

Appendix G

Traffic Impact Assessment





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Mount Hopeful Battery Project Traffic Impact Assessment September 2025

Prepared for Umwelt (Australia) Pty Ltd



Quality Information

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Executive Summary

Access Traffic Consulting was commissioned by Umwelt (Australia) Pty Ltd on behalf of Neoen Australia Pty Ltd (Neoen) to undertake a revised Traffic Impact Assