. A revised turn treatment assessment has been undertaken which shows that the existing Transgrid Substation Access requires a BAR/BAL treatment. The BAR/BAL treatment has been included as part of the updated strategic design using a 19m AV deign vehicle.	**Section 4.2, 7.1 and Appendix D**
The revised EIS will include an assessment of any proposed emergency access points. This is to include: *Must identify how the access will be managed (i.e. gates) to prevent the use of the access for other vehicles associated with the development during peak of construction and operation.* *Identify the emergency design vehicle and provide a swept path analysis identifying.*	As outlined in Section 7.4, the main site access is to be utilised for emergencies, should it be required. The flood hazard modelling shows that the main access provides a safe evacuation route and would remain accessible during a 1% AEP event. Sufficient visibility is provided at	**Section 7.4, Appendix D**

TfNSW Comment	Response	Reference Location
Provision of sufficient storage at the throat of the access to allow for the emergency vehicle to store within the access and not within the through lane or shoulder. *Identify compliance with SISD for the design speed (posted speed +10km/hr).*	the main access for emergency vehicles, and the security gates are proposed to be setback approximately 40 metres from the Riverina Highway, providing sufficient space to accommodate emergency vehicles clear of the Riverina Highway. Accordingly, no adverse impact would be expected to the State Road in the unlikely event of emergencies.	
Revisions required to concept level high-risk route analysis		
The TIA has provided a Concept Level Route Analysis (high risk OSOM (as defined on TfNSW website)) however further detail is required to be included within a revised route analysis: *The applicant must provide details of the crossings on CRN rail corridors located along the transport routes associated with the proposed development.* *Information regarding any crossings is to be provided in the RTS and revised TIA. If any adverse impacts to CRN corridors are identified, the applicant shall seek approvals from UGL Regional Linx (UGLRL) and TfNSW. The applicant must adhere to the transport management and safety requirements of UGLRL and TfNSW for the matters involving CRN corridor.*	The proposed route does not cross any rail corridors administered by CRN. There are crossings in Victoria administered by V/Line as outlined in Section 6.4.3. V/Line have been consulted as outlined in Table 2.	**Section 6, Appendix A**
Bridge and culvert assessments are required for affected locations along the route. For TfNSW assets and can be obtained by contacting spu@transport.nsw.gov.au. The TIA identifies the following locations, bridge assessments will be required for these: *Rail level crossing on Ochertyre Street in Deniliquin for all SPV classified vehicles;* *Bridge on Riverina Highway over Mulwala Canal, approximately 12.2 kilometres east of the site restricted for SPV Level 3 and above;* *Bridge on Riverina Highway over Mulwala Canal, approximately 210 metres north-west of the site restricted for SPV Level 3 and above;* *Bridge on Ochertyre Street over Mulwala Canal, approximately 3.7 kilometres south of Deniliquin for SPV Level 3 and above;* *Bridge on Davidson Street (Cobb Highway) over Edward River flood channel in Deniliquin restricted for SPV Level 4 and above; and* *Bridge on Davidson Street (Cobb Highway) over Edward River in Deniliquin restricted for SPV Level 6.* *Note: The result of bridge assessments may require a change to the route which must be accounted for in the updated route assessment.*	At the time of writing, the exact transformer, vehicle combination and time of transit are not known. The TIA includes detail on an approximate load and vehicle combination as outlined in Section 6.1 and 6.2, based on similar projects. This means that there is insufficient information, including exact axel loads, to undertake the bridge assessments. Once these details are known, formal bridge assessments will be undertaken as part of a future NHVR permit.	**Section 6.4.1**

1.3.2 Response to Submissions RFI

DPHI provided a Request for Further Information in relation to the Amendment Report and Response to Submissions. Matters related to traffic and transport, and this report, are summarised in Table 4.

Table 4: DPHI Request for Information and Response

DPHI Comment	Response	Reference Location
TIA – please ensure the report is consistent in referencing the Transgrid site access and BESS site access. For example, the Transgrid site access is sometimes referred to as the Substation site access.	The report has been updated with all references updated to Transgrid Substation access for clarity.	**Throughout**
It is highly likely that TfNSW will request the following updates to the TIA, as these matters were raised in their feedback during exhibition: *a. We note detailed flood modelling of the impacts to Riverina Highway have not been considered as part of the strategic concept design.*	It is understood that the Applicant are consulting with TfNSW around the requirements for detailed flood modelling. The Applicant is committed to providing detailed flood modelling to TfNSW, with the timing pending outcome of consultation.	**Section 7.2.1**
b. We note bridge assessments have not been conducted as part of the concept route analysis.	A submission was made to the Bridge Assessment team at TfNSW for a Bridge and Culvert assessment in July 2025 with the appropriate team at TfNSW. It is understood the timeframe for a response in 6-12 weeks. The TIA and route assessment will be updated with any findings from the assessment once the advice is provided.	**Section 6.4.1**
c. Details of any consultation conducted with Edward River Council in relation to the Basic Right Turn and Basic Left Turn treatments required for both the Transgrid site access and BESS site access.	Edward River Council were provided the updated Traffic Impacts Assessment (Rev. E data 10 July 2025) for comment and review. The confirmed the Engineering team had reviewed the updated TIA and had no further comment.	**Not applicable**

1.4 Purpose of Document

This Traffic Impact Assessment has been prepared to assess the construction, operational and decommissioning traffic impacts, and the access arrangements of the Project. The assessment responds to the SEARs and details how road impacts of the Project traffic, particularly from heavy vehicle use and oversize and overmass vehicles, would be avoided or managed using road-use management strategies.

More specifically, the report addresses the following key matters:

- Details of both light and heavy vehicle traffic volumes and proposed transport routes;

- An assessment of the potential traffic impacts of the Project on road network function and safety;
- An assessment of the capacity of the existing road network to accommodate the type and volume of traffic generated by the Project;
- Details of measures to mitigate and/or manage potential impacts, including construction traffic control, road dilapidation surveys and measures to control dust generated by traffic volumes; and
- Details of access roads and how these connect to the existing road network and ongoing operational maintenance.

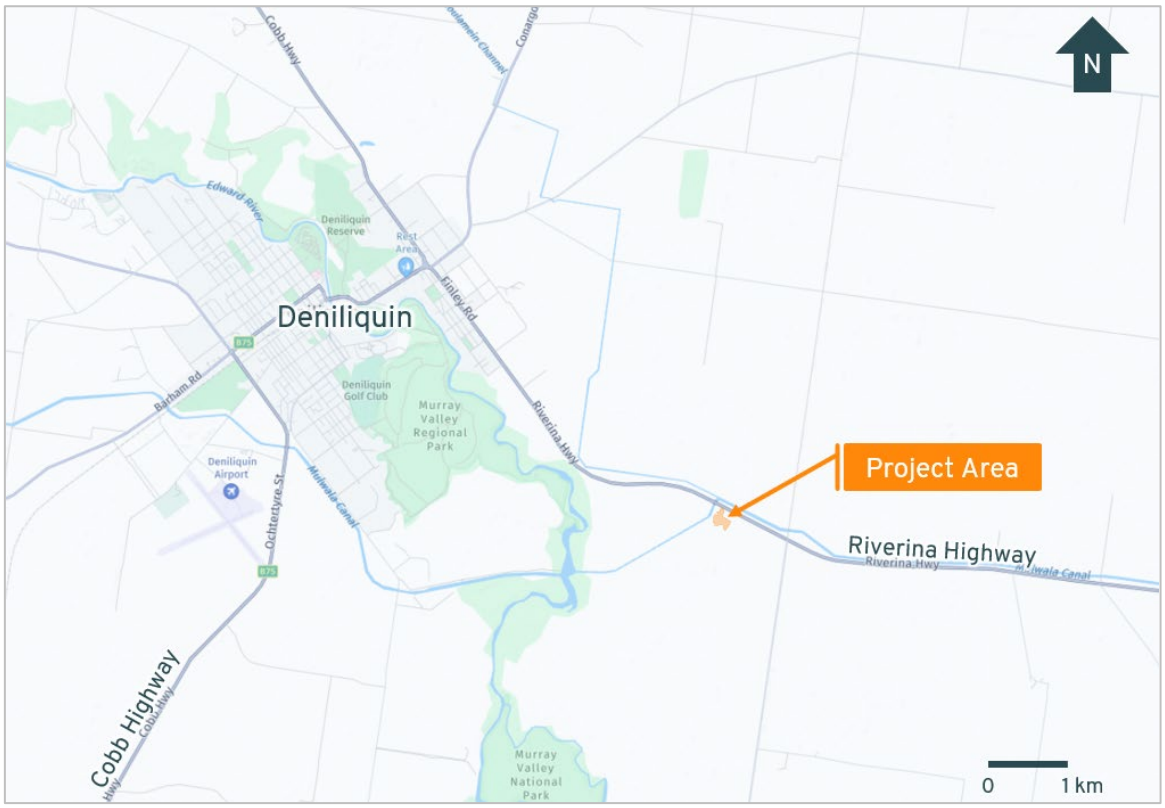
The traffic assessment has been undertaken in accordance with the *RTA Guide to Traffic Generating Developments* and relevant Austroads Guidelines.

2. Existing Conditions

2.1 Site Location

The site is located at 21541 Riverina Highway in Deniliquin, approximately 8 kilometres south-east of Deniliquin and 29 km south of the nominated South-West Renewable Energy Zone (SWREZ) of New South Wales. Figure 2 shows the location of the site in relation to the surrounding transport network.

Figure 2: Site Location



Source: Nearmap

The figure shows the site is well connected with the surrounding State Road network with Riverina Highway running in a general east to west alignment to the east of the site before turning to a north-west direction towards the town of Deniliquin.

The site and surrounding area are zoned *RU1 – Primary Production* and are primarily occupied by agricultural or vegetated land. Land along the north boundary of the site is zoned *SP2-Road Infrastructure.*

The site has an area of approximately 7.4 hectares, is currently used for agricultural purposes, and has access to the road network via an access road connecting with Riverina Highway. The Deniliquin Transgrid Substation is located adjacent to the site at the northeast corner, as shown in Figure 1.

Figure 3 provides an aerial photograph of the site and the surrounding area.

Figure 3: Aerial Photograph of Site and Surrounding Area

Source: SixMaps

The figure shows the agricultural nature of the surrounding area.

2.2 Road Network

Riverina Highway is a State Road that runs in a general east-west alignment along the southern Riverina Region between Deniliquin and East Albury, passing through the town of Finley to the east of the Project Site. It has a typical carriageway width of 7.0 metres which accommodates one lane of traffic in each direction. A guard rail is provided on the north side of the road extending from the bridge to 30 metres west of the site access. There are no turning treatments at the existing site access and a speed limit of 100km/hr applies along the road.

Riverina Highway provides access to Cobb Highway in Deniliquin, approximately 6 kilometres west of the Project Area, and Newell Highway in Finley, approximately 50 kilometres east. These highways provide access to the broader State Road network in New South Wales and Victoria.

2.3 Traffic Volumes

2.3.1 Riverina Highway

Amber commissioned a tube count on Riverina Highway at the proposed site access to determine the existing road environment. The tube count was undertaken from Friday 9 August to Thursday 15 August 2024. The survey results are provided in Appendix C with a summary presented in Table 5.

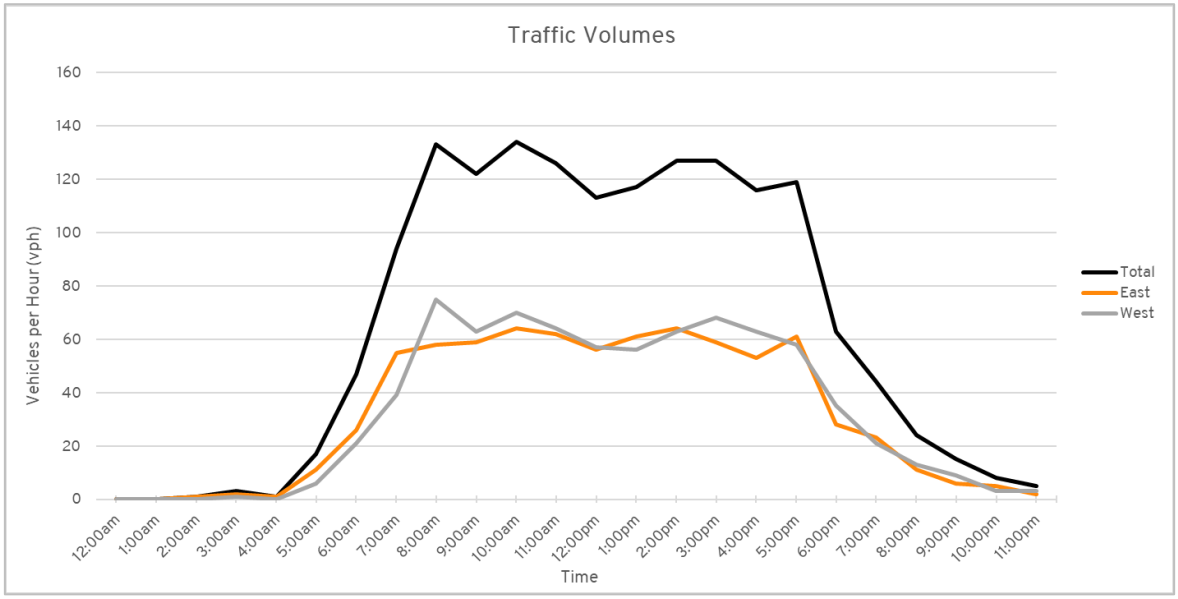
Table 5: Riverina Highway Traffic Volumes – Proposed Site Access

	Weekday Traffic (vpd)	Weekday AM Peak - 10:00 (vph)	Weekday PM Peak - 14:00 (vph)	85th Percentile Speed	Heavy Vehicle Percentage
Eastbound	776	65	64	104.7 km/hr	22%
Westbound	799	70	65	103.2 km/hr	
Both Directions	1575	134	129	103.7 km/hr	

The survey data indicates Riverina Highway currently experiences a moderate level of daily traffic in the order of 1575 vehicles per day which is split evenly between eastbound and westbound vehicles. The 85th percentile speed is marginally higher than the posted speed limit and the road accommodates approximately 22% heavy vehicle traffic.

The average Monday to Friday hourly volumes are shown graphically in Figure 4.

Figure 4: Average Week Day Traffic Volumes on Riverina Highway at Site Access



The figure shows that the traffic volumes along the highway with a relatively consistent volume of traffic between 8:00am and 5:00pm on weekdays.

Overall, the data indicates Riverina Highway currently accommodates a relatively low level of traffic for its road classification and is able to accommodate an increase in vehicle traffic.

2.4 Public Transport Services

A range of bus services are provided along Riverina Highway within the vicinity of the site as outlined in Table 6.

Table 6: Bus Services

Route No.	Route Name	Services	Schedule / Details
733	Wagga Wagga to Echuca	One service provided in the southbound direction on Monday, Wednesday, Friday and Sunday only.	Services travel along Riverina Highway and pass the Project Area at approximately 5:35pm. The nearest bus stop is Whitlock Street, Deniliquin. The bus stop to the east of the Project Area is in Blighty.
734	Echuca to Wagga Wagga	One service provided in the northbound direction on Monday, Wednesday, Friday and Sunday only.	Services travel along Riverina Highway and pass the Project Area at approximately 8:50am. The nearest bus stop is Whitlock Street, Deniliquin. The bus stop to the east of the Project Area is in Blighty.
741	Albury to Echuca	One service provided in the westbound direction on Tuesday, Thursday and Saturday only.	Services travel along Riverina Highway and pass the Project Area at approximately 6:35pm. The nearest bus stop is Whitlock Street, Deniliquin. The bus stop to the east of the Project Area is in Blighty.
742	Echuca to Albury	One service provided in the eastbound direction on Tuesday, Thursday and Saturday only.	Services travel along Riverina Highway and pass the Project Area at approximately 7:55am. The nearest bus stop is Whitlock Street, Deniliquin. The bus stop to the east of the Project Area is in Blighty.
N0658	Deniliquin to Blighty	School bus service	Uses Riverina Highway in the westbound direction in the morning and eastbound direction in the afternoon.
N1201	Deniliquin to Tuppal Creek	School bus service	Uses Riverina Highway in the westbound direction in the morning and eastbound direction in the afternoon.

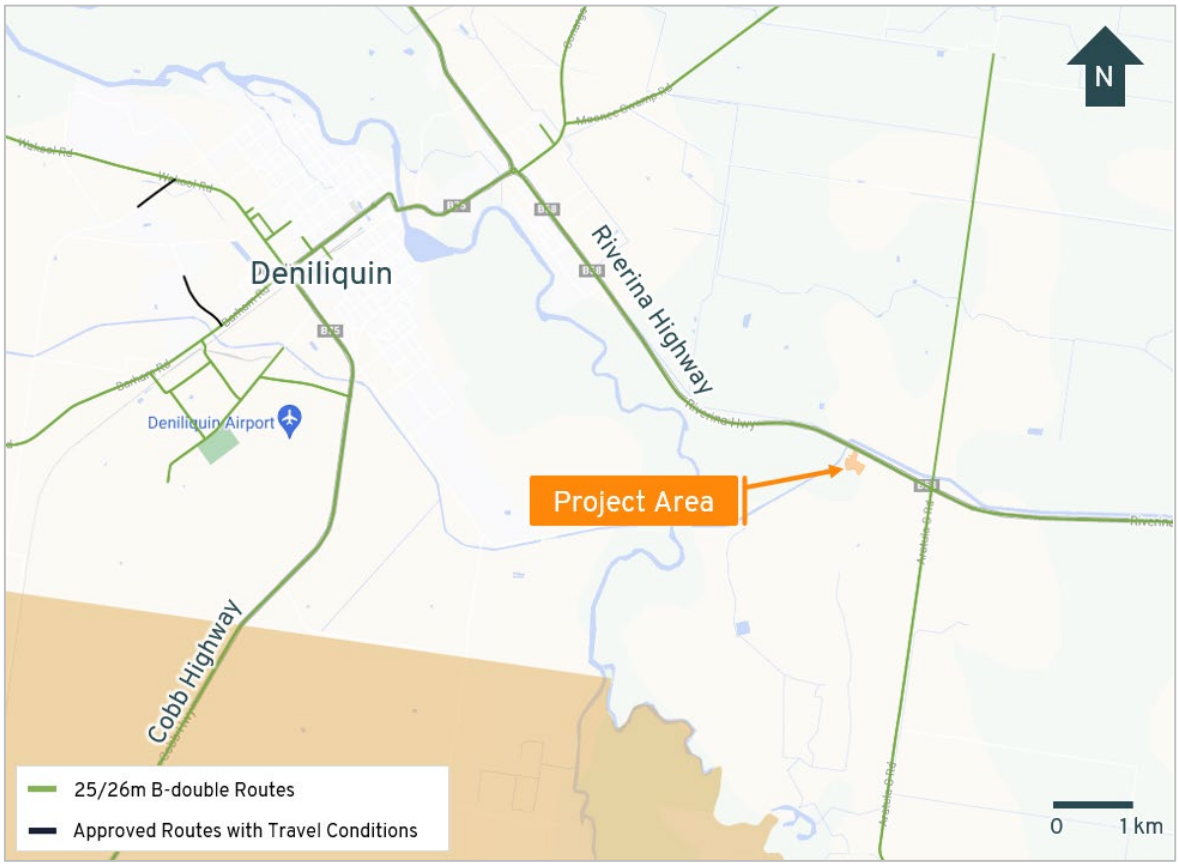
A local bus service, Deniliquin Town Service, operates in the town of Deniliquin three times a day on Monday to Friday only. The route utilises State Roads Riverina Highway (Finley Road) and Cobb Highway (Davidson Street, Charlotte Street and Hardinge Street), however does not leave the town area.

2.5 Restricted Vehicle Access

2.5.1 B-Doubles

The TfNSW Restricted Access Vehicle Map for the surrounding area is provided within Figure 5. The green lines indicate approved B-Double routes while the black lines represent approved routes with travel conditions. The figure shows that the surrounding State Road network are B-Double approved routes. Accordingly, the site has access to the B-Double approved road network via Riverina Highway.

Figure 5: NHVR 26m B-Double Network Approved Roads



Source: NHVR Restricted Access Vehicle Map

2.5.2 Class 1 OSOM Vehicles

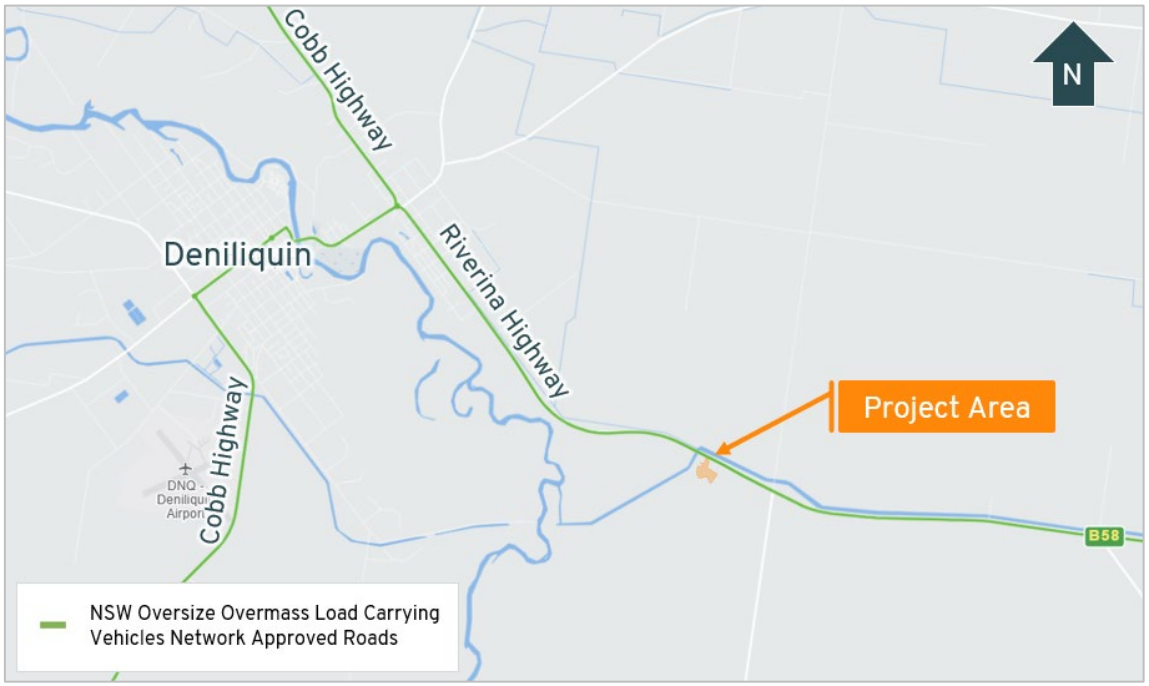
The TfNSW Oversize Overmass Load Carrying Vehicles Network map for the surrounding area is provided within Figure 6. The map shows approved routes for eligible vehicles operating under the Multi-State Class 1 Load Carrying Vehicles Mass and Mass Exemption Notices. A summary of the allowances under each exemption within New South Wales notice is provided below:

- Dimension: up to 5.0m wide, 5.0m high, 30.0m long and 7.5m rear overhang on approved (state owned) routes in NSW.
- Mass: up to 115.0 tonnes for rows of 8 tyres low loaders and up to 77.5 tonnes for rows of 4 tyres low loader combinations.

Vehicles operating in the daytime and not exceeding 3.5m wide or 26m long generally do not require a pilot vehicle.

The green lines indicate approved Class 1 OSOM Vehicle routes. Accordingly, the site has access to the Class 1 OSOM approved road network via Riverina Highway.

Figure 6: NHVR Class 1 Oversize Overmass Load Carrying Vehicles Network Approved Roads



Source: NHVR Restricted Access Vehicle Map

2.5.3 Special Purpose Vehicles (SPVs)

Vehicles built for a purpose other than carrying goods such as a mobile crane, a concrete pump or drill rig are defined as Special Purpose Vehicles (SPVs).

The NSW Special Purpose Vehicle Network map provides details of the approved roads as well as conditions of access and travel restrictions for eligible SPVs operating under the:

- National Class 1 Special Purpose Vehicle Notice;
- NSW Class 1 4-Axle & 5-Axle All Terrain Mobile Crane Mass and Dimension Exemption Notice; or
- NSW Class 1 All Terrain Mobile Crane and Dolly Combination Mass and Dimension Exemption Notice.

Roads that are not approved on the map require an access permit from the National Heavy Vehicle Regulator or the relevant road manager. There are six SPV access networks for cranes travelling on approved State Roads in NSW:

- SPV Level 1: Cranes and SPVs up to 40 tonnes that comply with the Bridge Formula.
- SPV Level 2: Crane and dolly combinations up to 70 tonnes that comply with the Bridge Formula.
- SPV Level 3: 3-axle All Terrain Cranes up to 36 tonnes and 4-axle All Terrain Cranes up to 43 tonnes.
- SPV Level 4: 4-axle All Terrain Cranes up to 45.8 tonnes and 5-axle All Terrain Cranes up to 50 tonnes.
- SPV Level 4 / 12t per axle: 4-axle All Terrain Cranes up to 48 tonnes and 5-axle All Terrain Cranes up to 50 tonnes.
- SPV Level 6: 5-axle All Terrain Cranes up to 60 tonnes.

The approved routes for SPV Level 6 vehicles travelling within the surrounding area are identified within Figure 7. The figure shows that SPV Level 6 vehicles are approved from Deniliquin and from the east to the site on Riverina Highway.

Some approved routes for SPV classified vehicles are limited due to restricted structures (bridges) and rail level crossings on the network within Deniliquin and in the surrounding area, including:

- Rail level crossing on Ochertyre Street in Deniliquin for all SPV classified vehicles;
- Bridge on Riverina Highway over Mulwala Canal, approximately 12.2 kilometres east of the site restricted for SPV Level 3 and above;
- Bridge on Riverina Highway over Mulwala Canal, approximately 210 metres north-west of the site restricted for SPV Level 3 and above;
- Bridge on Ochertyre Street over Mulwala Canal, approximately 3.7 kilometres south of Deniliquin for SPV Level 3 and above;
- Bridge on Davidson Street (Cobb Highway) over Edward River flood channel in Deniliquin restricted for SPV Level 4 and above; and
- Bridge on Davidson Street (Cobb Highway) over Edward River in Deniliquin restricted for SPV Level 6.

Figure 7: NHVR SPV Level 6 Network Approved Roads

Source: NHVR Special Purpose Vehicle Access Map

Figure 7 shows that the SPV Level 6 vehicle has access to the Project Area via the surrounding State Road network however several bridges and a rail level crossing have restricted use. SPV routes to and from the Project Area would need to be assessed when specific details of the required vehicles are established to avoid road infrastructure that does not have capacity for the proposed loading.

2.6 Crash History

Amber has conducted a review of the TfNSW Centre for Road Safety Crash and Casualty Statistics database for all recorded crashes within the surrounding area of the Project. The crash database

provides the location and severity of all injury and fatal crashes for the five-year period from 2018 to 2022. The search area included the following roads:

- Riverina Highway between Finley Road and Tocumwal Road (approximately 12 kilometres);
- All associated intersections.

The results of the crash search are summarised in Table 7.

Table 7: Crash Search Results

Road	Location	Severity	Crash Type	Date and Time	Light and Weather Conditions
Riverina Highway	Intersection with Twin Rivers Campground Entry	Moderate Injury	Rear end (vehicles in same lane)	October 2021 (14:00 - 15:59)	Daylight (Fine)

The crash search indicates that there are no discernible crash trends within the surrounding road network, and the crashes are distributed on the network with no 'Black Spots'. It is noted that no crashes were recorded along Riverina Highway within two kilometres of the Project Site. Given the results, it is concluded that the road network is currently operating in a relatively safe manner near the proposed site access.

3. Project Description

3.1 Proposed Works

The Project involves the development, construction, operation and decommissioning of a BESS of approximately 120MW/480MWh. The Project would consist of the following components:

- 140 Battery Containers measuring approximately 6.1m x 2.5m x 2.9m. Each container may house approximately 40 battery modules.
- 33 kV switch room and control room.
- Underground or overground transmission line connecting to Deniliquin Substation.
- 42 PCS units comprising of inverters, switchgear and transformer.
- Site office and maintenance building, vehicle parking areas, internal access tracks, water tank, pumpable sewerage holding tank and perimeter security fencing.
- Site access off Riverina Highway including construction of turn treatments and relocation and extension of roadside guard rail.

3.2 Construction Information

The physical construction of the Project is expected to commence in mid-2027 and take approximately 12 months, with the peak construction period expected to take 6 months. Construction activities would be undertaken during standard daytime construction hours, as follows:

- Monday to Friday: 7am – 6pm
- Saturday: 8am – 3pm
- No work on Sundays or public holidays.

Any construction outside of these normal working hours would only be undertaken with prior approval from relevant authorities and consultation with impacted road users. A construction workforce of up to 75 full-time equivalent (FTE) personnel would be on-site during the peak construction phase and would primarily be drawn from the nearby city of Deniliquin.

A Traffic Management Plan (TMP) would be prepared by the appointed contractor prior to construction commencing as outlined in Section 7.

4. Traffic Assessment

Traffic generated by the Project can be separated into three distinct stages: construction, operation and decommissioning. The peak traffic generating potential is during construction which generates trips associated with the workforce accessing the Project Area and the delivery of raw materials and plant. During operation the Project is expected to generate a lower amount of traffic associated with up to 1-2 full time maintenance personnel accessing the Project Area each day. Decommissioning is anticipated to generate a similar level of traffic to the construction stage.

The following provides an assessment of the potential traffic impacts of the Project on the road network function for each of the three stages.

4.1 Definitions

The following terminology is referenced throughout this section and within the remainder of the report.

Table 8: Traffic Assessment Definitions

Terminology	Definition
Vehicle Trip	A trip is defined as a one way vehicular movement from one point to another excluding the return journey. Therefore, a return trip to and from the site is counted as two trips.
Vehicles per Day (vpd)	The volume of traffic (number of trips) occurring within a 24-hour period. For traffic volumes associated with the Project, this value is generally an even number to reflect the return trip associated with each vehicle.
Vehicles per Hour (vph)	The volume of traffic (number of trips) occurring within a one hour period.
Heavy Vehicle	A vehicle with a Gross Vehicle Mass (GVM) or Aggregate Trailer Mass (ATM) of more than 4.5 tonnes as defined in the Heavy Vehicle National Law (HVNL).
General Access Vehicle (GAV)	General Access Vehicles (GAV) don't require a permit or notice to access road networks; these vehicles have as-of-right access to the network unless signposted otherwise (e.g. a bridge tonnage restriction).
Restricted Access Vehicle (RAV)	Restricted Access Vehicles (RAV) include Class 1, 2 or 3 vehicles that operate under a notice or permit and vehicles operating under higher mass limits (HML) that have restrictions on the parts of the road network they can access.
Oversize and/or Overmass (OSOM) Vehicle	OSOM vehicles are defined as Class 1 vehicles under the Heavy Vehicle National Law. A vehicle or vehicle combination is considered to be OSOM if it exceeds any general access mass or dimension limits.
High Risk Oversize/Overmass Vehicle (requiring escort)	OSOM vehicles exceeding certain criteria for length, height, rear overhang, forward projection, width or total combination weight. These vehicles are subject to Transport Management Plans (TMPs) which provide a comprehensive planning and execution focus to ensure that these movements are carried out in a safe and responsible manner with reduced impact on other road users and road infrastructure. These vehicles also typically require pilot vehicle escort.

4.2 Construction Phase

4.2.1 Standard Construction Traffic Generation

Construction traffic generated by the Project on a day-to-day basis can be broadly separated into the following categories as outlined in Table 9.

Table 9: Standard Construction Traffic

Terminology	Definition
Light Vehicles	The use of light vehicles will be associated with transporting the workforce to/from the Project Area. A conservative vehicle occupancy of approximately 1.5 people per car has been adopted to calculate the light vehicle traffic generation noting the workforce would be encouraged to carpool.
Heavy Vehicles	
Shuttle Buses	The Applicant has advised that shuttle buses will be utilised to transport the majority of the workforce to/from Deniliquin.
Rigid Trucks	Rigid Trucks will be used to deliver raw materials and smaller plant and have a typical length between 8 and 13 metres.
Truck and Dog	Truck and Dog vehicles consist of a rigid truck towing either a dog trailer or a pig trailer and are not more than 19 metres in length. A dog trailer is a trailer with axles at either end of the trailer, a pig trailer has the axles centred on the trailer. These vehicles will be utilised to transport the majority of quarry materials to/from the site.
Semitrailers	Semitrailers will be used to transport larger equipment and materials. These vehicles consist of a truck and a single trailer with a total length of 19 metres.
B-Doubles	B-Doubles will also be used to transport larger plant. B-Doubles consist of a truck with two trailers and have a maximum length of 26 metres.
Non High Risk OSOM (not requiring escort)	Class 1 OSOM vehicles which can operate on the approved network outlined in Section 2.5.2 subject to travel conditions, as well as vehicles built for a purpose other than carrying goods such as a mobile crane, a concrete pump or drill rig which are defined as Special Purpose Vehicles (SPVs) and can also operate on the relevant approved networks subject to travel conditions.

The peak hour for construction traffic will occur at the start and end of the day when workers are transported to/from the Project Area. Most workers will typically arrive on-site between 6:00am and 7:00am and depart between 5:00pm and 7:00pm. Workers generally have staggered finish times which results in the evening peak hour being less pronounced, however for the purposes of this assessment it is conservatively assumed that the evening peak hour Project traffic is the same as the morning peak, and the evening peak hour occurs from 5:00pm to 6:00pm.

The construction traffic volumes for the Project have been provided by the Applicant. It is anticipated that during peak construction the Project would generate up to 80 light vehicle and 86 heavy vehicle trips per day. Table 10 summarises the forecast traffic volumes expected to be generated during the construction period of the Project.

Table 10: Traffic Generation During Construction Period

Vehicle Type		Average Construction Periods		Peak Construction Period	
		Vehicle Trips per Day (vpd)	Peak Hour Trips (vph)	Vehicle Trips per Day (vpd)	Peak Hour Trips (vph)
Light Vehicles (LV)		35	20	80	24
Heavy Vehicles (HV)	Shuttle Buses	4	2	8	2
	Rigid Trucks	8	2	12	4
	Truck and Dog	22	4	48	12
	Semitrailers	8	2	8	4
	B-Doubles	2	0	6	0
	Non High Risk OSOM	*2*	*0*	*4*	0
	HV Subtotal	*46*	*10*	*86*	*22*
Total		**81**	**30**	**166**	**46**

Overall, the Project is expected to generate up to 46 vehicle trips per hour in the morning and evening peak hours during the peak construction period, which would reduce to 30 vehicle trips per hour during the average construction periods.

Of the traffic generated by the project, Transgrid have advised that a total of 6 vehicles (12 vehicle trips) would be required to access the project via the existing Transgrid site access. It has been assumed that these vehicles would arrive and depart in the respective peak hours during the peak construction period.

4.2.2 Non High Risk OSOM Vehicles

There is a mix of non-high risk OSOM vehicles required for the construction which would include vehicles and plant like:

- cranes
- drum rollers
- dump truck
- concrete pumps
- excavators
- grader
- compactors
- pile driving rig
- cable trenching and laying equipment

It is anticipated that the vehicles would comply with the Class 1 exemption notices and would be able to operate on the approved NSW Special Purpose Vehicle Network. The vehicles would access the site directly from the Riverina Highway which is rated to accommodate complying vehicles.

Many of the vehicles listed above would not create daily trips in and out of the Project Area. It is expected that there will be influxes of arrivals and departures from the site depending on the

phase of the construction. Once arrived, they would remain until not required, before being removed from the site. The trips would be generated outside of peak site access hours.

Vehicle types and any necessary permits would be confirmed and obtained (as needed) once the construction methodology is determined.

4.2.3 High Risk OSOM Vehicles

In addition to the traffic volumes outlined in Table 10, High Risk OSOM vehicles will also be required for the delivery of the largest plant and equipment. These vehicles would exceed the Class 1 mass and/or dimension requirements and are subject to separate permit applications and regulations, including use of a vehicle escort.

High Risk OSOM vehicles will contribute the smallest percentage of vehicles accessing the Project Area during the construction period and are subject to the development of Transport Management Plans to manage each vehicle trip in a safe manner. The movement and impact of these vehicles, and the subsequent road upgrades required, are discussed within Section 6. The following assessment focuses on the impacts of the regular light and heavy vehicles outlined in Table 10 which generate the bulk of the traffic and represent the typical traffic impact of the Project on a day-to-day basis.

4.2.4 Traffic Distribution

It is anticipated that the majority of the workforce for the construction of the Project would be located in Deniliquin. Materials and equipment will generally be sourced from within Deniliquin or the surrounding area where practicable, with all larger plant expected to be delivered from Port Botany or the Port of Melbourne.

During the morning peak all vehicle trips would be toward the site and in the evening peak all vehicle trips would be away from the site, with the exception of the staff shuttle bus which will arrive and leave within the peak hour. The majority of heavy vehicle trips would be distributed throughout the day and would be split evenly between inbound and outbound trips.

Accordingly, the following distribution for the AM peak hour has been adopted:

- **Light vehicles:** 70% from the west, 30% from the east;
- **Shuttle Buses:** 100% from the west;
- **Heavy Vehicles delivering materials:** 50% from the west, 50% from the east; and
- **Heavy Vehicles delivering plant and large project components:** 100% from the east.

Based on the traffic distribution above the estimated vehicle trips generated by the site during the peak hours are shown in Figure 8 and Figure 9.

Figure 8: Expected AM Peak Hour Project Traffic Volumes During Peak Construction

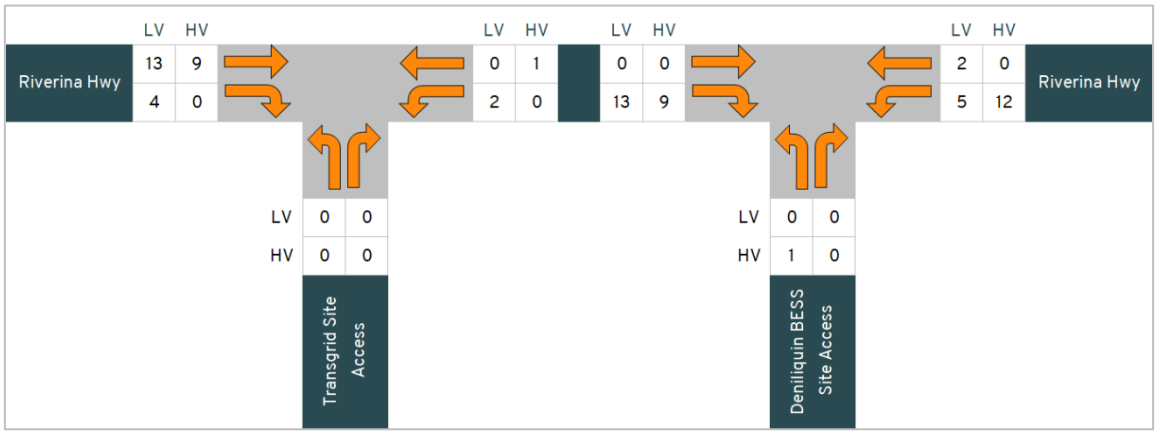
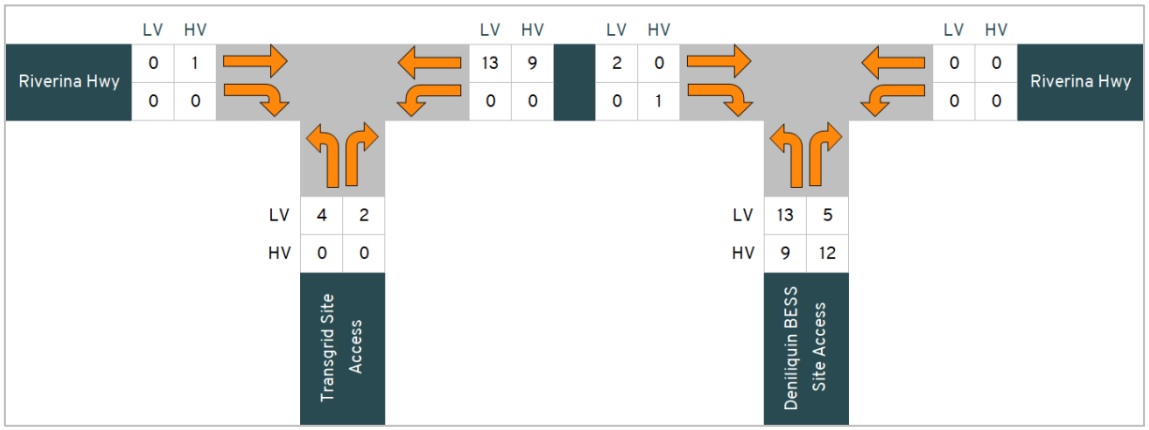


Figure 9: Expected PM Peak Hour Project Traffic Volumes During Peak Construction



4.2.5 Cumulative Traffic Impacts

The primary traffic impact of the BESS is generated during construction which is anticipated to start in mid-2027 and take approximately 12 months. A summary of the major projects that are proposed in the surrounding area are identified in Table 11. Highlighted projects would use Riverina Highway within the vicinity of the Project Area and have been included in cumulative traffic impact data.

Table 11: Assessment of Cumulative Impacts of Nearby Developments

Project	Description	Potential Vehicle Conflict
Tarleigh Park Solar Farm (Approved 2018)	Development of a 90 MW solar farm and associated infrastructure located approximately 19 kilometres east of the subject site.	Unknown construction timeline. Construction period of 12 months with a 2 month peak. There is potential for construction of both projects to overlap. Both projects are anticipated to have some workforce located in Deniliquin. There is potential for construction vehicles to interact within Deniliquin and at the site access.

Project	Description	Potential Vehicle Conflict
Deniliquin East BESS (Preparing EIS)	Development of a 100 MW BESS facility with associated infrastructure and battery storage located approximately 500 metres northwest of the subject site with access from Riverina Highway.	There is only capacity for one BESS project to connect with the Deniliquin Transgrid Substation and as such both cannot be constructed at the same time. There would therefore be no construction traffic conflict associated with these projects.
Currawarra Solar Farm (Approved 2018)	Development of a 195 MW solar farm and associated infrastructure located approximately 22 kilometres north-east of the subject site.	Unknown construction timeline. There is potential for construction of both projects to overlap. Both projects are anticipated to have a workforce located in Deniliquin. There is potential for construction vehicles to interact within Deniliquin with negligible impact at the site access due to location. There is no recent information about this project.
Deniliquin Ethanol Plant (Approved 2016)	Development of an ethanol plant capable of producing 115 megalitres of ethanol annually located approximately 11.5 kilometres west of the subject site.	Unknown construction timeline and a 14-16 month construction period. There is potential for construction of both projects to overlap. Both projects are anticipated to have a workforce located in Deniliquin. There is potential for construction vehicles to interact within Deniliquin with negligible impact at the site access due to location. There is no recent information about this project.
Finley BESS (Prepare EIS)	A battery energy storage system (BESS) with a capacity of 100MW/200MWh and associated infrastructure located approximately 45 kilometres east of the subject site.	Scoping report states project construction could commence in 2026. There is potential for construction of both projects to overlap. Not expected to have majority of workforce located in Deniliquin. There is potential for construction vehicles to interact within Deniliquin and at the site access.
Finley Solar Farm (Approved 2018)	Development of a 170 MW solar farm and associated infrastructure located approximately 45 kilometres east of the subject site.	Finley Solar Farm is fully operational and associated traffic would be captured in traffic surveys.
Berrigan BESS (Prepare EIS)	Construction, operation, and decommissioning of a battery energy storage system (BESS) with a capacity of 400MW/1600MWh and ancillary infrastructure. Located approximately 44 kilometres east of the subject site.	Construction may take 6-12 months. Currently an unknown commencement time or any traffic volume data. There is potential for construction of both projects to overlap. Expected to have majority of workforce in Finley or Deniliquin. There is potential for construction vehicles to interact on Riverina Highway.
South Coree BESS (Prepare EIS)	Construction, operation, and decommissioning of a battery energy storage system (BESS) with a capacity of 100MW/400MWh and ancillary infrastructure.	Construction may start in 2027 and take approximately 15 months to complete. There is potential for construction of both projects to overlap. Expected to have majority of workforce in Finley and some in Deniliquin. There is potential for construction vehicles to interact on Riverina Highway.

Project	Description	Potential Vehicle Conflict
Romani Solar Farm (Prepare EIS)	The construction, operation and decommissioning of a solar photovoltaic energy generating facility (250 MW) with an associated battery energy storage system (150MW / 300MWh). Located approximately 84km northwest of the Project Area	Unknown construction timeline at this stage. There is potential for construction of both projects to overlap. Both projects are anticipated to have some workforce located in Deniliquin. There is potential for construction vehicles to interact within Deniliquin with negligible impact at the site access due to location.
Pottinger Wind Farm (Assessment)	Development of a wind farm with up to 253 turbines and associated infrastructure located in the vicinity of the Project Area. Located approximately 86km northwest of the Project Area.	TIA states construction could commence in 2026 and peak for up to 44 months. Both projects are anticipated to have some workforce located in Deniliquin. There is potential for construction vehicles to interact within Deniliquin with negligible impact at the site access due to location.
Pottinger Solar Farm (Prepare EIS)	Development of a 300 MW solar farm and associated infrastructure located in the vicinity of the Project Area. Located approximately 80km north of the Project Area.	TIA states construction could commence in 2028 and peak for 4 months. Both projects are anticipated to have some workforce located in Deniliquin. There is potential for construction vehicles to interact within Deniliquin with negligible impact at the site access due to location.
Bullawah Wind Farm (Response to Submissions)	Development of a wind farm with up to 170 wind turbines and associated infrastructure, located approximately 86km northwest of the Project Area.	TIA states construction could commence in 2026 and peak for 12 months. Both projects are anticipated to have some workforce located in Deniliquin. There is potential for construction vehicles to interact within Deniliquin with negligible impact at the site access due to location.
Dinawan Solar Farm (Assessment)	Development of an 800MW solar farm and battery storage project located in the Riverina region, halfway between Coleambally and Jerilderie, approximately 89km northeast of the Project Area	There is potential for construction of both projects to overlap. A small portion of workers may reside in Deniliquin although worker accommodation will be provided on site. Heavy Vehicles will not be using the same transport access route. Traffic associated with this project will have negligible impact at the site access due to location.
Dinawan Wind Farm (Response to Submissions)	Development of a 1.2GW wind farm project located in the Riverina region, halfway between Coleambally and Jerilderie, approximately 89km northeast of the Project Area	There is potential for construction of both projects to overlap. A small portion of workers may reside in Deniliquin although worker accommodation will be provided on site. Heavy Vehicles will not be using the same transport access route. Traffic associated with this project will have negligible impact at the site access due to location.
The Plains Solar Farm (Response to Submissions)	Development of a 400MW solar farm and associated infrastructure, located approximately 90km northwest of the Project Area.	TIA states construction could commence in December 2026 and peak for 12 months. Both projects are anticipated to have some workforce located in Deniliquin. There is potential for construction vehicles to interact within Deniliquin with negligible impact at the site access due to location.

Project	Description	Potential Vehicle Conflict
The Plains Wind Farm (Response to Submissions)	Development of a wind farm with up to 226 wind turbines and associated infrastructure, located approximately 105km northwest of the Project Area.	TIA states construction could commence in 2027 and peak for 2 years. Both projects are anticipated to have some workforce located in Deniliquin. There is potential for construction vehicles to interact within Deniliquin with negligible impact at the site access due to location.
Baldon Wind Farm (Response to Submissions)	Development of a wind farm with up to 162 wind turbines and associated infrastructure, located approximately 64 km southwest of Hay.	There is potential for construction of both projects to overlap. The traffic generated from both projects may interact within the town of Hay.

The above assessment indicates that a number of projects are expected to generate additional vehicle traffic within and around Deniliquin. The vehicles would be distributed on the surrounding road network and are expected to have a minimal cumulative impact on the operation of the road network. It should be noted that all approved projects listed above currently don't provide any information on construction timelines and as such come with a low risk of conflicting peak construction periods.

Taking into consideration projects where EIS have been submitted, the review indicates that the Tarleigh Park Solar Farm has the potential to generate additional vehicle movements along the Riverina Highway in the vicinity of the Project Area during the construction period. Expected construction traffic volumes for the project have been sourced from available public documents and are outlined in Figure 10 for the morning peak and Figure 11 for the evening peak hour.

Figure 10: AM Peak Cumulative Traffic Volumes During Peak Construction

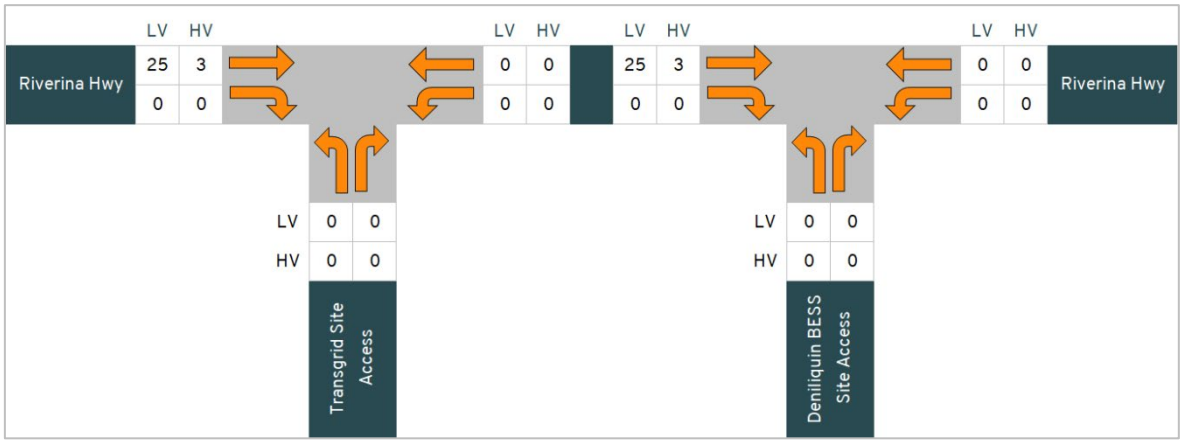
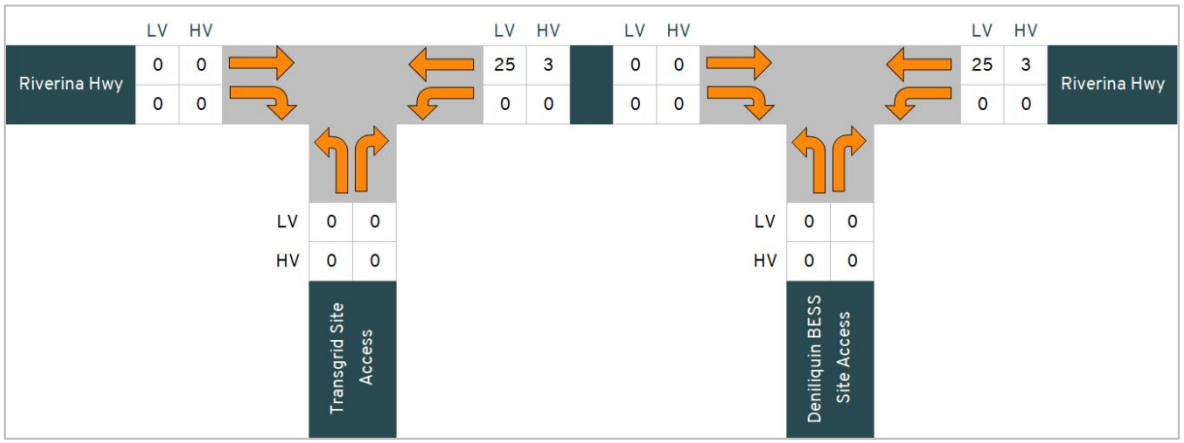


Figure 11: PM Peak Cumulative Traffic Volumes During Peak Construction



4.2.6 Traffic Assessment

All traffic travelling to/from the Project Area would travel via the Riverina Highway. An assessment of the mid-block operation of the road has been carried out to determine the ability of the road network to accommodate the traffic expected to be generated during the peak construction period.

An important consideration in determining the impact of a development proposal on the road system is to assess the effect on traffic efficiency, the objective of which is to maintain the existing level of service. Level of Service is defined within the *Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis* as:

> *'... a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A level of service definition generally describes these conditions in terms of factors such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience, and safety.'*

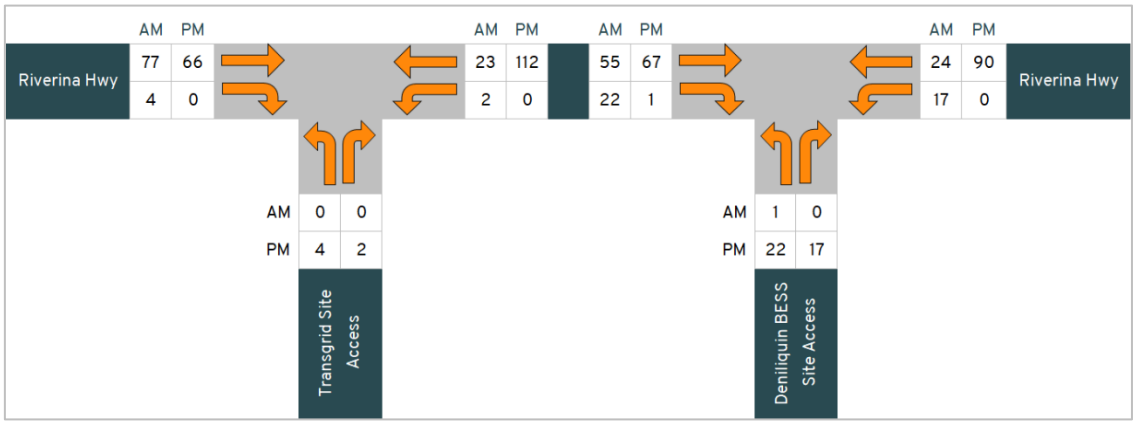
Levels of service are designated from A to F from best (free flow conditions) to worst (forced flow with stop start operation, long queues and delays). Table 4.5 of the RTA Guide sets out two-way hourly road capacities for two-lane roads for different levels of service and based on different terrain types.

The expected traffic volumes along the Riverina Highway have been determined for the morning peak hour (6:00-7:00am) and evening peak hour (5:00pm-6:00pm) during the peak construction period. The traffic volumes utilised for the assessment are the total volumes for the following:

- Existing surveyed traffic volumes presented within Appendix C adjusted by an estimated 1.5% compounded annual growth rate over 4 years to reflect the end of the construction period in 2028. These are based on the weekday average hourly counts.
- The cumulative traffic impact volumes that may coincide with peak construction of the Project as outlined in Figure 10 and Figure 11.
- The peak construction project traffic volumes presented within Figure 8 and Figure 9.

The resulting total traffic volumes used for the assessment are provided in Figure 12.

Figure 12: Peak Construction Traffic Volumes



The traffic volumes accommodated on the Riverina Highway during the peak hours are shown within Table 12, which is been based on the surveyed traffic volumes presented within Section 2.3.1 (existing volumes) and the anticipated traffic volumes of the proposal presented within Figure 12 (expected volumes).

Table 12: Expected Peak Hour Traffic Volumes During Construction

Road	AM Peak			PM Peak		
	Existing Volume	Expected Volume	LOS	Existing Volume	Expected Volume	LOS
Riverina Highway	50vph	123vph	A	126vph	201vph	A

Therefore, during the peak hours of construction Riverina Highway would accommodate approximately 123 to 201 vehicles per hour during peak construction which is well within the capacity of the road network, and the road is expected to continue to operate with a good level of service based on Table 4.5 of the RTA Guide.

During the middle of the day the traffic movements are expected to be predominantly associated with heavy vehicles with approximately 12 vehicle movements per hour. This increase in traffic would be within the daily variation of traffic volumes on Riverina Highway and can be readily accommodated on the road network.

Accordingly, the road network is able to readily accommodate the traffic generated by the development during the construction and operational periods.

4.3 Operational Phase

During operation, the BESS is expected to generate a minimal level of traffic associated with maintenance and operation services. The BESS is expected to be operated by up to 1-2 maintenance personnel and occasional deliveries resulting in a traffic generation of up to 8 vehicle movements per day which would result in a negligible change to the traffic environment. There would also be occasional heavy vehicles delivering to the site but only as required for maintenance.

4.4 Decommissioning Phase

At the end of the operational life of the Project all above ground infrastructure would be dismantled and removed from the Project Site. Internal roads, if not required for ongoing farming purposes or fire access, would be removed and the site reinstated as close as possible to its original state.

Traffic generation during decommissioning would be similar to traffic generation during the average construction period. A comprehensive Traffic Management Plan would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities. This would aim to ensure adequate road safety and road network operations are maintained.

4.5 Summary

The Project is expected to generate the highest level of traffic during the peak construction period. The assessment presented above indicates that the road network is able to accommodate the Project traffic during the peak construction period. The assessment also included a review of the cumulative traffic generated by other major Projects within the surrounding area.

During construction the vehicle trips throughout the middle of the day are expected to be predominantly associated with heavy vehicles with approximately 12 vehicles per hour. This increase in traffic would be within the daily variation of traffic volumes on the road network and can be readily accommodated.

It is anticipated that high risk OSOM vehicles would access the site during the construction phase. The vehicles would be unloaded and kept to their smallest practicable dimensions when departing the site. The vehicles will travel under escort outside of the peak periods and would be able to be accommodated on the road network subject to the road upgrades and mitigation measures discussed in Section 6 which would be confirmed as part of specific permits that would be applied for prior to construction.

During operation the increase in traffic of up to 6 vehicle movements per day would result in a negligible change to the traffic environment.

Accordingly, the road network is able to readily accommodate the traffic generated by the Project during the construction, operation, and decommissioning periods.

5. Heavy Vehicle Route Assessment

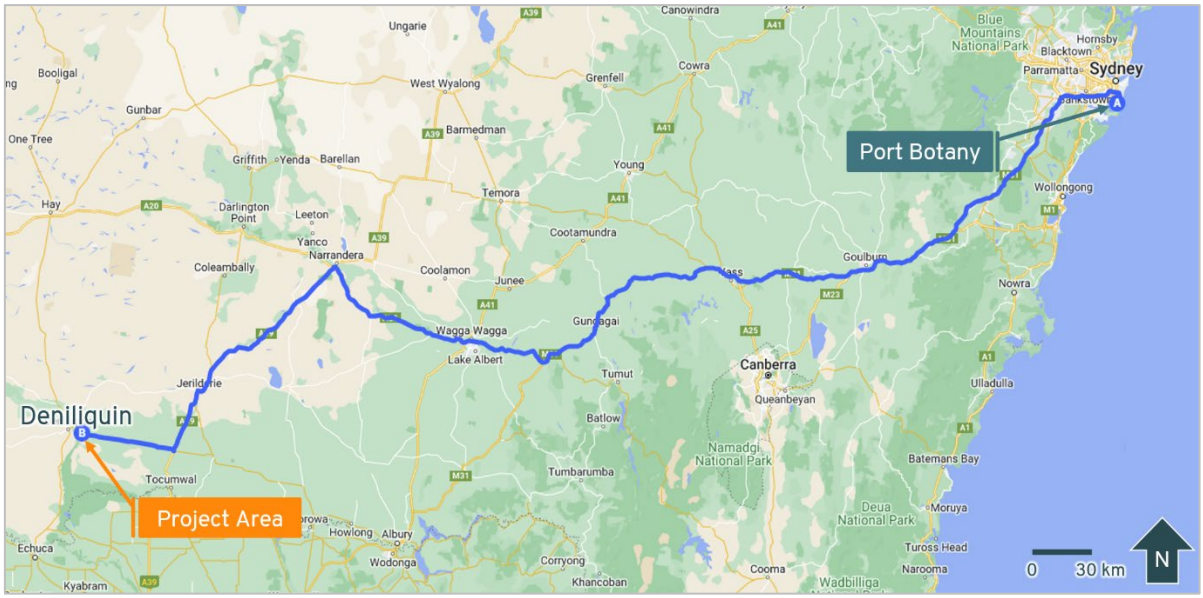
All specialist plant and BESS components are expected to be delivered from Port Botany, Port of Melbourne or Glen Waverley, Victoria. The following provides a review of the proposed access routes for heavy vehicles (excluding High Risk OSOM vehicles) travelling from the ports.

5.1 General Access Vehicles

All heavy vehicle Project traffic up to and including semitrailers would be classified General Access Vehicles (GAV) which have as-of-right access to the road network unless signposted otherwise. These vehicles would travel along a direct route between Port Botany or Port of Melbourne and the Project Area.

The proposed access route from Port Botany to the site measures approximately 745 kilometres and is outlined in Figure 13.

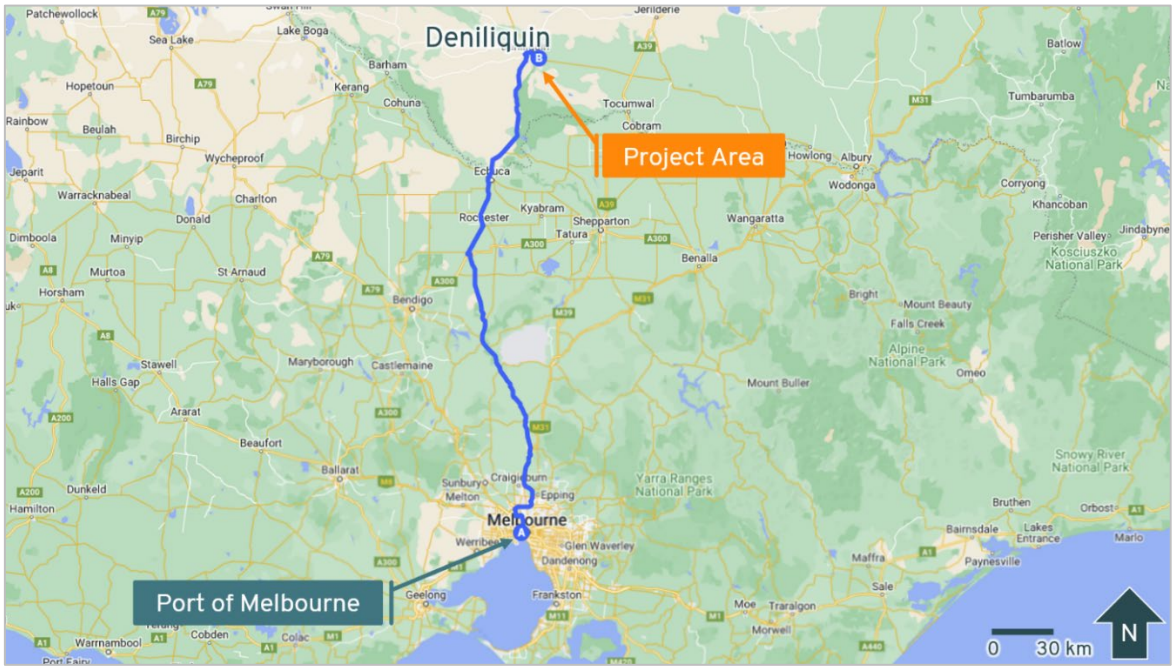
Figure 13: General Access Vehicle Route from Port Botany to Site



Source: Google Maps - Link

The proposed access route from Port of Melbourne to the site measures approximately 304 kilometres and is outlined in Figure 14.

Figure 14: General Access Vehicle Route from Port of Melbourne to Site



Source: Google Maps - Link

5.2 B-Double Access Route

5.2.1 Port Botany Access Route

The proposed access route for 26m B-Doubles travelling from Port Botany to the Project Area is the same as the GAV route proposed above in Section 5.1. A summary of the relevant roads is provided in Table 13. The majority of the roads are approved for 26 metre B-Double access as outlined in the NHVR National Network Map. The M8 Motorway Tunnel is an approved route under the condition of no dangerous goods being transported through the tunnel.

Table 13: B-Double Vehicle Route - Access Roads from Port Botany

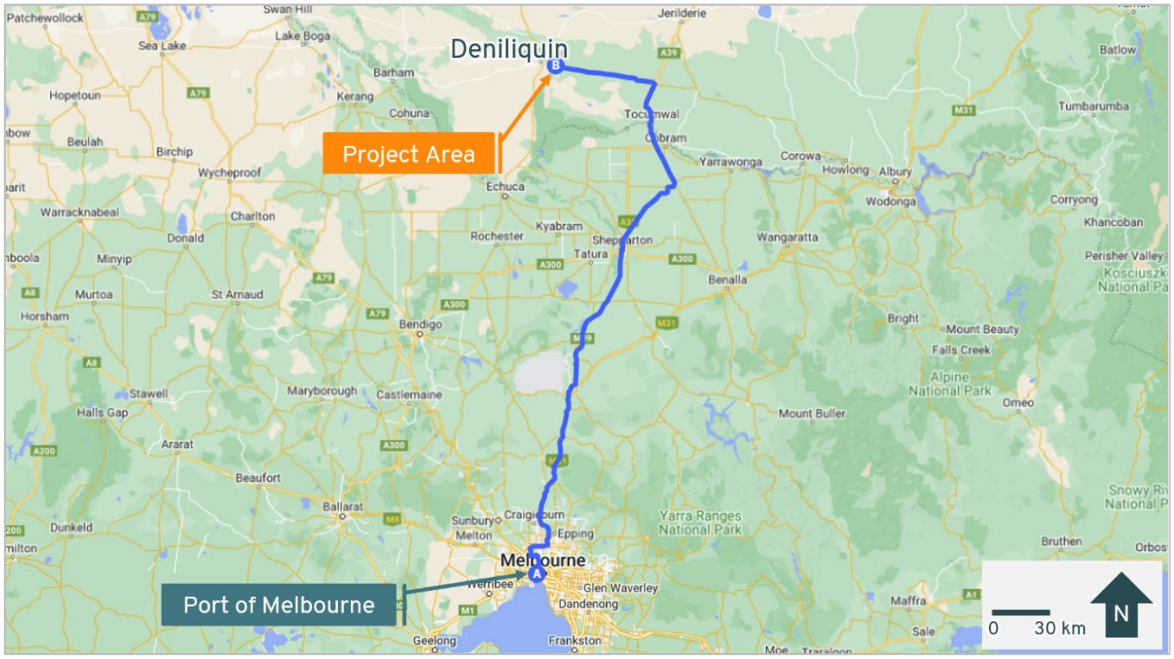
Road Name	State	Jurisdiction	B-Double Approved
Friendship Road	New South Wales	TfNSW	Approved
Bumborah Point Road			
Botany Road			
Bunnerong Road			
Gardeners Road			
M8 Motorway Tunnel			Approved with Travel Conditions (No Dangerous Goods)
M5 East Motorway			Approved
South Western Motorway (M5)			
Hume Motorway (M31)			
Sturt Highway (A20)			

Road Name	State	Jurisdiction	B-Double Approved
Newell Highway (A39)			
Riverina Highway (B58)			

5.2.2 Port of Melbourne Access Route

The proposed access route for 26m B-Doubles travelling from Port of Melbourne to the Project Area is outlined in Figure 15 with a summary of the relevant roads provided in Table 14. The access differs from the GAV route proposed in Section 5.1 to ensure heavy vehicles with plant or large BESS component deliveries approach the site from the east. The route measures approximately 345 kilometres in length and all roads approved for 26 metre B-Double access as outlined in the NHVR Network Map.

Figure 15: B-Double Access Route from Port of Melbourne to Site



Source: Google Maps - Link

Table 14: B-Double Vehicle Route - Access Roads from Port of Melbourne

Road Name	State	Jurisdiction	B-Double Approved
Docklands Highway	Victoria	DTP	Approved
Whitehall Street			
Hopkins Street			
Dynon Road			
City Link (M2)			
Tullamarine Freeway (M2)			
Metropolitan Ring Road (M80)			
Hume Freeway (M31)			
Goulburn Valley Freeway (M39)			

Road Name	State	Jurisdiction	B-Double Approved
Katamatite-Shepparton Main Road (C363)			
Katamatite-Nathalia Road (C361)			
Benalla-Tocumwal Road (C371)			
Murray Valley Highway (B400)			
Goulburn Valley Freeway (A39)			
Newell Highway (A39)	NSW	TfNSW	
Riverina Highway (B58)			

5.3 Mitigation Measures

A TMP is to be developed which is recommended to include the following measures to minimise the impact of construction traffic:

- Neighbours of the Project are to be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.
- Heavy vehicles should avoid travel during peak bus operating times to limit the interaction of larger vehicles and vulnerable road users. Buses operate along Riverina Highway as outlined in Section 2.4 and will be detailed within the TMP.

Therefore, it is concluded that the road network is suitable to accommodate the future light and heavy vehicle traffic volumes generated by the Project.

6. High-Risk OSOM Vehicles

OSOM vehicles will be required to deliver larger plant to the site such as the sub-station transformer and earthmoving equipment. These vehicles are expected to exceed the Class 1 mass and/or dimension requirements and would be classified as high risk OSOM vehicles. These vehicles are subject to Transport Management Plans (TMPs) which provide a comprehensive planning and execution focus to ensure that vehicle movements are carried out in a safe and responsible manner with reduced impact on other road users and road infrastructure. High Risk OSOM vehicles also typically require pilot vehicle escort.

The Applicant has advised that 3 high risk OSOM vehicles would be required to access the site during the construction period. The vehicles would be unloaded and kept to their smallest practicable dimensions when departing the site to avoid classification as OSOM where possible.

High risk OSOM vehicles will travel outside of the peak periods and would be subject to the mitigation measures discussed throughout this section which would be confirmed as part of specific permits that would be applied for prior to construction.

6.1 Load and Vehicle Configurations

The 3 high risk OSOM vehicles are outlined as follows:

- 2 vehicles to transport the main transformer and spare transformer. The delivery is assumed from Glen Waverley in Victoria, which would result in two high risk OSOM vehicles accessing the site loaded and departing the site unloaded during construction and decommissioning.
- 1 vehicle to transport the modular building resulting in the vehicle being classed as oversize in one direction only for both construction and decommissioning. The modular building would be delivered from Port of Melbourne and is expected to utilise the same access route as the transformer delivery once on the Hume Freeway.

These OSOM vehicles will travel outside of the peak periods and would be subject to the road upgrades and mitigation measures discussed throughout this section which would be confirmed as part of specific permits that would be applied for prior to construction.

The following provides a review of the proposed access route for the transformer vehicle which is the largest transport vehicle configuration proposed.

6.2 Transformer Vehicle

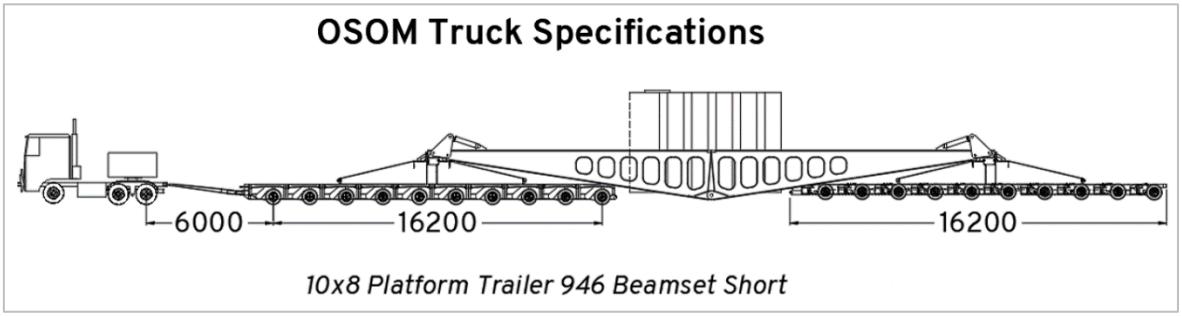
The largest component to be delivered to the site is expected to be the transformer. The Applicant has provided information regarding the expected specifications of the transformers which are outlined in Table 15.

Table 15: Estimated Transformer Specifications

Length (mm)	Width (mm)	Height (mm)	Mass	Trailer Specs
8000	4000	4500	> 150 tonnes	10x8 + 10x8 Platform Trailer Beamset

An OSOM vehicle configuration has been identified for the expected transformer model. The vehicle used for the assessment is shown within Figure 16 and is based on feedback from a transport company which confirmed that the vehicle specification would be suitable for the weight and size of the transformer.

Figure 16: OSOM Vehicle



Source: RJA

6.3 Access Route

The Applicant has advised that the transformer could be manufactured and delivered from *Wilson Transformer Company*, located at 310-336 Springvale Road, Glen Waverley, Victoria. In order to determine whether any civil works are required to accommodate the OSOM vehicle on the road network a route assessment has been undertaken from this origin. The OSOM vehicle would be provided with escort and pilot vehicles in accordance with relevant authority requirements.

The proposed OSOM route for the transformer varies from the B-Double access route (Section 5.2) south of Hume Freeway due to the different origin but is otherwise consistent. The OSOM transformer route would utilise the following roads to access the site as outlined in Table 16. It should be noted that the route taken in metropolitan Melbourne is identical to that taken for the delivery of the transformers to the *Waratah Super Battery Energy Storage System* project[1], which is a larger transformer than that required for this project.

Table 16: OSOM Route – Access Roads

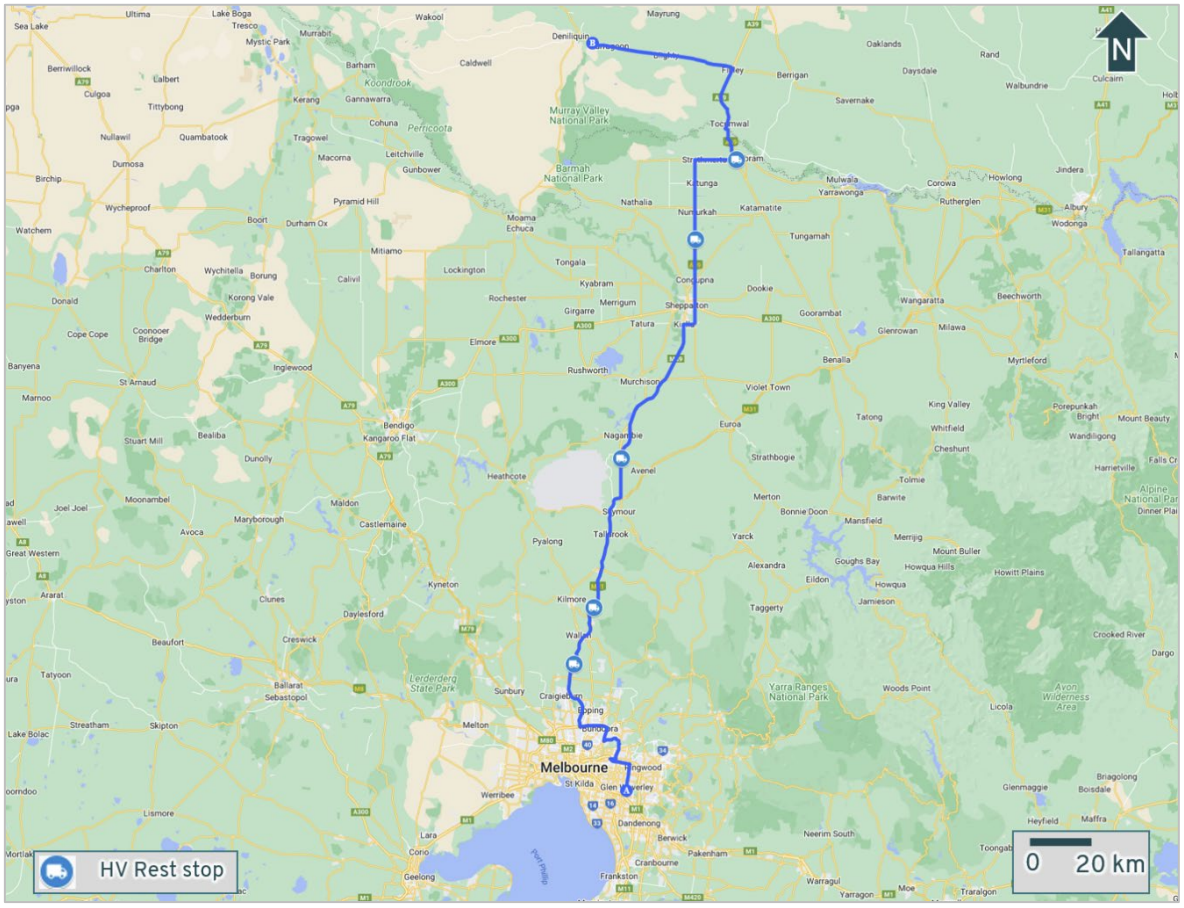
Road Name	State	Jurisdiction
Springvale Road	Victoria	DTP
Eastern Freeway (M3)		
Doncaster Road		
Williamsons Road		
Fitzsimons Lane		
Main Road		
Lower Plenty Road		
Greensborough Road		
Greensborough Highway		
Greensborough Bypass		
Metropolitan Ring Road (M80)		

[1] Waratah Super Battery Energy Storage System: Stage 2 TMP: https://www.planningportal.nsw.gov.au/major-projects/projects/waratah-super-battery-energy-storage-system

Road Name	State	Jurisdiction
Hume Freeway (M31)		
Goulburn Valley Freeway (M39)		
River Road (C391)		
Doyles Road (C391)		
Grahamvale Road (C391)		
Goulburn Valley Highway (A39)		
Murray Valley Highway (B400)		
Goulburn Valley Highway (A39)		
Newell Highway (A39)	NSW	TfNSW
Riverina Highway (B58)		

The access route, along with 5 identified truck rest areas that could be used along the route, are shown in Figure 17. It is noted that additional rest stop areas may also be available along the route. A total of 17 points of interest for further assessment were identified as part of the assessment of the access route. The points of interest have been assessed in further detail, including the site access, with the full assessment provided within Appendix A.

Figure 17: OSOM Route



Source: Google Maps - Link, NHVR Route ID: 2N895-9 (NSW section only)

The assessment of the access route identified that the vehicle is able to access the site with minor temporary works such as signage relocation and suitable traffic management measures. A review of the key constraints along the route is provided below with an overview of the proposed treatments and/or management measures at each point of interest.

6.4 Bridge and Rail Infrastructure

A desktop assessment of bridge and rail infrastructure has been undertaken to determine interfacing locations with the proposed OSOM route.

6.4.1 Bridges and Overpasses

A detailed review of the load limits on all bridges and structures along the route will be undertaken as part of the permit process for the OSOM vehicles, however it is noted that the route predominantly utilises major highways between either Glen Waverley, Port Botany and Port of Melbourne. The State Roads along the route have been utilised for other renewable energy projects in the area and no restricted structures have been identified based on the TfNSW or Department of Victoria Oversize Overmass Load Carrying Vehicles Network maps. Accordingly, it is expected that the vehicle loading will be within the allowable limit for all bridges, culverts and other structures on the State Road network.

Nonetheless, a formal application for a Bridge and Culvert assessment has been made with the appropriate team at TfNSW in July 2025. This TIA is to be updated with the findings of this assessment included once received.

6.4.2 Underpasses

An assessment of the height clearances along the Glen Waverley or Port of Melbourne to Deniliquin OSOM route was undertaken to confirm the suitability of the proposed route for a total proposed vehicle combination load height of approximately 4.8 metres. The assessment showed that the required clearance of 4.8 metres is provided along the entire route. It is also noted that some overhead electrical cables along the route may require temporary lifting which would be confirmed prior to construction.

Accordingly, the available height clearance along the proposed route is appropriate to accommodate the required OSOM vehicles.

6.4.3 Railway Level Crossings

A total of 2 railway level crossings have been identified along the OSOM route as outlined in Table 17 which includes summarised advice from the relevant rail authority for each crossing.

Table 17: Railway Level Crossing Assessment

Railway Crossing Location	Rail Authority	Authority Advice
Grahamvale Road, Greater Shepparton	V/Line	ODL Permit from DTP is required

Murray Valley Highway, Strathmerton	V/Line	ODL Permit from DTP is required

Written approval will be sought from the relevant rail authorities for all level crossings as part of the TMP. Accordingly, the OSOM traffic is expected to have no major impact on the operation or safety of the railway level crossings.

6.5 Summary

The route assessment prepared for the High-Risk OSOM vehicle (Appendix A) identifies a number of minor road works are required in order to allow the vehicles to successfully access the site from Glen Waverley with a summary provided in Table 18. The site access requires upgrading to a Basic Right and Basic Left (BAR/BAL) turn treatment to accommodate increased traffic which is detailed in Section 7. Escorts and spotters will be required at all locations to control traffic and ensure the vehicle and load are clear of infrastructure.

Table 18: Road Works Schedule - OSOM Vehicles

Pinch Point / Sheet	Location	Works Required
Melbourne Metropolitan Area		
01	Springvale Road / Eastern Freeway (on ramp) (Nunawading, Vic)	No road upgrades required.
02	Eastern Freeway (off ramp) / Doncaster Road (Balwyn North, VIC)	No road upgrades required.
03	Doncaster Road / Williamsons Road (Doncaster, VIC)	No road upgrades required.
04	Williamsons Road / Manningham Road (Doncaster, VIC)	No road upgrades required.
05	Fitzsimons Lane / Main Road (Eltham, VIC)	No road upgrades required.
06	Lower Plenty Road / Greensborough Road (Rosanna, VIC)	Temporary signage relocation.
Victorian Regional Area		
07	Goulburn Valley Highway / River Road (Kialla, VIC)	No road upgrades required.
08	Doyles Road / Midland Highway (Orrvale, VIC)	No road upgrades required.
09	Doyles Road / Old Dookie Road (Shepparton-Mooroopna, VIC)	No road upgrades required.
10	Doyles Road / Grahamvale Road / New Dookie Road (Grahamvale, VIC)	No road upgrades required.
11	Grahamvale Road / Rail Level Crossing (Greater Shepparton, VIC)	No road upgrades required.

Pinch Point / Sheet	Location	Works Required
12	Grahamvale Road / Goulburn Valley Highway (Congupna, VIC)	Temporary signage relocation.
13	Goulburn Valley Highway / Murray Valley Highway (Strathmerton, VIC)	No road upgrades required.
14	Goulburn Valley Highway / Murray Valley Highway (Yarroweyah, VIC)	Temporary signage relocation.
NSW Regional Area		
15	Newell Highway / Tuppal Road / Deniliquin Road (Tocumwal, NSW)	No road upgrades required.
16	Newell Highway / Riverina Highway (Finley, NSW)	Temporary signage relocation.
17	Riverina Highway / Site Access (Deniliquin, NSW)	BAR/BAL Turn Treatment at site access

Accordingly, it is concluded that the proposed route is suitable for use by OSOM vehicles associated with the Project with permits to be applied for as part of the TMP. It is recommended that any OSOM movements be timed so they do not coincide with other OSOM vehicles within the surrounding area to limit the impact to the road network, which can be undertaken as part of the permit application.

7. Site Access

7.1 Turn Treatments

Austroads Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings specifies the turning treatments required at intersections. An assessment has been undertaken for the site accesses from Riverina Highway in order to ensure vehicles are able to safely leave the State Road network. To confirm that a worst case scenario is tested, the construction peak hour and road network peak hour have both been assessed.

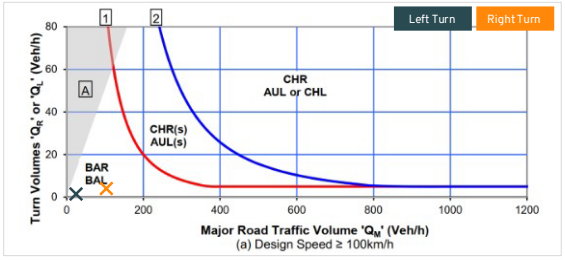
7.1.1 Construction Peak Hour Assessment

The expected traffic volumes, as per Section 4.2.6, have been used to assess the turn treatment requirement for the site accesses. Figure 3.25 of the guide specifies the required turn treatments on the major road at unsignalised intersections and is provided below for a design speed of 100km/hr or greater.

The requirement to provide turn facilities at the intersection is primarily generated during the morning peak hour when the workforce access the site, which occurs from 6:00am to 7:00am. Figure 18 identifies the required turning treatments based on the expected traffic volumes at the intersections (Figure 12).

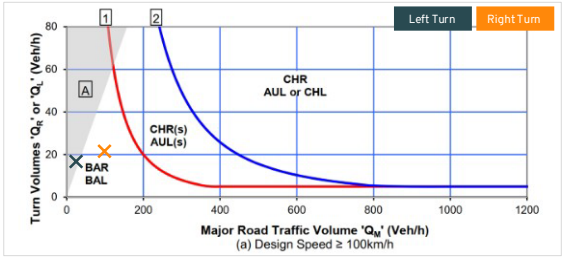
Figure 18: Turn Treatment Assessment Results – Construction Peak Hour

Transgrid Access



Turning Treatment	Traffic Volume (vph)		Requirement
	Turn	*Major Road*	
Right	4	102	BAR
Left	2	23	BAL

BESS Access



Turning Treatment	Traffic Volume (vph)		Requirement
	Turn	*Major Road*	
Right	22	97	BAR
Left	17	24	BAL

Therefore, both site access intersections would require a Basic Right Turn (BAR) and Basic Left Turn (BAL) treatment to meet the requirements of the Austroads Guide.

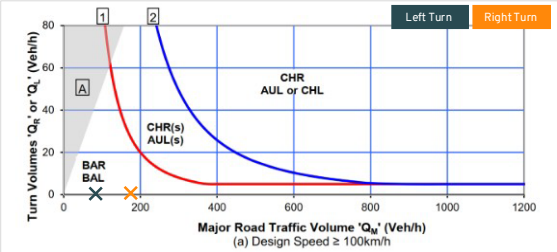
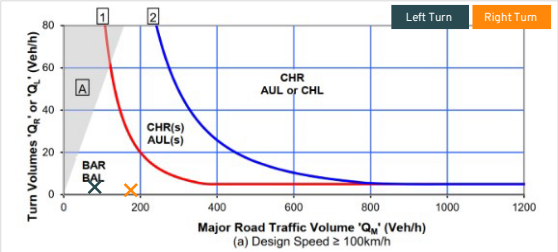
7.1.2 Road Network Peak Hour Assessment

In order to confirm the suitability of the turn treatment, an assessment has also been undertaken of a scenario during the road network peak. The road network peak hour occurred at the hour starting 10:00am during the most recent traffic volume survey, however 8:00am is considered better reflective of the morning peak hour. As shown in Figure 4, a spike occurred at 8:00am which is similar to the volume recorded at 10:00am.

A turn treatment assessment has been undertaken using this road network peak hour traffic volume along with the non-peak construction traffic and cumulative impacts of surrounding projects. The light vehicle traffic to/from the site has been significantly reduced as these movements only reflect deliveries to and from the site as staff are already on-site having arrived before the road network peak hour (i.e. before 8:00am).

Figure 19 identifies the required turning treatments based on the expected traffic volumes at the intersections (Figure 12).

Figure 19: Turn Treatment Assessment Results – Network Peak Hour

Transgrid Substation Access	BESS Access
	

Turning Treatment	Traffic Volume (vph)		Requirement	Turning Treatment	Traffic Volume (vph)		Requirement
	Turn	*Major Road*			*Turn*	*Major Road*	
Right	1	175	BAR	Right	2	175	BAR
Left	1	82	BAL	Left	4	81	BAL

Accordingly, the provision of a BAL and a BAR treatment at both site access intersections is considered suitable.

7.2 Design

Two key constraints at the site access are the guard rail on the north side of Riverina Highway and the existing Deniliquin Transgrid Substation site access which is approximately 70 metres west of the site access. Design of the BESS site access has considered the continued use of both of these road features.

The guard rail is within an area that would be impacted by an intersection turn treatment. To safely accommodate the site access, it is proposed to modify and extend the guardrail along and past the turn treatment to maintain (and improve) safety at the site access and along the frontage road. It is noted that the modifications to the guardrail would be undertaken in accordance with TfNSW requirements which include additional 0.5 metre distancing from the edge of seal.

Due to the close proximity of the two site accesses, the Transgrid Substation site access is proposed to be upgraded to tie in with the proposed BESS site access.

The layout of the site and the proposed access locations is shown within Figure 1 with a strategic design presented in Appendix D.

A swept path assessment has also been undertaken to confirm the site accesses can accommodate heavy vehicles using the Autodesk Vehicle Tracking software. The assessment is provided in Appendix D and demonstrates the BESS site access has been suitably designed to cater for the Project traffic expected to access the site as follows:

- 26 metre B-Doubles from the east;
- Semitrailers from the west; and
- High Risk OSOM Vehicles from the east.

The Site access has been designed to ensure that simultaneous movements can occur with B-Double vehicles accessing and egressing the site at the same time.

The Transgrid Substation site access has been designed accommodate a 19 metre semitrailer vehicle which is the largest vehicle required to regularly access the Substation during the construction period.

Accordingly, it is concluded that the site accesses have been suitably designed and are able to accommodate the vehicles expected to access the site.

7.2.1 Flood Modelling

It is understood that the Applicant is currently consulting with TfNSW on the requirements for detailed flood modelling as part of the strategic concept designs.

Any outcomes of the flood modelling are to be provided on updated strategic designs, as appropriate.

7.3 Sight Distance

Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections specifies the Safe Intersection Sight Distance (SISD) as the minimum sight distance which should be provided along the major road at any intersection. Table 3.1 of the guide specifies the SISD required for various design speeds. Given Riverina Highway has a speed limit of 100km/hr a design speed of 110km/hr has been adopted which requires an SISD of 300 metres based on a reaction time of 2.5 seconds.

The available sight distance at both access points exceeds the requirements of the Austroads Guide given the relatively flat and straight alignment of the road network. It is noted that some larger trees on the site boundary may need to be pruned to maintain adequate sight distance towards the east for the BESS site access. The sight distance for each direction is depicted within Figure 20 and SISD drawings provided in Appendix E.

Figure 20: Sight Distance Assessment

Riverina Highway / Site Access
Facing east
Facing west

Accordingly, vehicles are expected to be able to safely enter the State Road network at the intersection.

7.4 Emergency Access

As part of the EIS submission a Flood Assessment has been undertaken by *Cumulus Engineering* which is the key emergency risk to the site given the proximity to the nearby canals and Edward River. The assessment report is included in the EIS submission and concludes the following:

> *The subject site experiences some inundation from local runoff during the 5%, 1%, 0.5%, 0.2% AEP events and the PMF event. However, the modelling indicates that the site remains within an area of low overall flood risk.*
>
> *Flood risk from the Edward River is considered low due to the extended warning period and the site being flood-free from riverine flood events up to and including the 0.5% AEP event.*
>
> *The proposed development does not adversely impact the flood behaviour on neighbouring properties and/or infrastructure.*
>
> *There is safe access and egress to site in the 1% AEP flood event into the eastern portion of Deniliquin.*
>
> *The proposed development site benefits from safe evacuation routes, including the Riverina Highway, which remains accessible during a 1% AEP event.*
>
> *There is no significant impact on existing emergency management arrangements. Given the low hazard classification of access routes and manageable flood risks, a dedicated flood emergency response plan is deemed unnecessary.*

Per the assessment report, the main access, along with existing safe evacuation routes on the surrounding road network, are sufficient to manage risks associated with flooding.

As a result, and given the site location, size and access to the surrounding road network, it is proposed to use the main site access for emergency access.

It is noted that emergency measures to manage other risks (such as fire, medical etc) will be included in future management plans prepared prior to commencement of construction of the development.

The main site access is to be setback approximately 40 metres from the Riverina Highway, sufficient to accommodate emergency vehicles clear of the roadway in the event they are required.

8. Traffic Management Plan

It is recommended that a TMP be prepared prior to commencement of construction of the development. The TMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017. The TMP would provide additional information regarding the traffic volumes and distribution of construction vehicles that is not available at this time including:

- Road transport volumes, distribution and vehicle types broken down into:
  - Hours and days of construction.
  - Schedules for phasing/staging of the Project.
- The origin, destination and routes for:
  - Employee and contractor light vehicles.
  - Heavy vehicle traffic.
  - Oversize/overmass vehicles.
- A map of the primary haulage routes highlighting critical locations.
- An induction process for vehicle operators and regular toolbox meetings.
- A complaint resolution and disciplinary procedure.
- Local climatic conditions that may impact road safety of employees throughout all project phases (e.g. fog, wet and significant dry, dusty weather).

The following provides recommended measures that should be adopted within the TMP to minimise the impact of construction traffic along the road network.

8.1 Information and Communication

The implementation of a community information and awareness program would assist in managing the traffic impacts. Prior to construction commencing and during the construction period, a program of consultation shall be initiated to ensure local residents are aware of construction traffic accessing the Project. This program may include elements of the following as appropriate to the phase of works:

- Press releases in local newspapers.
- Specific emails, newsletters and individual letter drops to neighbouring residents along the access route to the Project.
- Provision of a website providing details of the status of works and contact details for complaints or enquiries.
- Provide key contact personnel and contact details, including out of hours contact information to residents, schools, public activities and business operating alongside the local route.
- Neighbours of the BESS would be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.

8.2 Signage

If deemed necessary, specific warning signs advising of the changed traffic operations and heavy vehicles are to be appropriately located on approaches to and from the transport routes on Council roads. These should warn existing road users of changed traffic conditions. The use of day warning notices where signs are activated on a specific day to warn local road users of construction activities may also be applied.

8.3 Shuttle Buses

Shuttle buses would be used to transport workers to and from the Project Area from Deniliquin.

Measures to ensure the shuttle bus program can be practically achieved and monitored will be included within the Construction Environmental Management Plan and/or TMP. Recommended measures include:

- Limiting car parking for light vehicles on-site.
- Regular toolbox meeting sessions identifying method of travel to work and strongly encouraging use of the shuttle buses.
- Identifying the bus drop off/pick up locations and clearly communicating these locations with the workforce.
- Allocating a team member to be responsible for enforcement and management of the shuttle buses.
- Identifying mechanisms to be put in place if shuttle bus passenger numbers are not achieved.

8.4 On-Site Mitigation Measures

On-site mitigation measures targeted at safety and reducing the impact of on-site transport would include:

- On-site speed restrictions.
- Appropriate dust suppression measures.
- Maintenance program for on-site access tracks to ensure safe access.
- Loading and unloading is proposed to occur within the work area. No street or roads would be used for material storage at any time.
- Sufficient car parking is to be provided on-site to ensure vehicles do not park on the surrounding road network.
- All car parking and loading areas to be designed in accordance with the relevant Australian Standard (2890 series) and Council requirements.

8.5 Site Specific Measures

At regular intervals, visibility checks are to be undertaken at the site accesses to ensure that departing motorists are provided with sufficient visibility which is compliant with the SISD requirements (as described in Section 7.3).

Should insufficient visibility be available due to vegetation on the eastern side of the site access (refer Section 7.3), works are to be arranged to safely trim and maintain the vegetation so that the visibility is compliant.

8.6 Driver Protocols

Management of vehicular access to and from the site is essential in order to maintain the safety of the general public as well as the workforce. A Driver Code of Conduct is to be implemented as a measure to maintain safety within and around the site:

- All vehicles would enter and exit the site in a forward direction.
- Heavy vehicle movements should avoid peak school bus times to limit the interaction of larger vehicles and vulnerable road users.
- Safety initiatives for impacts to residential areas and/or school bus zones.
- Utilisation of only the designated transport routes.
- Construction vehicle movements are to abide by finalised schedules as agreed by the relevant authorities.
- All permits for working within the road reserve must be received from the relevant authority prior to works commencing.

The above recommendations will ensure the construction traffic would have a minimal impact to the capacity and safety of the surrounding road network. The TMP would be prepared in conjunction with consultation with Transport for NSW and Edward River Council.

9. Mitigation Measure Summary

The assessment has identified a number of traffic management measures that are to be implemented during construction and recommended to be included in the TMP. The key measures are summarised below:

- Prior to construction, a pre-condition survey of the Riverina Highway along the project area frontage should be undertaken in consultation with TfNSW. During construction the sections of the road network utilised by the proposal are to be monitored and maintained to ensure continued safe use by all road users, and any faults attributed to construction of the BESS would be rectified. At the end of construction, a post-condition survey would be undertaken to ensure the road network is left in a condition equivalent to that at the start of construction.
- Neighbours of the BESS are to be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.
- Heavy vehicles should avoid travel during peak bus operating times to limit the interaction of larger vehicles and vulnerable road users. Buses operate along Riverina Highway as outlined in Section 2.4.
- It is recommended that any OSOM vehicle trips be timed so they do not coincide with other OSOM vehicles within the surrounding area to limit the impact to the road network, which can be undertaken as part of the permit application.

9.1 Schedule of Road Upgrades

In addition to the above traffic management measures, it is proposed to provide road upgrades as part of the Project which are to be constructed prior to construction commencing. A schedule of the road upgrades is provided below:

- Minor road works (comprising temporary relocation of road signs) are proposed to accommodate the largest high-risk OSOM vehicle combination as outlined in Section 6.5.
- Construction of BAR/BAL at site accesses as described in Section 7.2 and shown in Appendix D. Minor works to prune existing vegetation may be required to ensure suitable sight distance as described in Section 7.3 as shown in Appendix E.

The inclusion of the proposed upgrades are suitable to accommodate the future traffic volumes to and from the project.

10. Conclusion

Amber Organisation has assessed the traffic impacts of the proposed Deniliquin BESS. The BESS is proposed to have a capacity of up to 120MW/480MWh.

The Project Area is located on the southern side of Riverina Highway, approximately 8 kilometres southeast of Deniliquin. Access to the site is proposed via a new access road connecting Riverina Highway with the north of the site.

The construction period is expected to commence in mid-2027 and take approximately 12 months, with the peak construction period expected to take 6 months. A construction workforce of up to 75 full-time equivalent personnel would be on-site during the peak construction phase and would primarily be drawn from the nearby town of Deniliquin.

Plant is expected to be delivered from either Port Botany or the Port of Melbourne while the largest OSOM BESS component may be transported from Glen Waverley, Victoria. General construction materials and equipment will be sourced from within Deniliquin or the surrounding area where practicable.

The above assessment determined the following:

- The site is expected to generate up to 166 vehicles per day during the peak construction period, including 86 heavy vehicles.
- The road network is able to accommodate the traffic generated by the development during the construction, operation and decommissioning stages.
- The B-Double access route utilises roads that are designated within the Transport for New South Wales and Victorian Restricted Access Vehicle Map.
- The preferred access route for the largest OSOM vehicle travelling from Glen Waverley has been identified within a Route Assessment. The same route would apply to a vehicle travelling from the Port of Melbourne once the Hume Freeway (M31) is reached. This identifies some minor road works such as temporary removal of traffic signs in order to allow the vehicles to access the Project Area. The Route Assessment is provided within Appendix A of this document.
- The site accesses on Riverina Highway are designed to accommodate the Project traffic and is provided with adequate sight distance to allow vehicles to safely enter the road network, subject to the potential minor pruning of roadside vegetation.
- In order to mitigate the impacts of the development during construction a TMP would be prepared which should include the recommendations provided within this document.

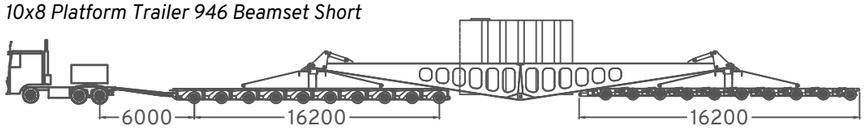
Accordingly, based on the assessment above, it is concluded that the proposed access arrangements for the BESS are suitable to accommodate the expected construction vehicle types and traffic volumes during the construction and operation phase of the Project.

Appendix A

OSOM Route Assessment

OSOM Truck Specifications

10x8 Platform Trailer 946 Beamset Short



Overall Length	*56.633m*
Track width	*4.200m*
Beamset width	*5.740m*
Load Height	*4.500m*
Axle spacing	*1.800m*

OSOM Configuration calibrated against similar OSOM configurations and is based on information available at the time of assessment

17 Points of interest tested

Online Map Link

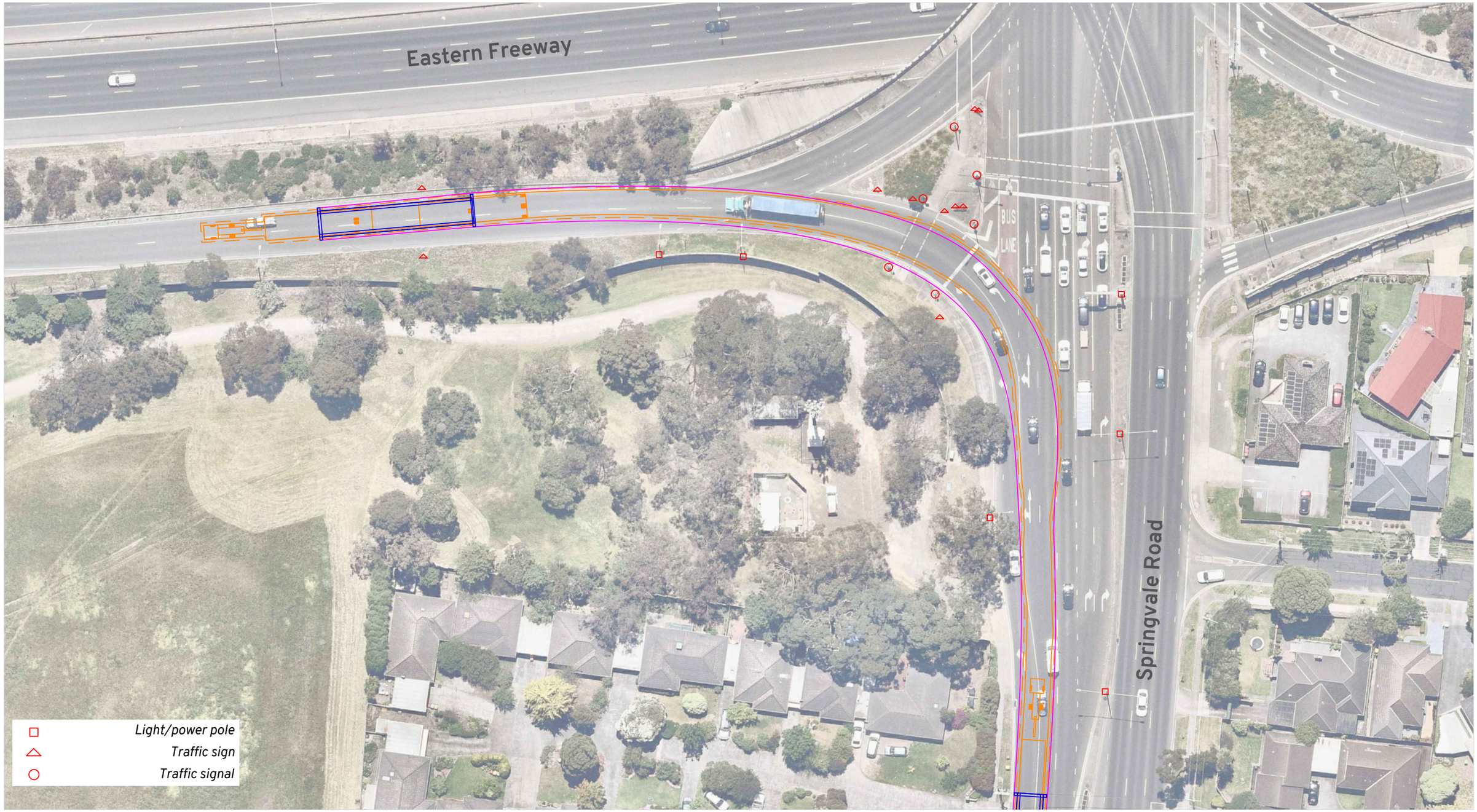
OSOM Route Assessment

Deniliquin BESS

Overall Route Summary and OSOM Details

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: NTS

Amber 00



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Location:

Nunawading VIC 3131

Online Map Link

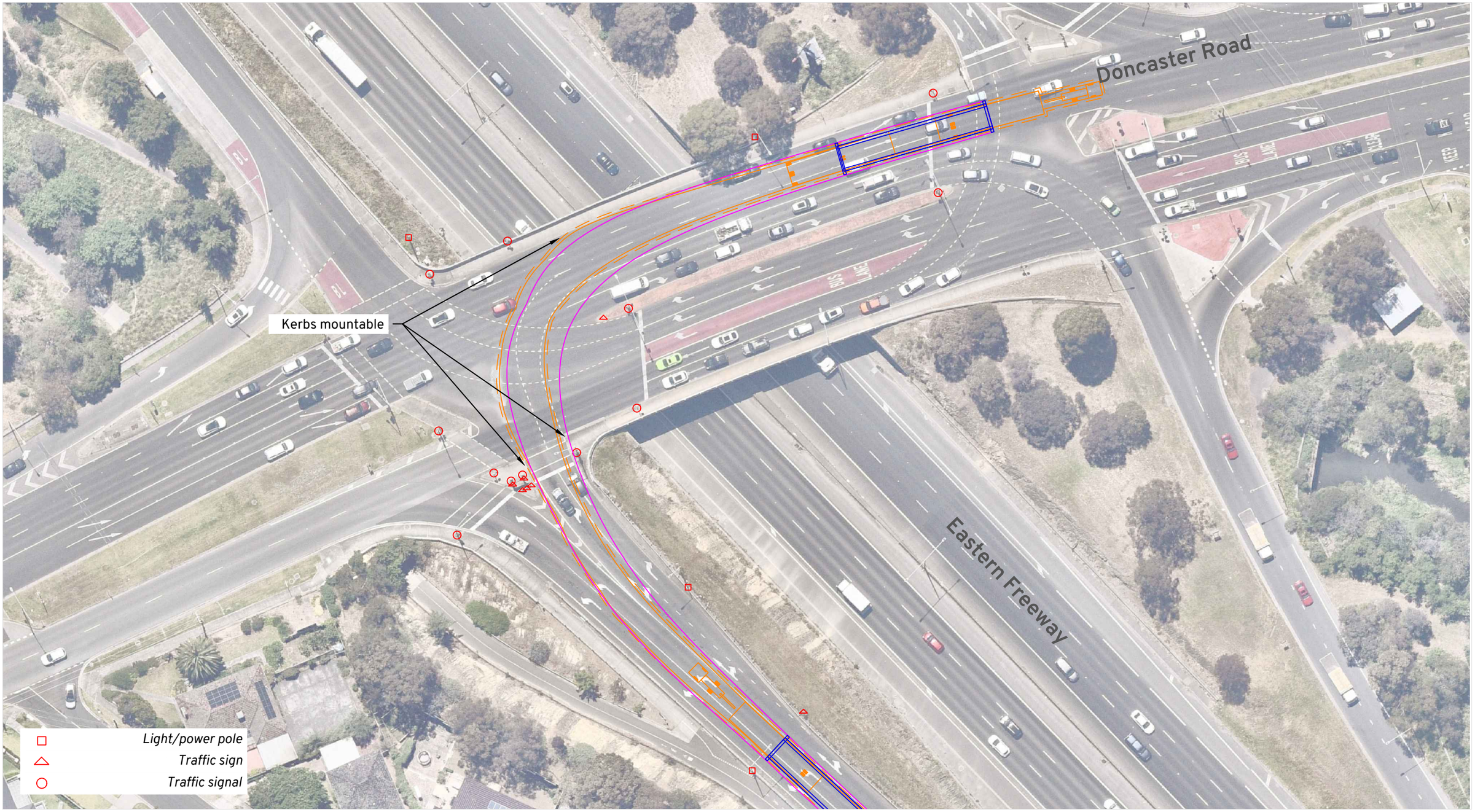
OSOM Route Assessment

Deniliquin BESS

Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:750

Amber 01



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Location:

Balwyn North VIC 3104

Online Map Link

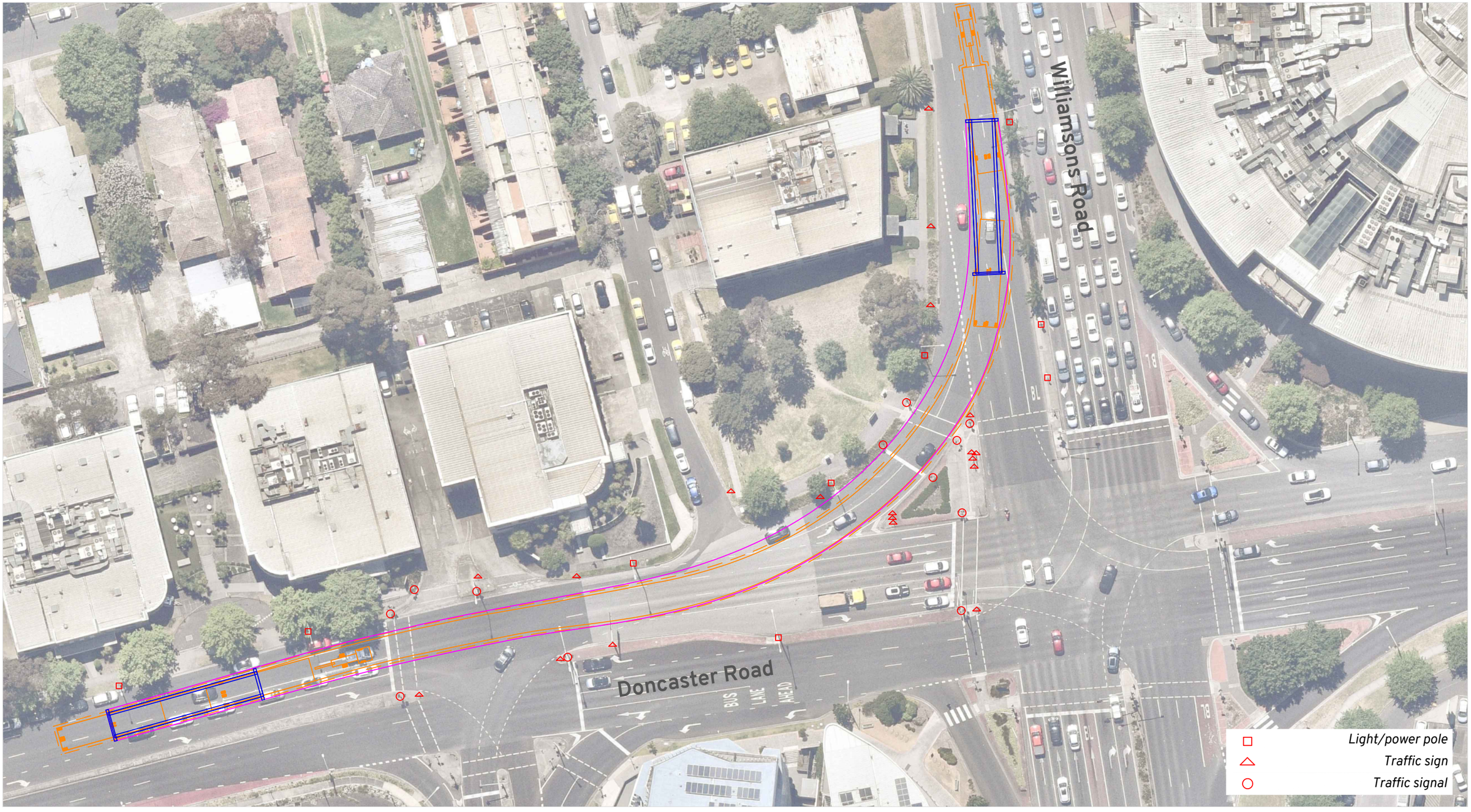
OSOM Route Assessment

Deniliquin BESS

Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:750

Amber 02



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Location:

Doncaster VIC 3108

Online Map Link

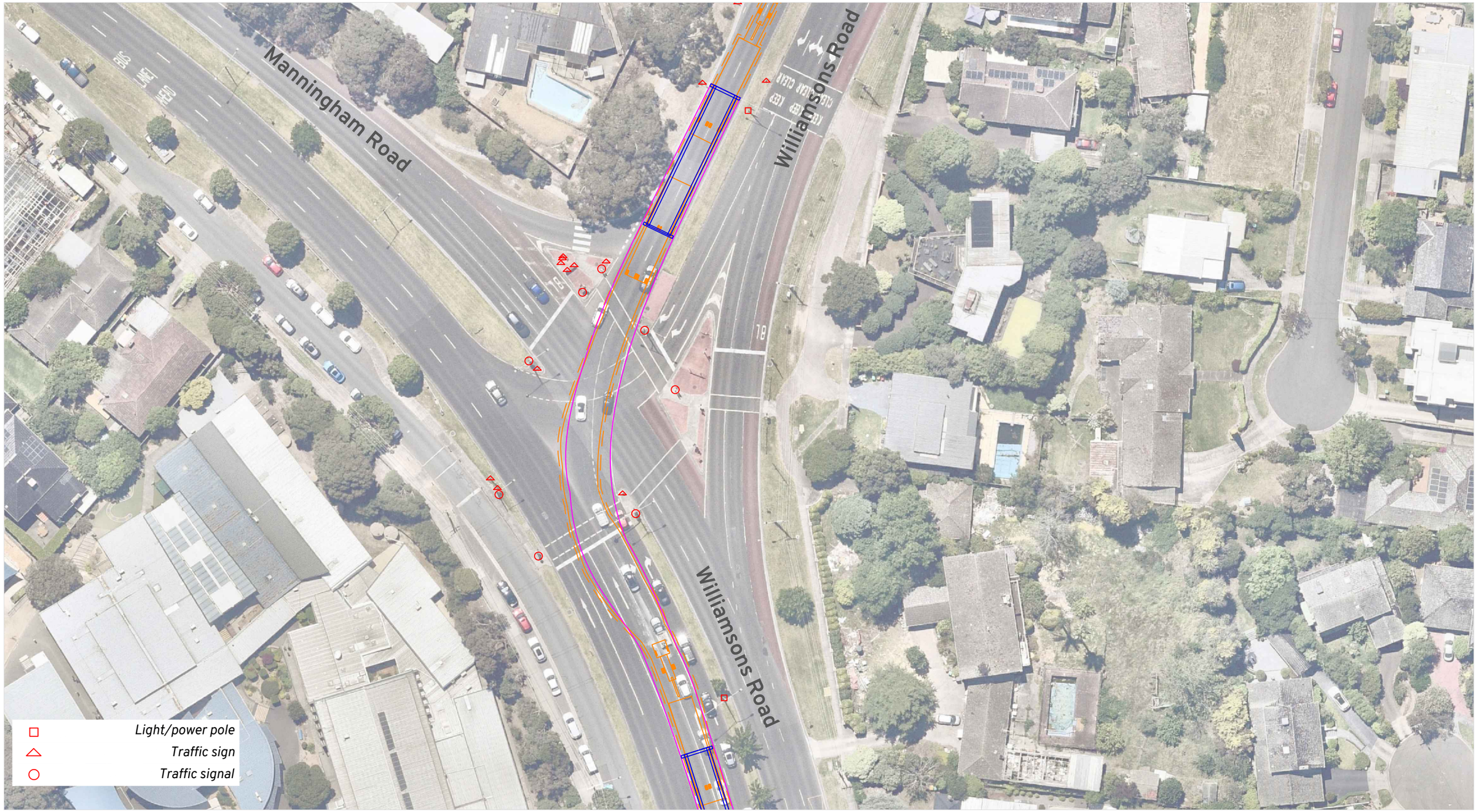
OSOM Route Assessment

Deniliquin BESS

Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:750

Amber 03



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Location:

Doncaster VIC 3108

Online Map Link

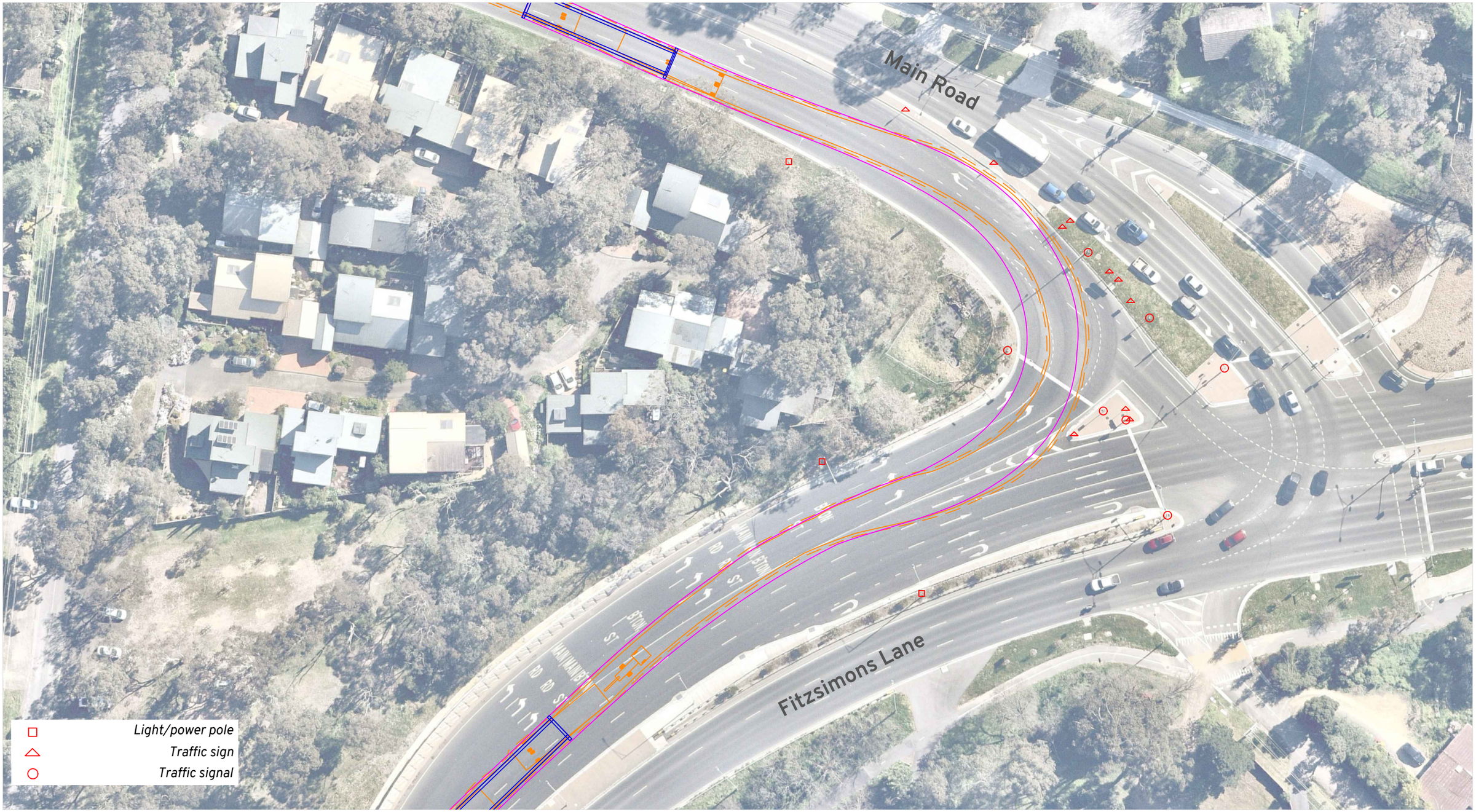
OSOM Route Assessment

Deniliquin BESS

Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:750

Amber 04



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Location:
Eltham VIC 3095
Online Map Link

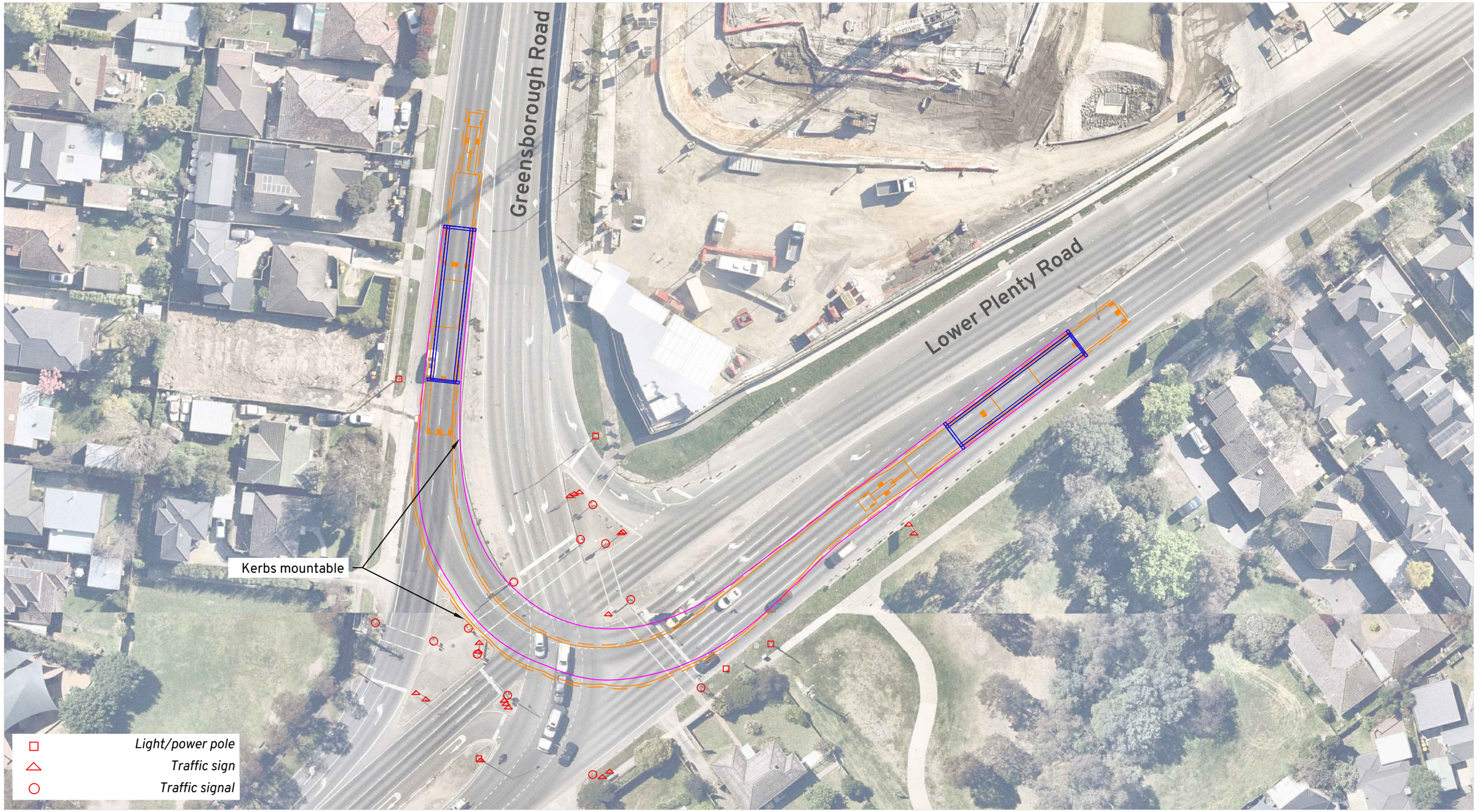
OSOM Route Assessment

Deniliquin BESS

Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:750

Amber 05



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

All kerbs are mountable.

Location:
Rosanna VIC 3084
Online Map Link

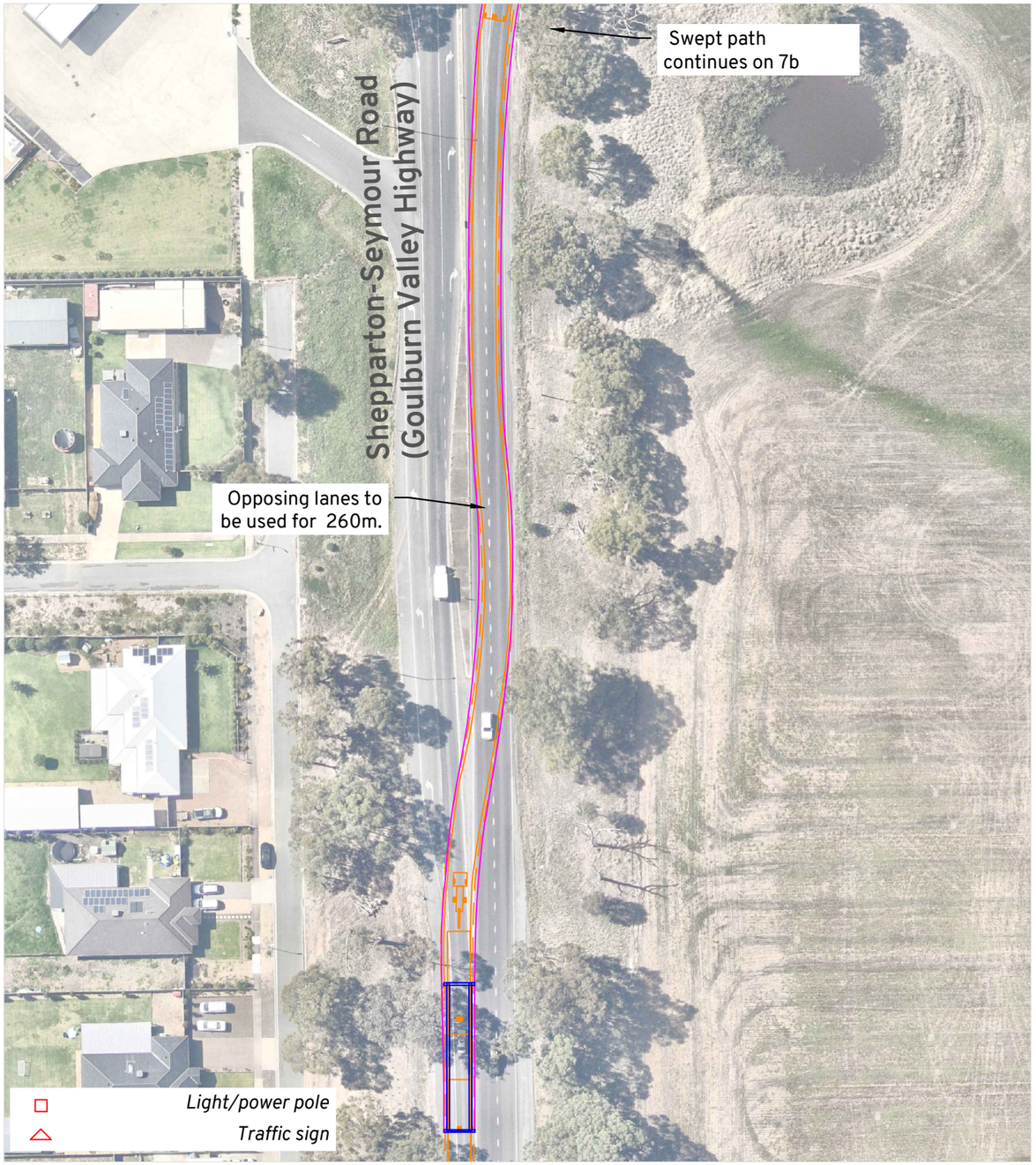
OSOM Route Assessment

Deniliquin BESS

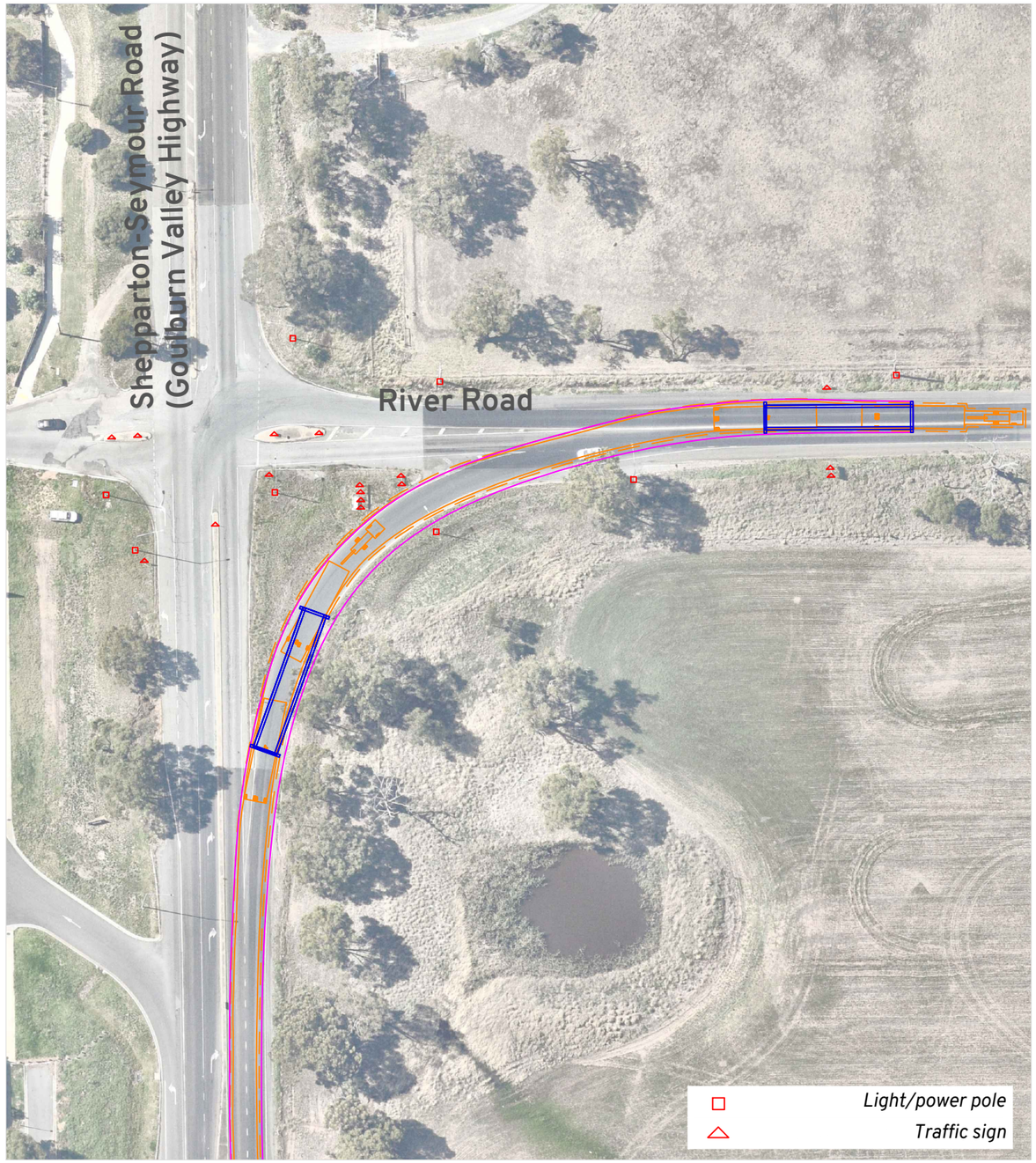
Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:750

Amber



07a



07b

Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required and facilitate use of opposing lanes.

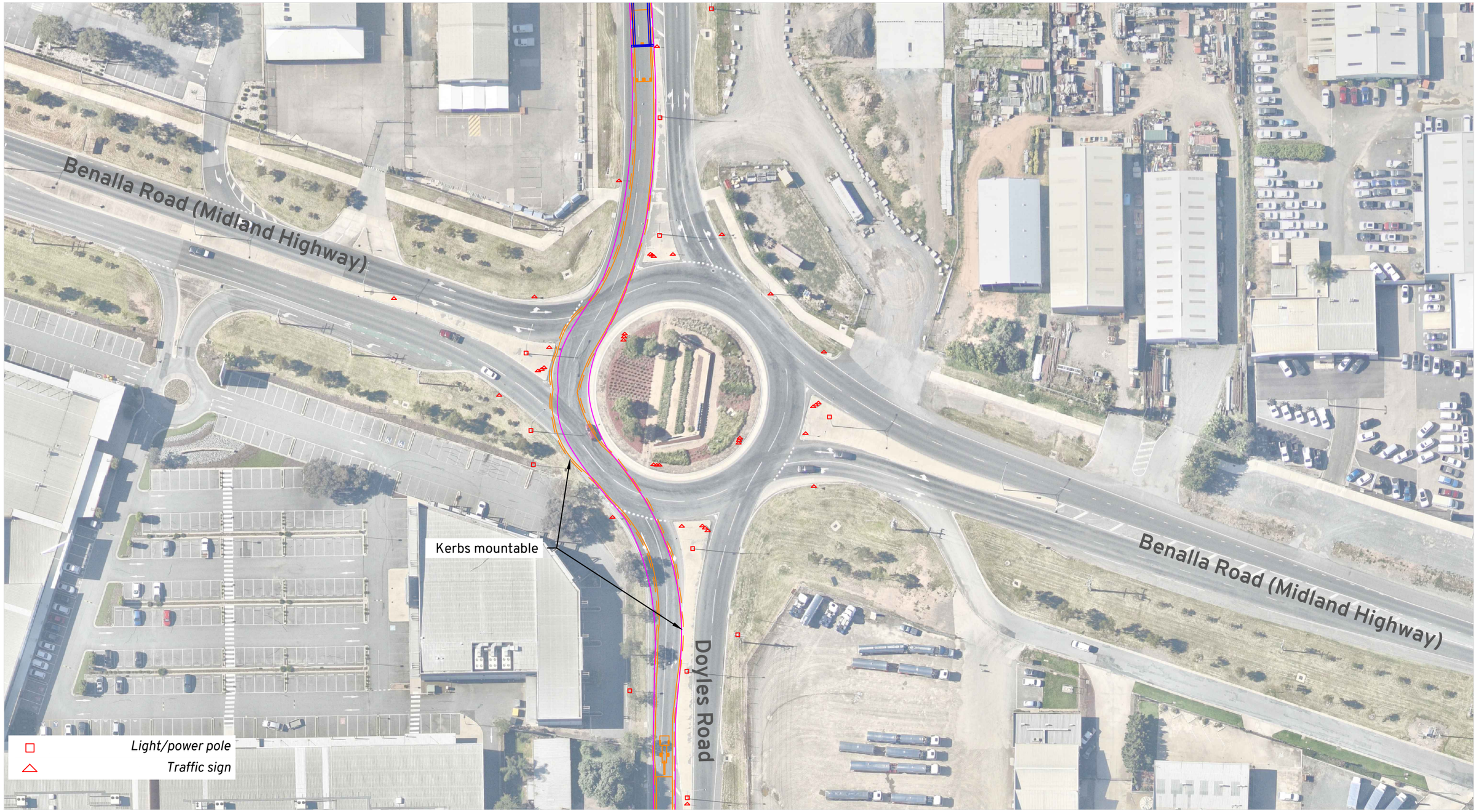
Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Location:
Kialla VIC 3631
Online Map Link

OSOM Route Assessment
Deniliquin BESS
Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:1000

Amber 07



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Location:
Orrvale VIC 3631
Online Map Link

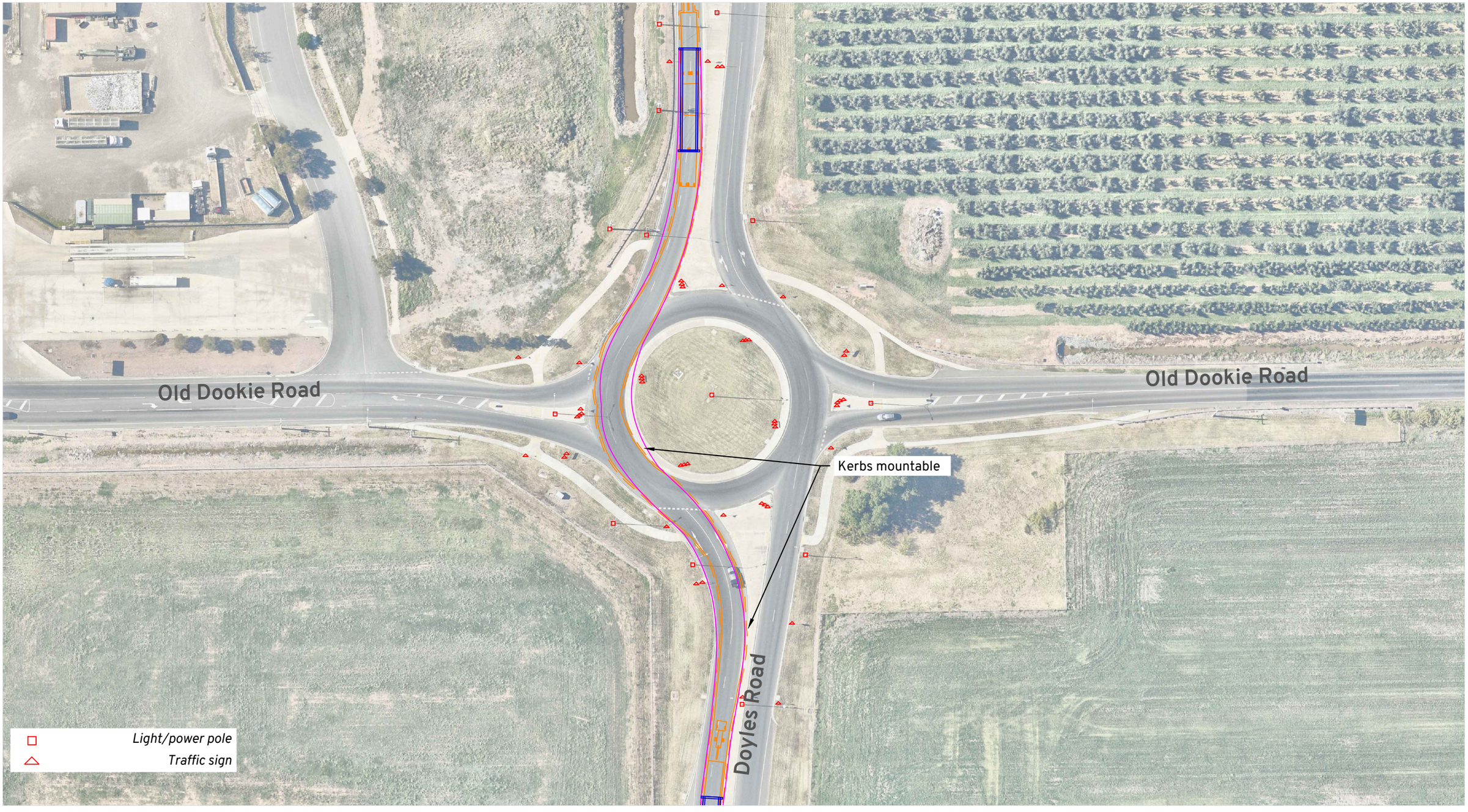
OSOM Route Assessment

Deniliquin BESS

Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:1000

Amber 08



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Location:

Shepparton-Mooroopna VIC 3630

Online Map Link

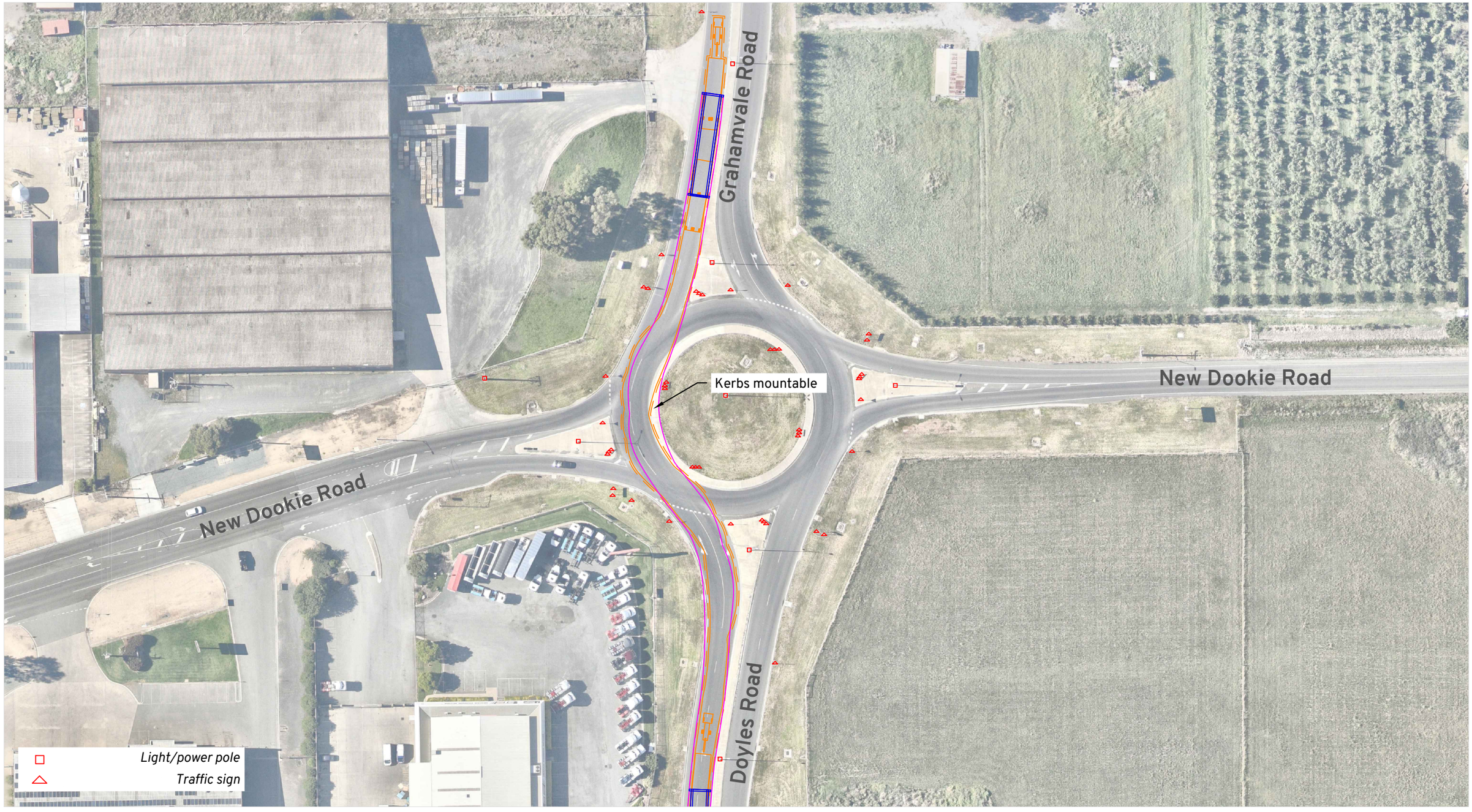
OSOM Route Assessment

Deniliquin BESS

Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:1000

Amber 09



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Location:

Grahamvale VIC 3631

Online Map Link

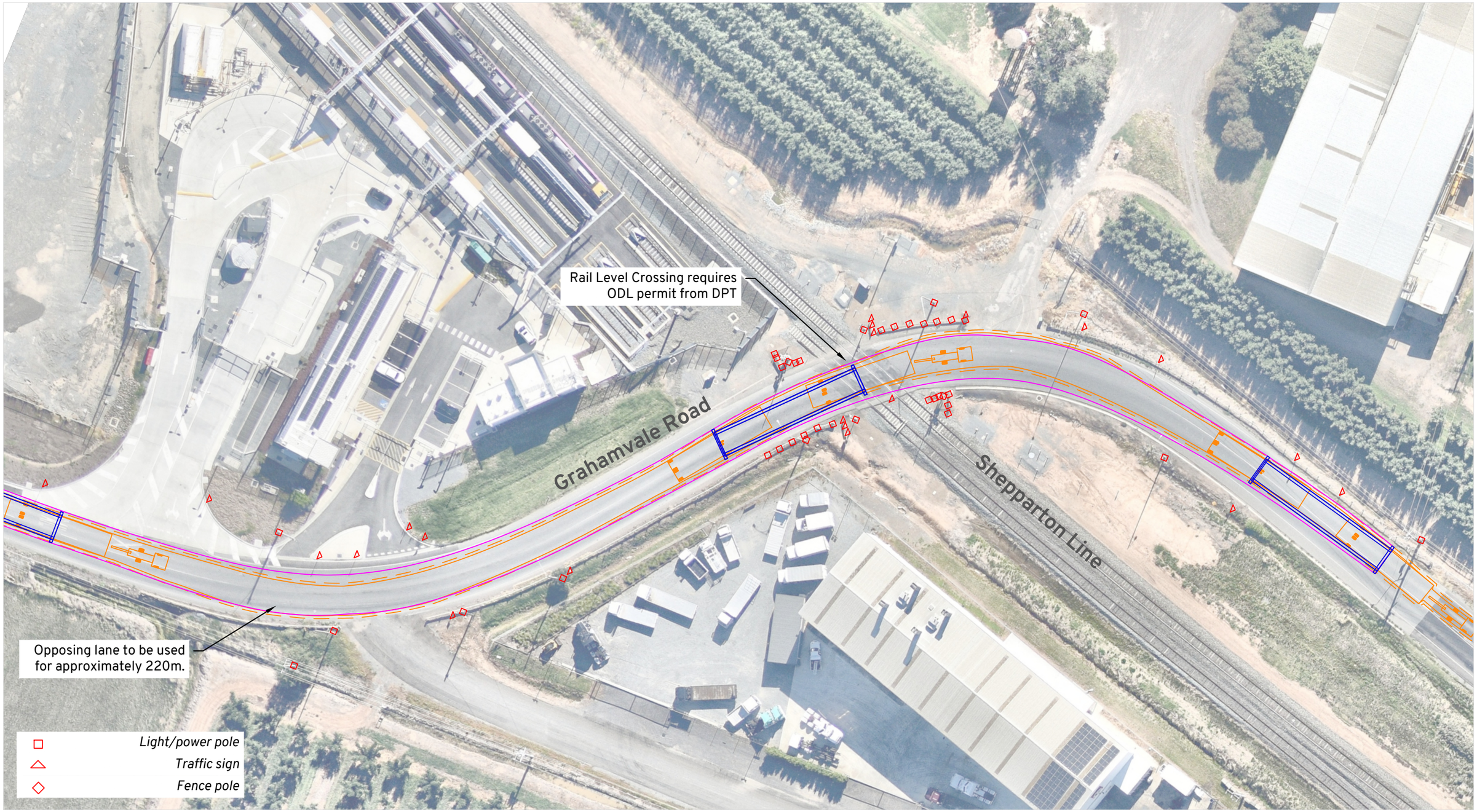
OSOM Route Assessment

Deniliquin BESS

Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:1000

Amber 10



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required and facilitate use of opposing lane on Grahamville Road.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

ODL permit required from DPT for rail level crossing.

Location:
Greater Shepparton VIC 3630
Online Map Link

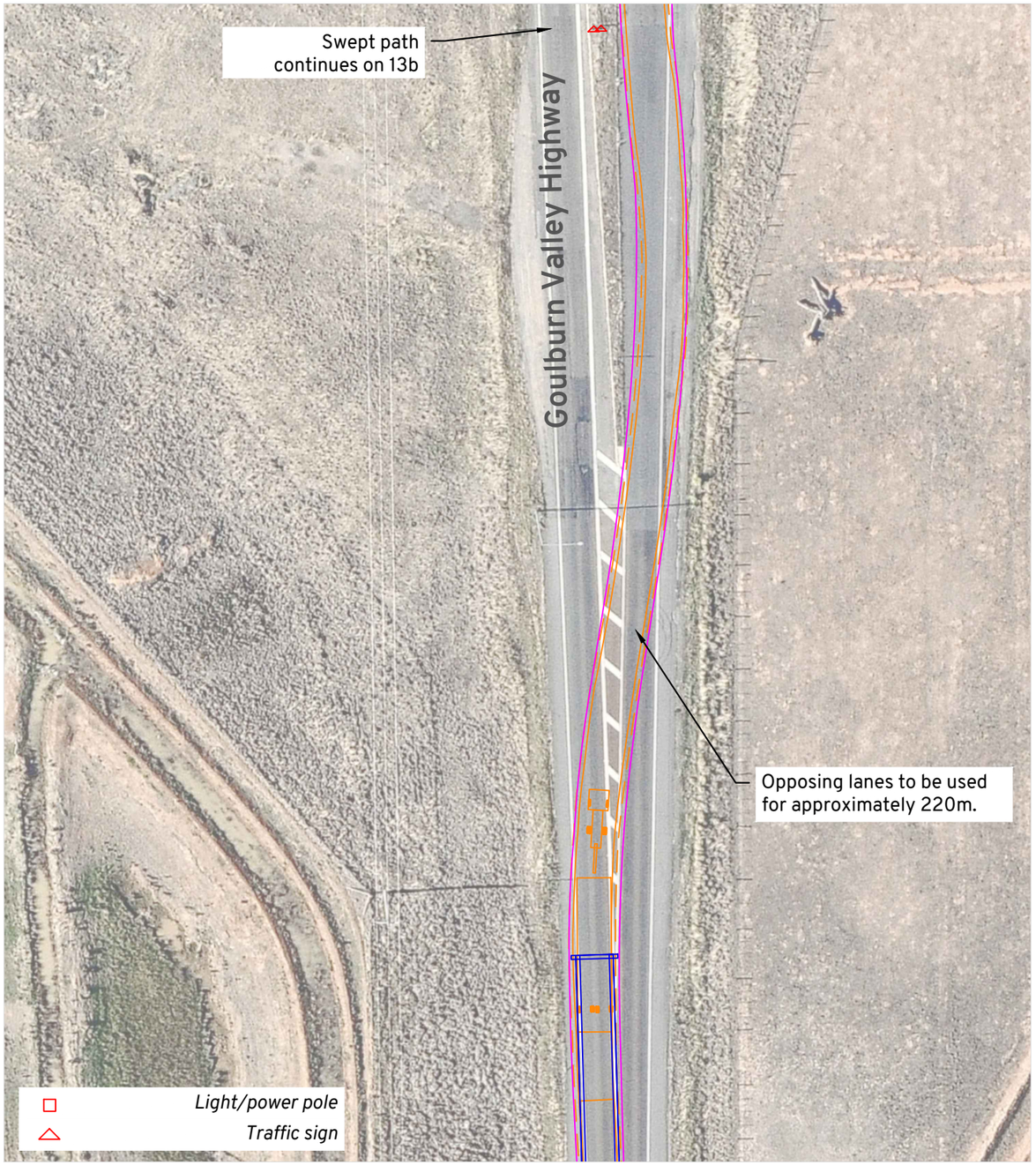
OSOM Route Assessment

Deniliquin BESS

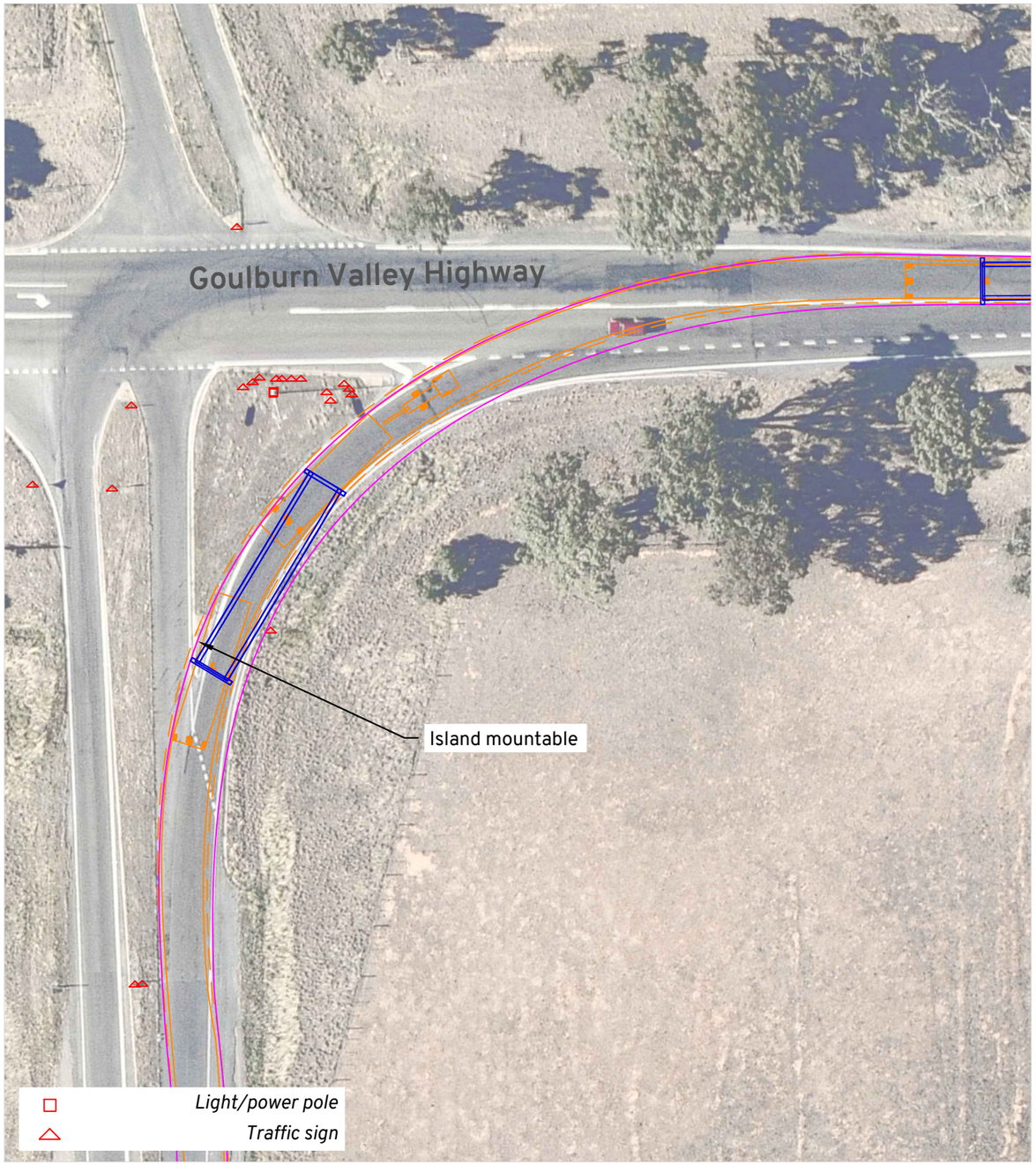
Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:750

Amber 11



13a



13b

Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required and facilitate use of opposing lane from east.

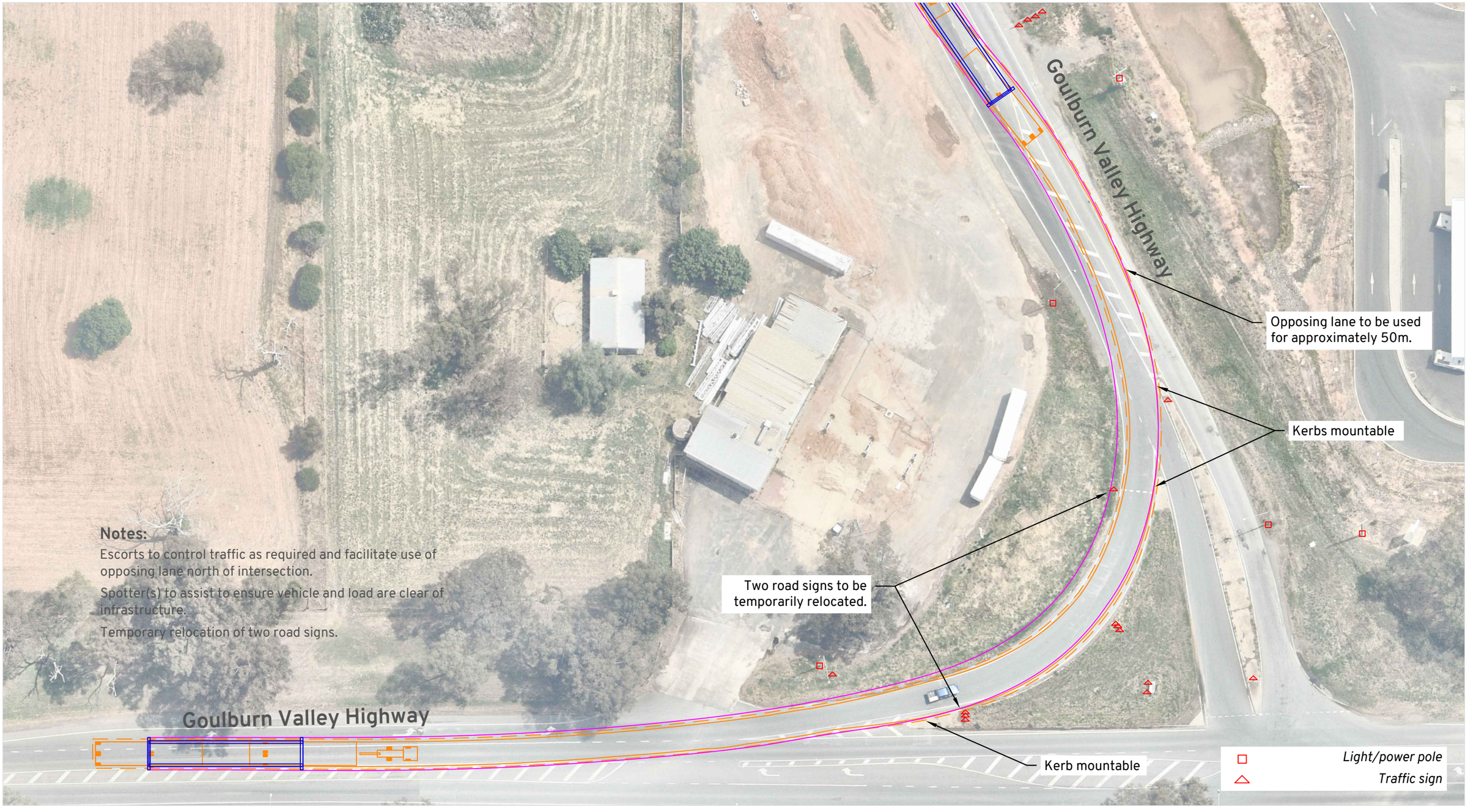
Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Location:
Strathmerton VIC 3641
Online Map Link

OSOM Route Assessment
Deniliquin BESS
Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:750

Amber



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required and facilitate use of opposing lane north of intersection.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

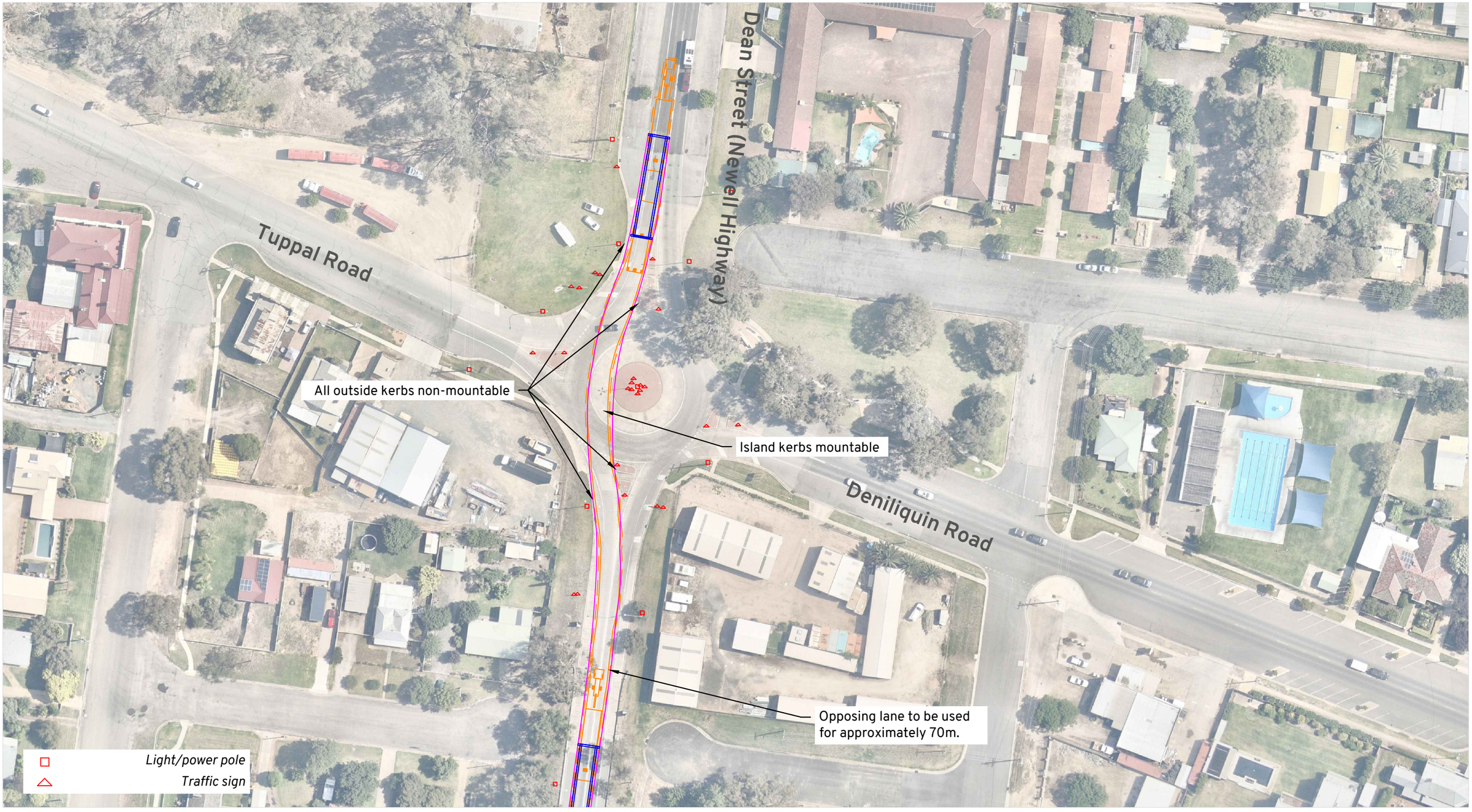
Temporary relocation of two road signs.

Location:
Yarroweyah VIC 3644
Online Map Link

OSOM Route Assessment
Deniliquin BESS
Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:750

Amber 14



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required and facilitate use of opposing lane south of roundabout.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Only kerbing on roundabout island is mountable, all others non-mountable.

Location:
Tocumwal NSW 2714
Online Map Link

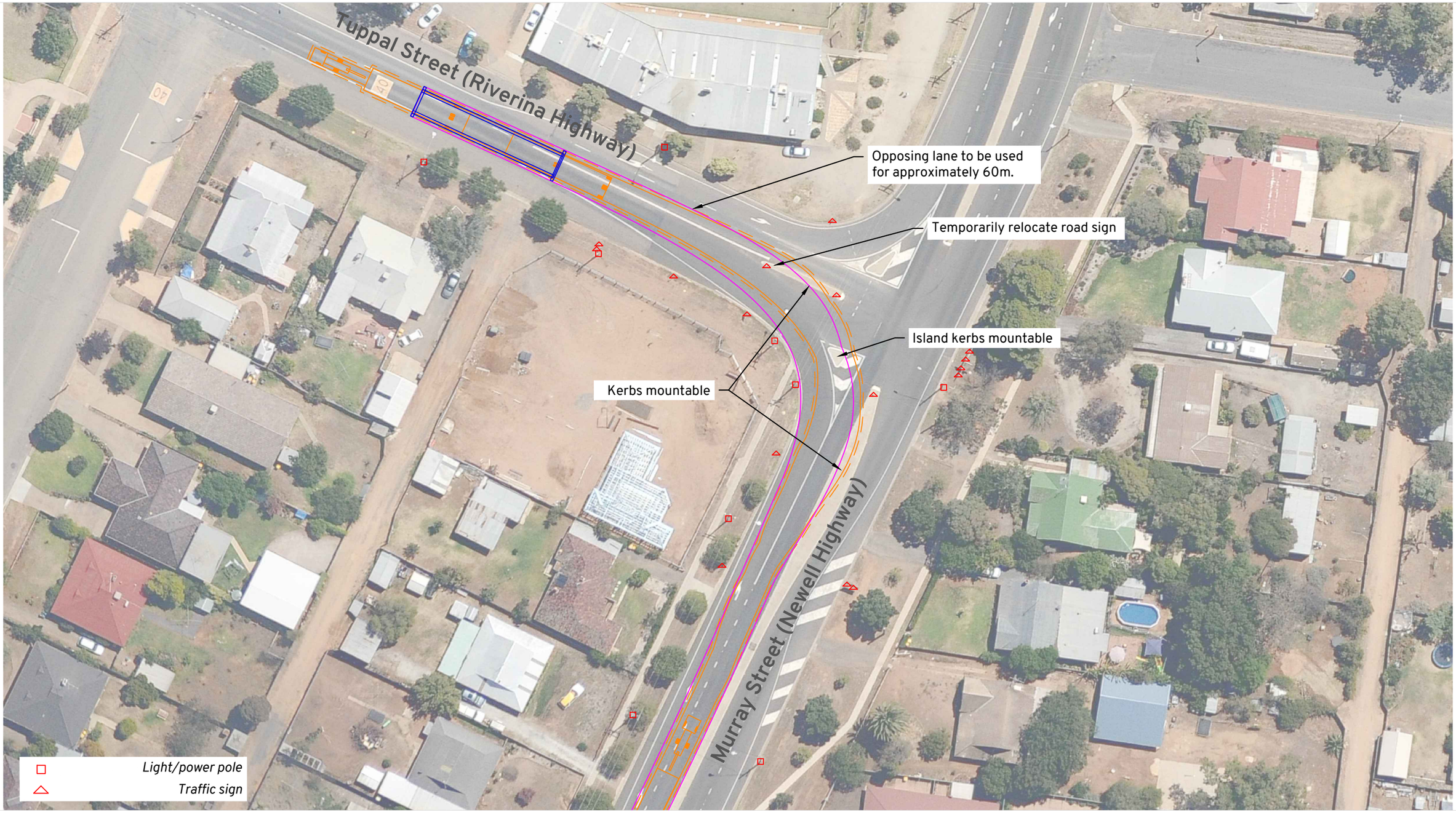
OSOM Route Assessment

Deniliquin BESS

Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:1000

Amber 15



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required and facilitate use of opposing lane on Tuppal Street.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

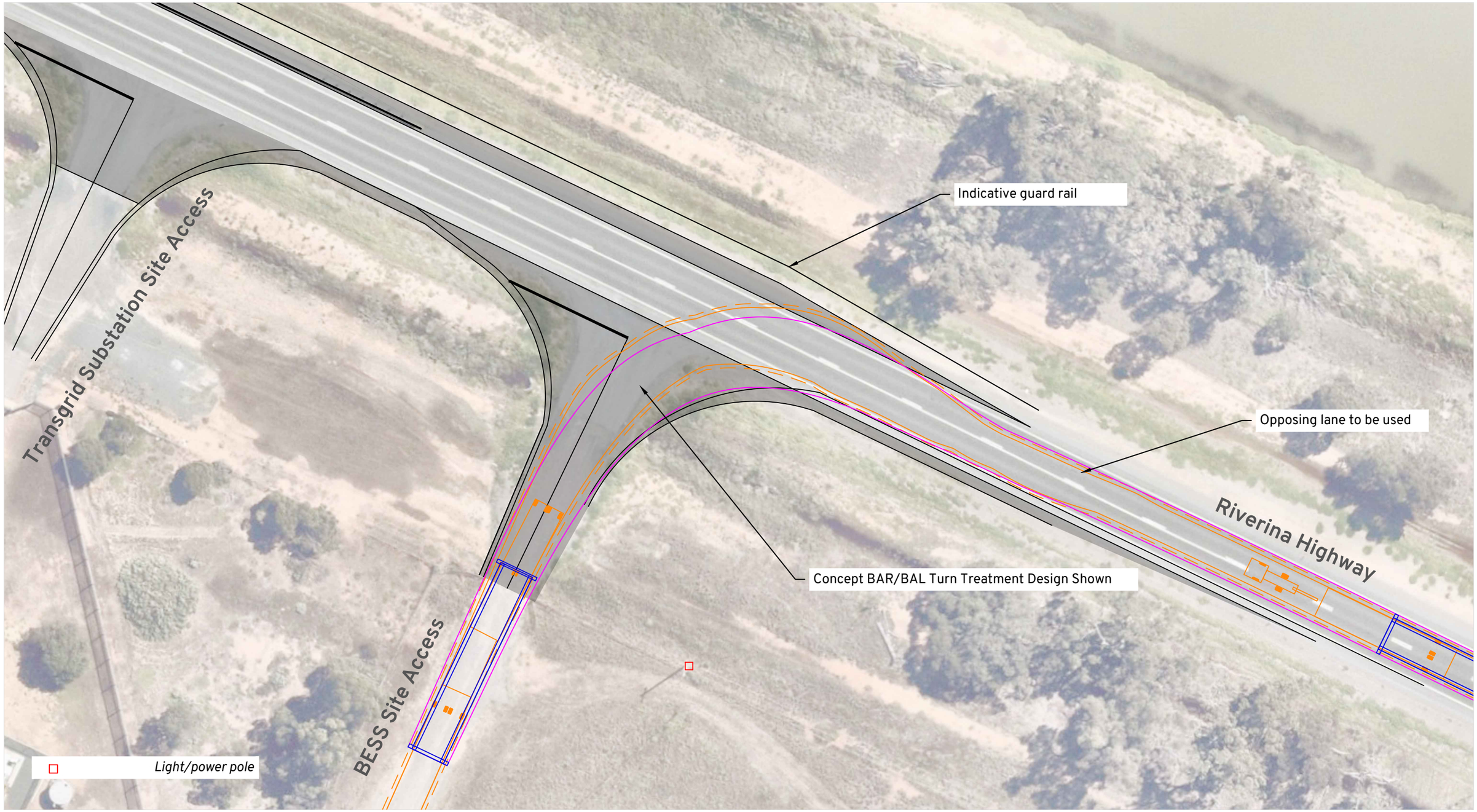
Temporary relocation of one sign required.

Location:
Finley NSW 2713
Online Map Link

OSOM Route Assessment
Deniliquin BESS
Swept Path Assessment

DRAWN: SE
DATE: 10/09/2024
DWG NO: 987 RA02A
SCALE at A3: 1:750

Amber 16



Vehicle Envelope

0.5m Clearance

Load Outlines

Load Path

Notes:

Escorts to control traffic as required and facilitate use of opposing lane on Riverina Highway.

Spotter(s) to assist to ensure vehicle and load are clear of infrastructure.

Location:
Deniliquin NSW 2710
Online Map Link

OSOM Route Assessment
Deniliquin BESS
Swept Path Assessment

DRAWN: SE
DATE: 06/05/2025
DWG NO: 987 RA02A
SCALE at A3: 1:500

Amber 17

Appendix B

Response to TfNSW Agency Advice

TfNSW Comment	Response
Hours, days and periods of construction.	The proposed construction hours and project timeframe are provided within Section 3.2.
Schedule for phasing/staging of the project (including pre-construction, accommodation and ancillary infrastructure works) and identify the traffic volumes for each stage	The traffic assessment in Section 4 details the known works associated with each stage including traffic volumes.
Traffic volumes: • Surveyed existing background traffic at key intersections with State Road network. Traffic surveys are required for each intersection with the State Road networks and are to be in accordance with Part 3 Austroads Guide to Traffic Management with raw data included in the TIA. • Project-related traffic volumes (measured as vehicle trips per hour and per day) for each stage, including pre-construction, construction, operation and decommissioning and identifying the peak period for traffic volumes. • Traffic volumes are to include a description of: ○ Ratio of light vehicles to heavy vehicles (including OSOM that do not require an NHVR permit). ○ Peak times for existing traffic. ○ Peak times for project-related traffic. ○ Transportation hours. ○ Project-related traffic interaction with existing and projected background traffic with annual growth applied linearly to peak of construction. • The origin, destination and routes for: ○ Employee and contractor light traffic. ○ Heavy vehicle traffic. ○ OSOM vehicle traffic (inclusive of high-risk).	Existing traffic captured in surveys provided in Section 2.3.1 with the data provided in Appendix C. Project traffic presented in Section 4.2.1. Section 4 shows different vehicle classifications using the road network, different impacts at differing peak times of day, factoring up of background traffic to proposed peak construction period, and traffic distribution. The traffic assessment within this report has subsequently focused on the traffic impacts during construction when the majority of vehicle movements are generated.
A description of all heavy vehicles (including non-high-risk OSOM vehicles) and materials to be transported.	Section 5 shows proposed heavy vehicles and Section 6.1 shows OSOM vehicles
The impact of generated traffic and measures employed to ensure efficiency and safety on the public road network during the project's construction, operation and decommissioning. This includes enforcement to manage traffic volumes, driver behaviour, and access paths to the site.	The traffic generation is shown in Section 4 and mitigation measures to ensure road efficiency and safety in Section 5.3 for heavy vehicles and Section 9 for general mitigation measures.
A turn warrant assessment for the worst-case scenario (i.e. peak project traffic volumes applied to the identified background traffic at the construction and background peak hour) in accordance with Part 6 of Austroads Guide to Traffic Management is to be undertaken at identified key intersections on project routes, project site access and site access points to access ancillary infrastructure.	Turn Treatment assessment has been completed for the peak construction period's peak hour (6:00-7:00am) and peak road network hour (8:00-9:00am) and is provided in Section 7.1.

TfNSW Comment	Response
The TIA is required to detail improvements to the road network, such as road widening and intersection treatments, to cater for and mitigate the impact of project-related traffic (including accommodation and ancillary infrastructure components) at key intersections with the State Road network. Strategic designs must be accompanied by safe intersection sight distance and swept path analysis using the largest heavy vehicle and high-risk OSOM passing through the intersection(s).	An overview of the required road upgrades is provided in Section 9.1. The turn treatments and available sight distance at all locations comply with the requirements of the Austroads Guide subject to the potential maintenance of roadside vegetation along Riverina Highway east of the site access which is proposed to occur prior to the commencement of the construction phase of the Project.
Local climate conditions that may affect road safety for vehicles used during construction, operation and decommissioning of the project (e.g. fog, wet weather, etc)	Recommendations have been provided for inclusion within the TMP which address the proposed operation measures during local climate events explained in Section 8.6.
Measures to be employed to ensure a high level of road safety for daily staff commutes between accommodation and the construction site, specifically addressing the impacts of unsafe driver behaviour and driver fatigue for all project stages and how measures employed will be enforced.	Recommendations will be made within the TMP. Driver Protocols explained in Section 8.6.
Details of emergency access/egress, including details of: • How will access be managed (i.e., gates) to prevent the use of access by non-emergency related vehicle movements? • Identify emergency design vehicle and suitability of the access to accommodate. • Provision of sufficient storage at the throat of the access to allow emergency vehicle(s) to store within the access and not within the through lane or shoulder.	As outlined in Section 7.4, a Flood Assessment has been undertaken which has shown that the main access and existing paths on the surrounding road network are suitable to manage this key risk. Measures to manage other risks (medical, fire etc) will be identified and part of future management plans. S The main site access is set back approximately 40 metres from the frontage road, so any emergency vehicle would be clear of the road and shoulder.
The route assessment is required for high risk OSOM (as defined on TfNSW website) required to deliver components to the project. The concept-level route analysis must include: • The port or point of origin and must be for the entire route to the site access or intersections required to facilitate the high risk OSOM movements required for the project. • The TIA is required to include details of all high risk OSOM loads and vehicle configurations for the project. • The location of pull-over bays / rest areas along the high risk OSOM routes (including GPS coordinates) and demonstrate through swept paths that the high risk OSOMs can be physically accommodate all high risk OSOMs for the project (in terms of size, width and accessibility).	The route assessment of high risk OSOM vehicles and list of OSOM loads and vehicle configurations is within Section 6.1. Rest Areas along the route have been identified and shown in Figure 17.

TfNSW Comment	Response
Expanding on the points above, the concept route assessment is required to include: • Details of the road geometry and alignment along the identified transport route/s, including existing formations, crossings, bridges, intersection treatments and any identified hazards, including: ○ Bridge Assessments for any at risk bridges on the classified road network due to dimensions and weight of OSOM vehicles. ○ Swept path analysis demonstrating the largest design vehicle can enter and leave the development, and simultaneously pass through intersections along the proposed transport route/s. ○ The design vehicle templates used in the swept path analysis software are also requested in order for TfNSW to review the performance within the software (e.g. Autodesk Vehicle Tracking or Transoft AutoTURN). ○ Highlighting each at-risk road structures that the haulage route crosses including bridges, traffic signals, signage, major culverts, and minor culverts that may not meet the desirable cover to cater for proposed axle loads.	High level route assessment of one OSOM route for the largest BESS component has been completed and provided in Section 6. Detailed bridge assessments to be undertaken as part of the permit process. Swept path analysis undertaken using AutoTrack software and is provided in Appendix A. Minor road works and signage relocation is indicated at each pinch point along the assessed route.
Expanding on the points above, the concept route assessment is required to include: • Identify and provide the following measurements parameters of OSOM components / materials to be moved: ○ Identify types and numbers of high risk OSOM vehicles proposed to be used for the project. ○ Overall combination type, configuration, load and vehicle configuration: ○ length, width, height and mass (gcm, tare, weight to axle and payload) for components and nominated vehicles. ○ Wheelbase dimensions. ○ Maximum trailer articulation angle(s). ○ Minimum overhang heights above the road surface. ○ Vehicle configurations. ○ Traffic mitigation measures or road works, modifications, or road upgrades to facilitate the movement of the high risk OSOM(s) associated with the project. ○ Potential high level mitigation measures or commitments to mitigate known traffic, safety and impacts to road users along the high risk OSOM route (i.e. school bus routes, mining shift changes, TSRs, harvest periods and events).	All OSOM parameters for the project have been provided in Section 6. Summarised road upgrades provided in Section 6.5. Public Transport services which interface with the project are provided in Section 2.4.

TfNSW Comment	Response
Expanding on the points above, the concept route assessment is required to include: • Identify and assess implications of any road and rail projects that may be under construction during the indicative schedule for the OSOM movements.	A review of the rail impacts is provided in Section 6.4.3.
Access points or access tracks required for ETLs or other infrastructure will require the same level of assessment as the primary project access point and will need to address the matters outlined within this letter for this type of access with the state classified road. Strategic designs and swept path analysis will be required for these types of accesses.	Not applicable: transmission lines to connect with the adjacent Transgrid Substation do not cross or impact any State Roads.

Appendix C

Traffic Survey Data

TRANS TRAFFIC SURVEY
trafficsurvey.com.au
T. 1300 82 88 82 - F. 1300 83 88 83 - E. traffic@trafficsurvey.com.au - W. www.trafficsurvey.com.au

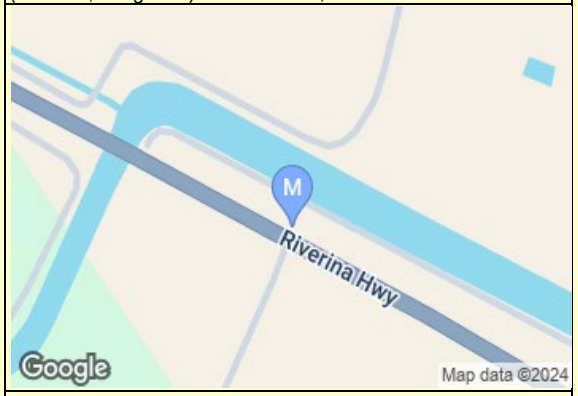
AUTOMATIC COUNT SUMMARY

Street Name :	Reverina Hwy	**Location :**	Approx. 1km West of Aratula N Rd
Suburb :	Deniliquin	**Start Date :**	00:00 Fri 09/August/2024
Machine ID:	XP74A7SX	**Finish Date :**	00:00 Fri 16/August/2024
Site ID:	3435	**Speed Zone :**	100 km/h
Prepared By :	Vo Son Binh	**Email:**	binh@trafficsurvey.com.au

GPS information		Lat 35° 33' 22.31 South Long 145° 1' 57.59 East	Direction of Travel		
			Both directions	**Westbound**	**Eastbound**
Traffic Volume :		Weekdays Average	1,575	799	776
(Vehicles/Day)		7 Day Average	1,431	727	704
Weekday	**AM**	10:00	134	70	65
Peak hour start	**PM**	14:00	129	65	64
Speeds :		85th Percentile	103.7	103.2	104.7
(Km/Hr)		Average	98.2	97.7	99.0
Classification % :		Light Vehicles up to 5.5m	77.7%	78.0%	77.4%

Location

GPS Information	Load Google Map (internet required)
(Latitude, Longitude)	-35.556198, 145.032664



Speed Data	Speed Graph	Speed Bin
Volume Data	Volume Graph	Classification

QUALITY ASSURED COMPANY BY ISO 9001:2015
OH&S SYSTEM CERTIFIED TO ISO 4801:2001
ENVIRONMENT MANAGEMENT SYSTEM CERTIFIED TO ISO14001:2015

Status of movement – Covid 19

"Traffic behaviour is not the same as pre-pandemic (traditional morning/afternoon peak is much less pronounced and school start/finish times are much more pronounced), the current patterns are close enough to what probably is going to be a 'COVID normal' situation for at least the next year or two. Workplaces are currently not all yet open.
These results should be used for indicative assessment only."

TRANS TRAFFIC SURVEY
trafficsurvey.com.au

Site Reverina Hwy

Direction Westbound

Back to Site Summary Page

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	12/08/2024	13/08/2024	14/08/2024	15/08/2024	9/08/2024	10/08/2024	11/08/2024	Total	Average	Total	Average	Total	Average
AM Peak	10:00	08:00	08:00	10:00	08:00	10:00	11:00	N/A	10:00	N/A	08:00	N/A	10:00
PM Peak	17:00	15:00	16:00	15:00	14:00	15:00	15:00	N/A	15:00	N/A	15:00	N/A	15:00
00:00	0	1	1	2	1	1	6	12	2	5	1	7	4
01:00	1	0	1	0	1	1	6	10	1	3	1	7	4
02:00	1	1	1	2	1	1	1	8	1	6	1	2	1
03:00	0	0	2	3	2	3	0	10	1	7	1	3	2
04:00	2	2	1	0	0	0	1	6	1	5	1	1	1
05:00	8	4	9	8	5	2	1	37	5	34	7	3	2
06:00	26	29	18	18	16	8	5	120	17	107	21	13	7
07:00	42	42	40	38	39	31	7	239	34	201	40	38	19
08:00	77	90	76	65	68	27	30	433	62	376	75	57	29
09:00	73	66	55	67	64	46	24	395	56	325	65	70	35
10:00	91	73	58	75	52	55	44	448	64	349	70	99	50
11:00	82	59	57	60	61	42	48	409	58	319	64	90	45
12:00	58	68	47	57	51	35	52	368	53	281	56	87	44
13:00	54	61	47	58	62	43	45	370	53	282	56	88	44
14:00	62	58	67	53	83	58	53	434	62	323	65	111	56
15:00	58	73	64	63	76	68	62	464	66	334	67	130	65
16:00	45	68	71	61	72	41	45	403	58	317	63	86	43
17:00	66	57	60	61	50	42	35	371	53	294	59	77	39
18:00	36	32	23	42	42	17	25	217	31	175	35	42	21
19:00	17	21	16	24	27	21	17	143	20	105	21	38	19
20:00	14	14	9	20	13	13	15	98	14	70	14	28	14
21:00	10	9	7	5	15	9	3	58	8	46	9	12	6
22:00	2	4	6	4	3	8	3	30	4	19	4	11	6
23:00	0	5	2	3	5	5	4	24	3	15	3	9	5
Total	825	837	738	789	809	577	532	5107	730	3998	800	1109	555
% Heavy	26.91%	25.45%	25.61%	21.67%	20.40%	14.04%	15.23%	21.97%		24.01%		14.61%	

TRANS TRAFFIC SURVEY
trafficsurvey.com.au

Site Reverina Hwy

Direction Eastbound

Back to Site Summary Page

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	12/08/2024	13/08/2024	14/08/2024	15/08/2024	9/08/2024	10/08/2024	11/08/2024	Total	Average	Total	Average	Total	Average
AM Peak	11:00	10:00	08:00	10:00	09:00	08:00	11:00	N/A	11:00	N/A	10:00	N/A	11:00
PM Peak	14:00	14:00	15:00	13:00	13:00	16:00	13:00	N/A	13:00	N/A	14:00	N/A	13:00
00:00	0	0	0	1	1	1	7	10	1	2	0	8	4
01:00	1	0	1	0	0	2	1	5	1	2	0	3	2
02:00	0	0	0	3	1	1	2	7	1	4	1	3	2
03:00	1	2	2	4	1	1	0	11	2	10	2	1	1
04:00	1	2	4	1	1	3	0	12	2	9	2	3	2
05:00	9	10	14	18	6	2	3	62	9	57	11	5	3
06:00	19	31	18	31	27	5	3	134	19	126	25	8	4
07:00	56	62	60	56	46	26	7	313	45	280	56	33	17
08:00	51	65	64	52	54	70	24	380	54	286	57	94	47
09:00	63	59	51	47	72	50	44	386	55	292	58	94	47
10:00	69	86	58	66	44	55	34	412	59	323	65	89	45
11:00	76	46	54	55	72	62	57	422	60	303	61	119	60
12:00	53	56	58	46	69	39	38	359	51	282	56	77	39
13:00	60	55	52	66	75	42	48	398	57	308	62	90	45
14:00	65	68	63	54	71	36	45	402	57	321	64	81	41
15:00	58	60	66	58	62	31	29	364	52	304	61	60	30
16:00	57	54	54	54	55	45	38	357	51	274	55	83	42
17:00	56	57	62	54	73	30	37	369	53	302	60	67	34
18:00	25	23	27	40	25	17	24	181	26	140	28	41	21
19:00	31	29	21	23	18	21	12	155	22	122	24	33	17
20:00	8	10	6	16	19	15	5	79	11	59	12	20	10
21:00	6	1	4	11	12	10	4	48	7	34	7	14	7
22:00	4	3	7	4	7	5	4	34	5	25	5	9	5
23:00	3	3	3	2	7	4	3	25	4	18	4	7	4
Total	772	782	749	762	818	573	469	4925	704	3883	777	1042	521
% Heavy	23.70%	23.91%	26.84%	23.36%	26.41%	14.83%	14.93%	22.74%		24.85%		14.88%	

TRANS TRAFFIC SURVEY
trafficsurvey.com.au

Site Reverina Hwy

Direction Both Directions

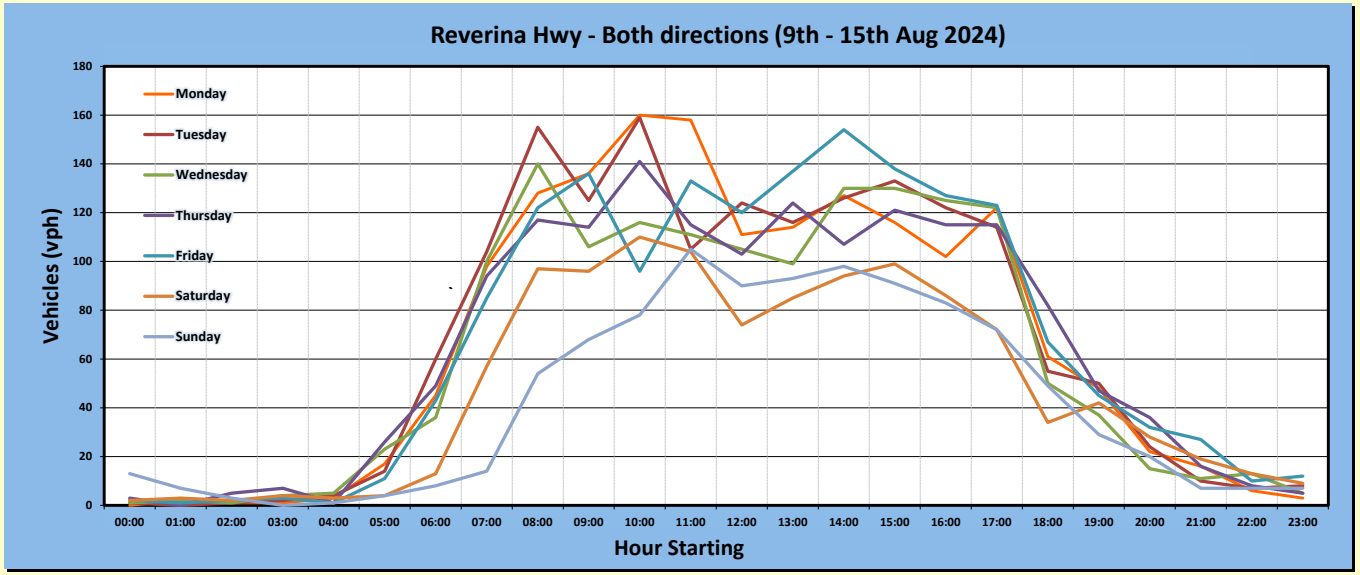
Back to Site Summary Page

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	12/08/2024	13/08/2024	14/08/2024	15/08/2024	9/08/2024	10/08/2024	11/08/2024	Total	Average	Total	Average	Total	Average
AM Peak	10:00	10:00	08:00	10:00	09:00	10:00	11:00	N/A	10:00	N/A	10:00	N/A	11:00
PM Peak	14:00	15:00	14:00	13:00	14:00	15:00	14:00	N/A	14:00	N/A	14:00	N/A	14:00
00:00	0	1	1	3	2	2	13	22	3	7	1	15	8
01:00	2	0	2	0	1	3	7	15	2	5	1	10	5
02:00	1	1	1	5	2	2	3	15	2	10	2	5	3
03:00	1	2	4	7	3	4	0	21	3	17	3	4	2
04:00	3	4	5	1	1	3	1	18	3	14	3	4	2
05:00	17	14	23	26	11	4	4	99	14	91	18	8	4
06:00	45	60	36	49	43	13	8	254	36	233	47	21	11
07:00	98	104	100	94	85	57	14	552	79	481	96	71	36
08:00	128	155	140	117	122	97	54	813	116	662	132	151	76
09:00	136	125	106	114	136	96	68	781	112	617	123	164	82
10:00	160	159	116	141	96	110	78	860	123	672	134	188	94
11:00	158	105	111	115	133	104	105	831	119	622	124	209	105
12:00	111	124	105	103	120	74	90	727	104	563	113	164	82
13:00	114	116	99	124	137	85	93	768	110	590	118	178	89
14:00	127	126	130	107	154	94	98	836	119	644	129	192	96
15:00	116	133	130	121	138	99	91	828	118	638	128	190	95
16:00	102	122	125	115	127	86	83	760	109	591	118	169	85
17:00	122	114	122	115	123	72	72	740	106	596	119	144	72
18:00	61	55	50	82	67	34	49	398	57	315	63	83	42
19:00	48	50	37	47	45	42	29	298	43	227	45	71	36
20:00	22	24	15	36	32	28	20	177	25	129	26	48	24
21:00	16	10	11	16	27	19	7	106	15	80	16	26	13
22:00	6	7	13	8	10	13	7	64	9	44	9	20	10
23:00	3	8	5	5	12	9	7	49	7	33	7	16	8
Total	1597	1619	1487	1551	1627	1150	1001	10032	1433	7881	1576	2151	1076
% Heavy	25.36%	24.71%	26.23%	22.50%	23.42%	14.43%	15.08%	22.35%		24.43%		14.74%	

TRANS TRAFFIC SURVEY
trafficsurvey.com.au

Site Reverina Hwy - Both directions (9th - 15th Aug 2024) Back to Site Summary Page

Direction Both directions

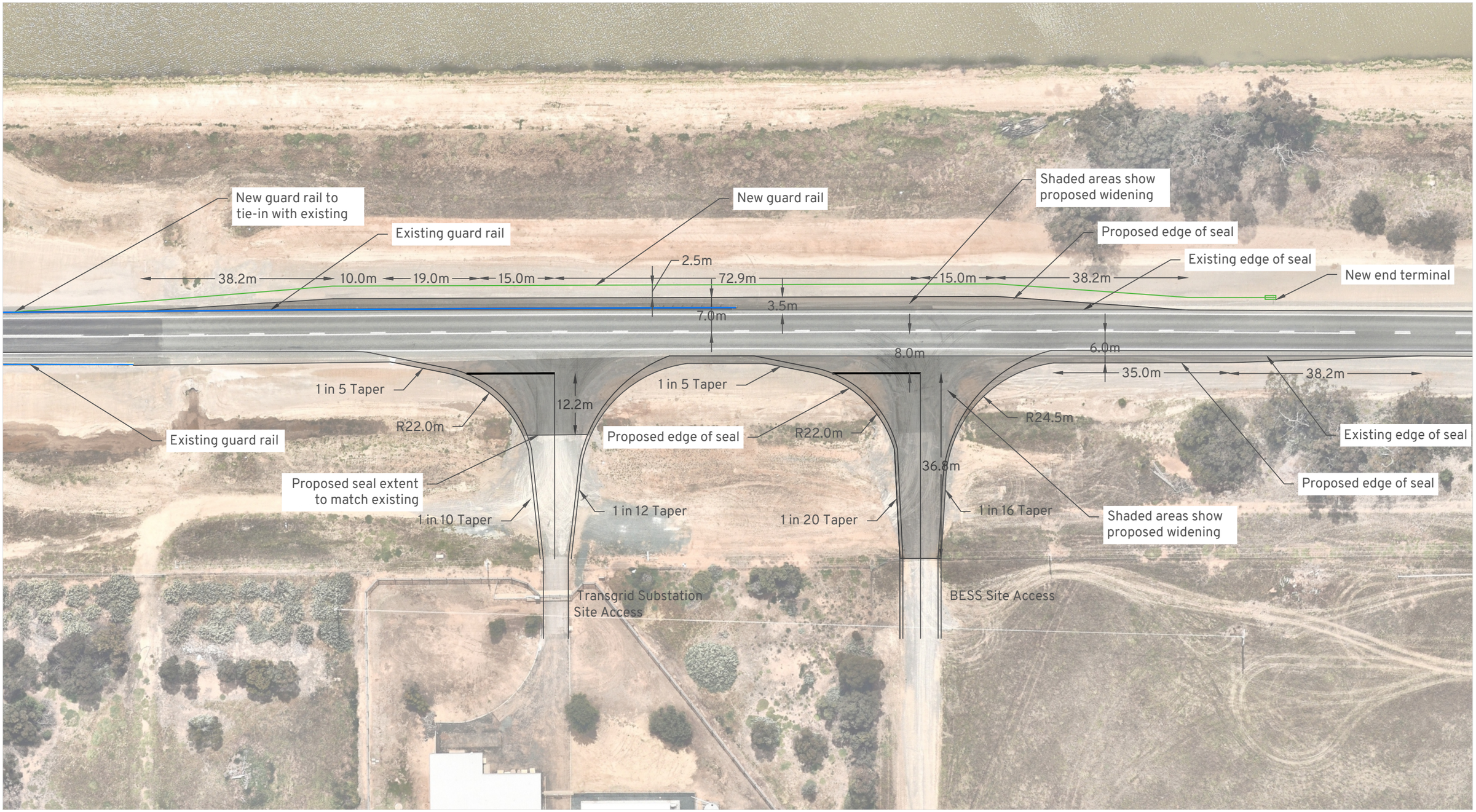


Volume Sumary

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Date	12/08/2024	13/08/2024	14/08/2024	15/08/2024	9/08/2024	10/08/2024	11/08/2024
AM Peak	10:00	10:00	08:00	10:00	09:00	10:00	11:00
PM Peak	14:00	15:00	14:00	13:00	14:00	15:00	14:00
00:00	0	1	1	3	2	2	13
01:00	2	0	2	0	1	3	7
02:00	1	1	1	5	2	2	3
03:00	1	2	4	7	3	4	0
04:00	3	4	5	1	1	3	1
05:00	17	14	23	26	11	4	4
06:00	45	60	36	49	43	13	8
07:00	98	104	100	94	85	57	14
08:00	128	155	140	117	122	97	54
09:00	136	125	106	114	136	96	68
10:00	160	159	116	141	96	110	78
11:00	158	105	111	115	133	104	105
12:00	111	124	105	103	120	74	90
13:00	114	116	99	124	137	85	93
14:00	127	126	130	107	154	94	98
15:00	116	133	130	121	138	99	91
16:00	102	122	125	115	127	86	83
17:00	122	114	122	115	123	72	72
18:00	61	55	50	82	67	34	49
19:00	48	50	37	47	45	42	29
20:00	22	24	15	36	32	28	20
21:00	16	10	11	16	27	19	7
22:00	6	7	13	8	10	13	7
23:00	3	8	5	5	12	9	7
Total	1597	1619	1487	1551	1627	1150	1001
% Heavy	25.36%	24.71%	26.23%	22.50%	23.42%	14.43%	15.08%

Appendix D

Site Access Design and Swept Path Assessment



The following design details have been taken from Austroads Guide to Road Design Part 4A

Rural Basic Right-turn Treatment (BAR) - Section 7.2.1.
1: Design speed of 110km/h.
2: Nominal lane width of 3.5m.
3: Formation/carriageway widening is 2.5m, total width (C) is 7m.
4: Taper lengths calculate to 38.2m.
5: Storage length is 19.0m for one Semi-Articulated Vehicle.

Rural Left-turn Treatment (BAL) - Part 4A Section 8.2.1.
1: Design speed of 110km/h.
2: Nominal lane width of 3.5m.
3: Formation/carriageway widening is 2.5m, total width (C) is 6m.
4: Taper length calculates to 38.2m.
5: Minimum length of parallel widened shoulder used from Table 8.1 is 35m.

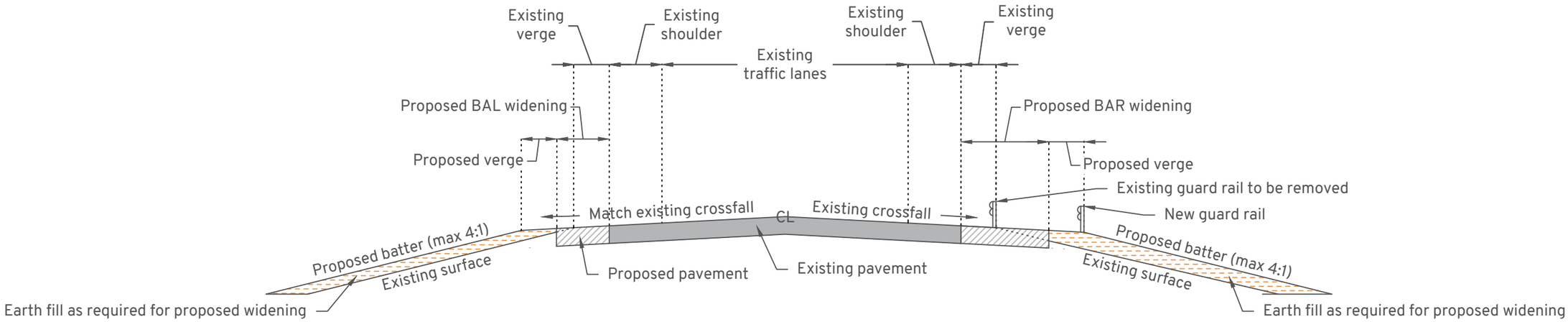
Concept Access Design

Deniliquin BESS

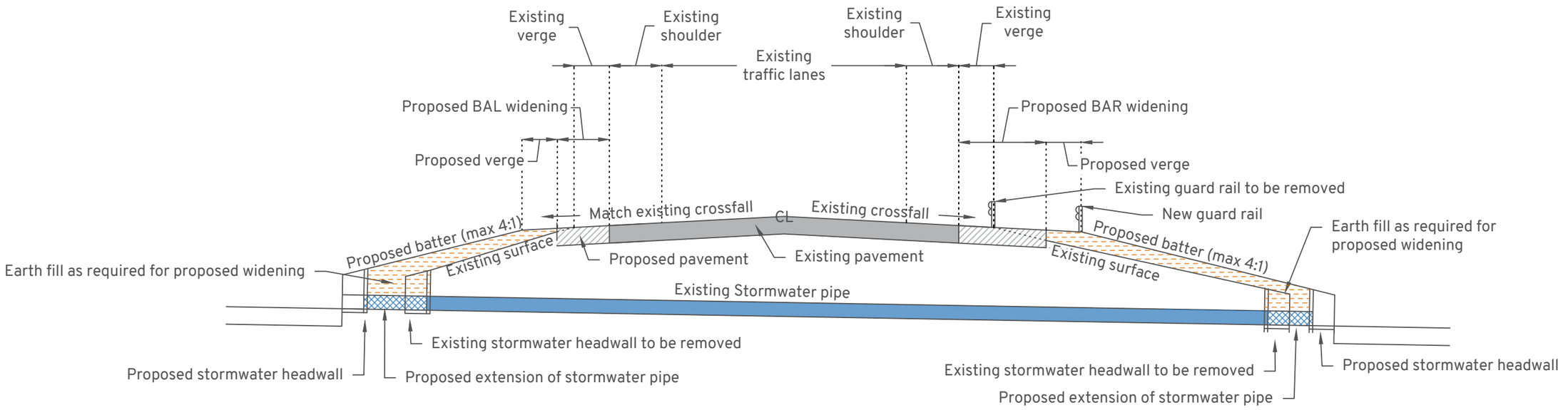
Intersection Design (BAR/BAL)

DRAWN: SE
DATE: 08/04/2025
DWG NO: 987 S01D
SCALE at A3: 1:750

Amber 00



Typical Cross Section - Indicative in Nature



Typical Cross Section - Indicative in Nature

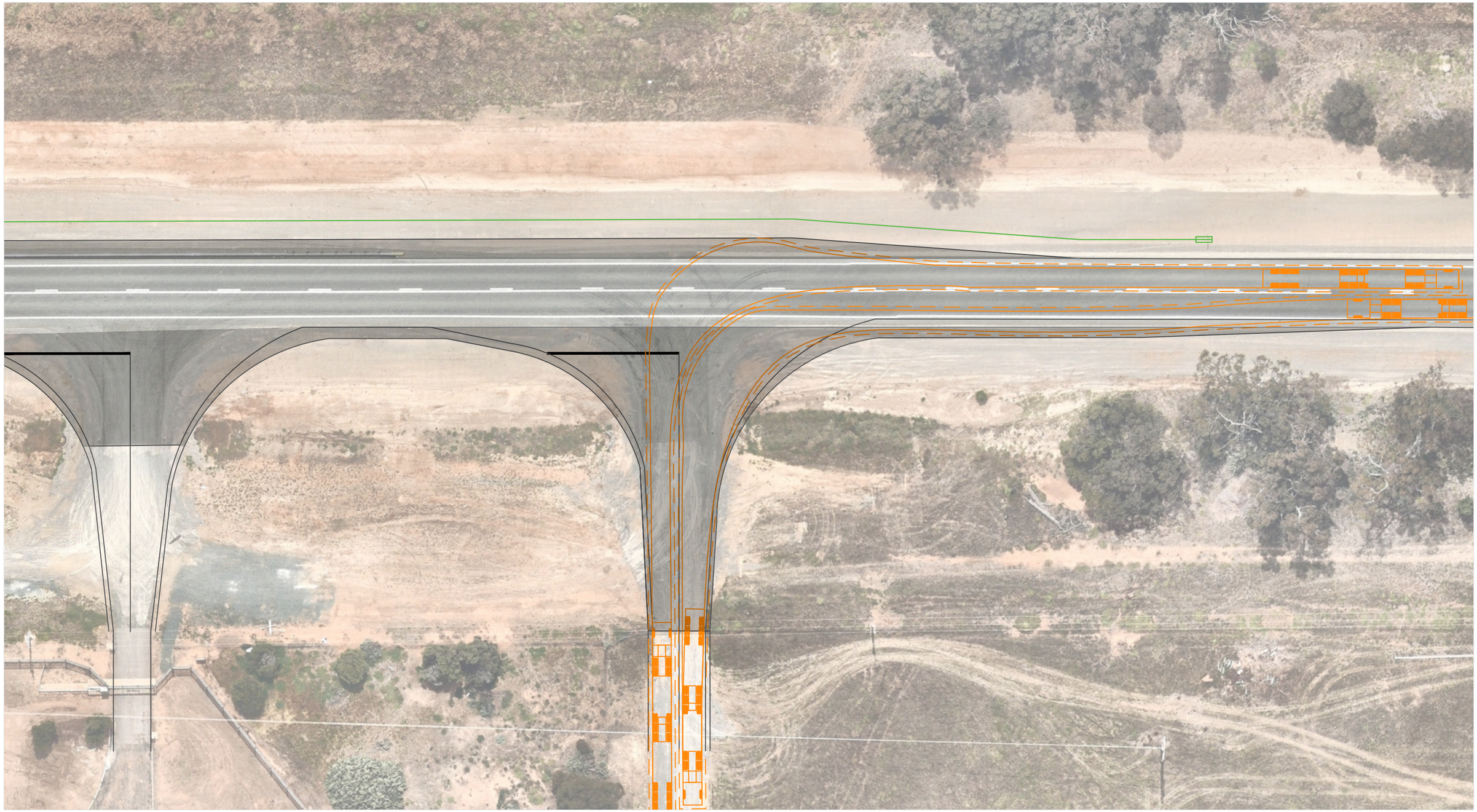
Concept Access Design

Deniliquin BESS

Typical Cross Section - Discussion purposes only

DRAWN: SE
DATE: 15/05/2025
DWG NO: 987 S01D
SCALE at A3: NTS

Amber 01



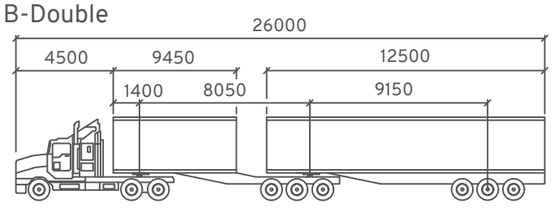
Vehicle Envelope

500mm Clearance

Reverse Manoevure

Min. Design Speed 5km/h

26.0m B-Double



	mm
Tractor Width	: 2500
Trailer Width	: 2500
Tractor Track	: 2500
Trailer Track	: 2500
Lock to Lock	: 6.0s
Steering Angle	: 22.2
Articulating Angle	70.0

Concept Access Design

Deniliquin BESS

BESS Swept Path Assessment

DRAWN: SE
DATE: 08/04/2025
DWG NO: 987 S01D
SCALE at A3: 1:500

Amber 02

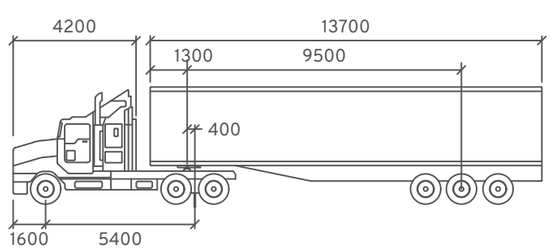
Vehicle Envelope

500mm Clearance

Reverse Manoevure

Min. Design Speed 5km/h

AV



	mm
Tractor Width	: 2500
Trailer Width	: 2500
Tractor Track	: 2500
Trailer Track	: 2500
Lock to Lock	: 6.0s
Steering Angle	: 28.3
Articulating Angle	70.0

Concept Access Design

Deniliquin BESS

BESS Swept Path Assessment

DRAWN: SE
DATE: 08/04/2025
DWG NO: 987 S01D
SCALE at A3: 1:500

Amber 03

Vehicle Envelope

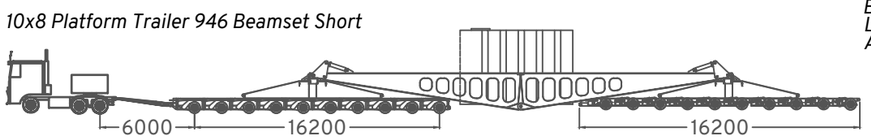
0.5m Clearance

Load Outlines

Load Path

OSOM Truck Specifications

10x8 Platform Trailer 946 Beamset Short



Overall Length	*56.633m*
Track width	*4.200m*
Beamset width	*5.740m*
Load Height	*4.250m*
Axle spacing	*1.800m*

OSOM Configuration calibrated against similar OSOM configurations and is based on information available at the time of assessment

Concept Access Design

Deniliquin BESS

BESS Swept Path Assessment

DRAWN: SE
DATE: 08/04/2025
DWG NO: 987 S01D
SCALE at A3: 1:500

Amber

Vehicle Envelope

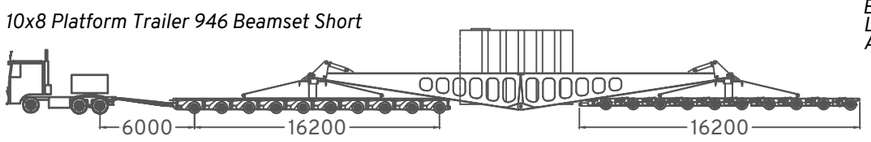
0.5m Clearance

Load Outlines

Load Path

OSOM Truck Specifications

10x8 Platform Trailer 946 Beamset Short



Overall Length	*56.633m*
Track width	*4.200m*
Beamset width	*5.740m*
Load Height	*4.250m*
Axle spacing	*1.800m*

OSOM Configuration calibrated against similar OSOM configurations and is based on information available at the time of assessment

Concept Access Design

Deniliquin BESS

BESS Swept Path Assessment

DRAWN: SE
DATE: 08/04/2025
DWG NO: 987 S01D
SCALE at A3: 1:500

Amber 05

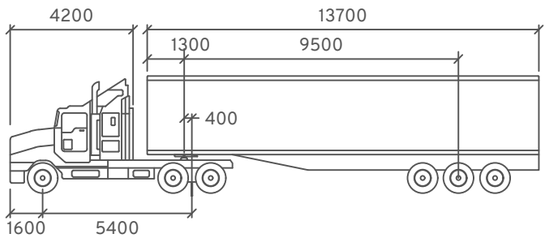
Vehicle Envelope

500mm Clearance

Reverse Manoevure

Min. Design Speed 5km/h

AV



	mm
Tractor Width	: 2500
Trailer Width	: 2500
Tractor Track	: 2500
Trailer Track	: 2500
Lock to Lock	: 6.0s
Steering Angle	: 28.3
Articulating Angle	70.0

Concept Access Design

Deniliquin BESS

Transgrid Substation Swept Path Assessment

DRAWN: SE
DATE: 08/04/2025
DWG NO: 987 S01D
SCALE at A3: 1:500

Amber 06

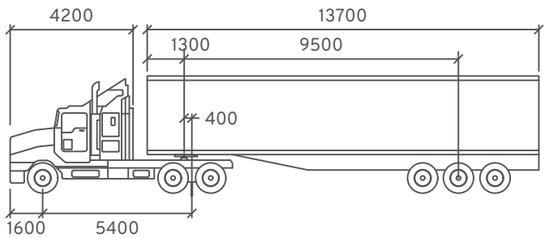
Vehicle Envelope

500mm Clearance

Reverse Manoevure

Min. Design Speed 5km/h

AV



	mm
Tractor Width	: 2500
Trailer Width	: 2500
Tractor Track	: 2500
Trailer Track	: 2500
Lock to Lock	: 6.0s
Steering Angle	: 28.3
Articulating Angle	70.0

Concept Access Design

Deniliquin BESS

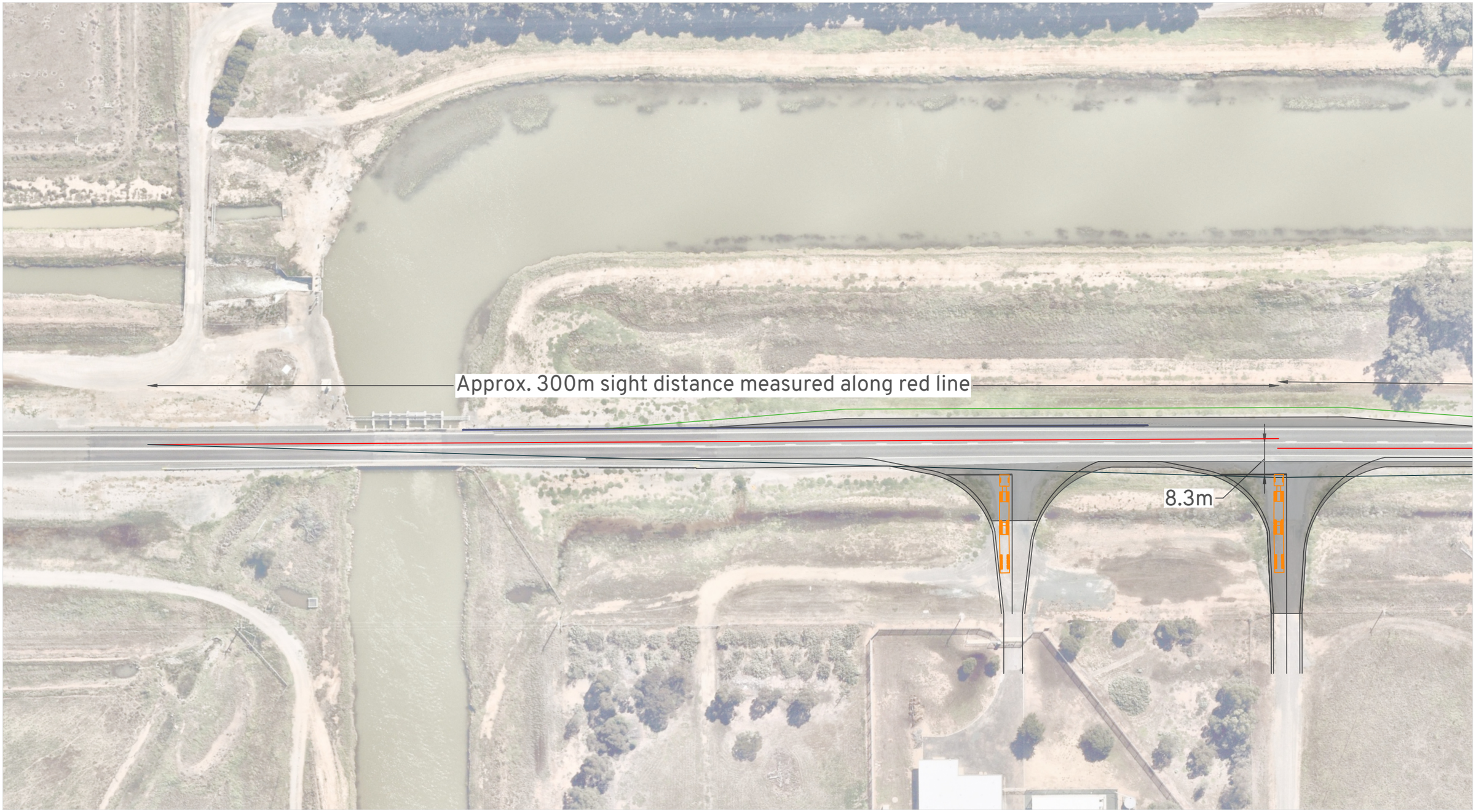
Transgrid Substation Swept Path Assessment

DRAWN: SE
DATE: 08/04/2025
DWG NO: 987 S01D
SCALE at A3: 1:500

Amber 07

Appendix E

Sight Distance Assessment – Site Accesses / Riverina Highway



Sight Distance

Sight Line

Deniliquin BESS

Preliminary Assessment

Sight Distance- BESS Access to the East

DRAWN: SE
DATE: 06/05/2025
DWG NO: 987 SD01B
SCALE at A3: 1:1000

Amber 01

Sight Distance

Sight Line

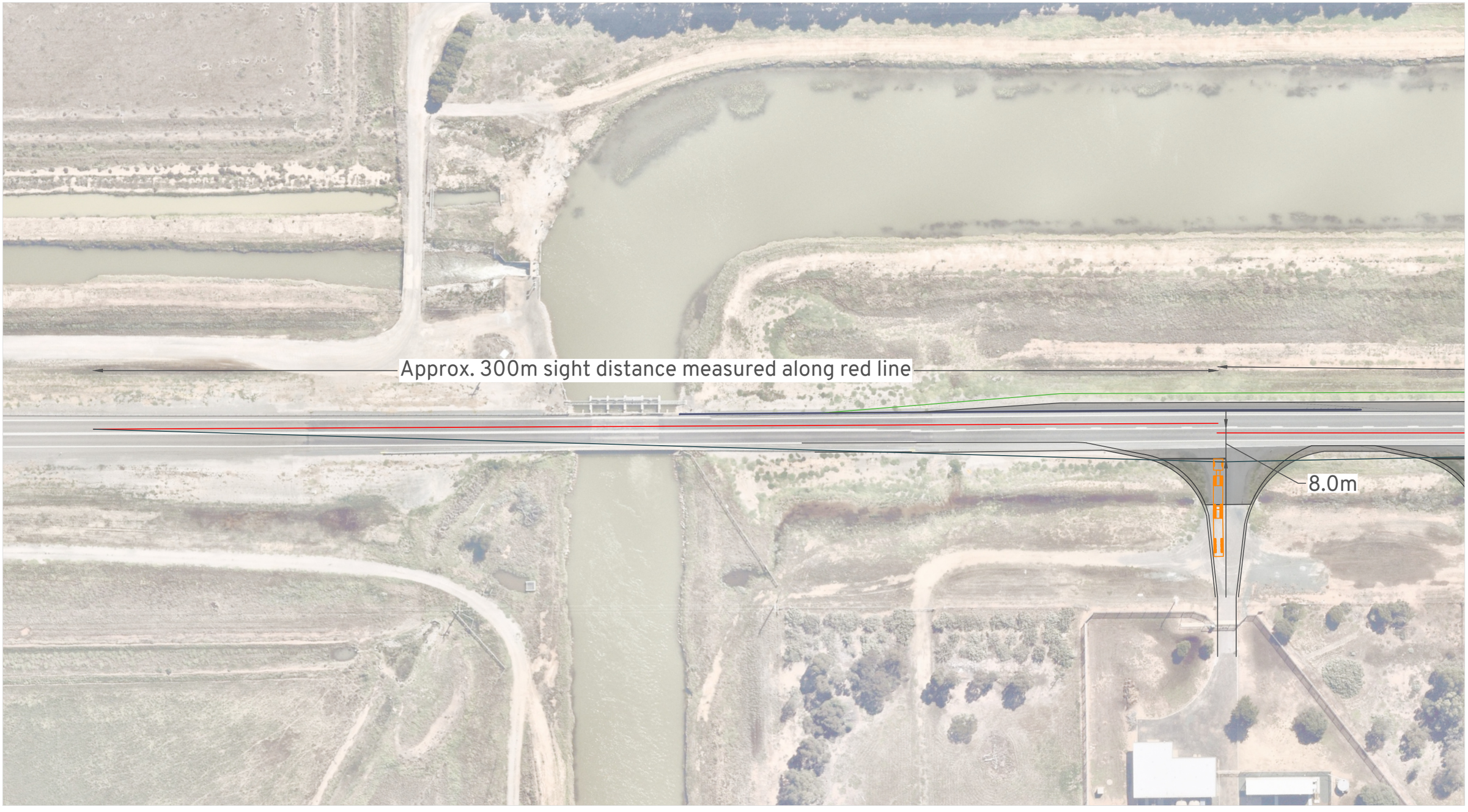
Deniliquin BESS

Preliminary Assessment

Sight Distance- BESS Access to the West

DRAWN: SE
DATE: 06/05/2025
DWG NO: 987 SD01B
SCALE at A3: 1:1000

Amber 02



Sight Distance

Sight Line

Deniliquin BESS

Preliminary Assessment

Sight Distance -Transgrid Substation Access to the East

DRAWN: SE
DATE: 06/05/2025
DWG NO: 987 SD01B
SCALE at A3: 1:1000

Amber 03

Sight Distance

Sight Line

Deniliquin BESS

Preliminary Assessment

Sight Distance- Transgrid Substation Access to the West

DRAWN: SE
DATE: 06/05/2025
DWG NO: 987 SD01B
SCALE at A3: 1:1000

Amber 04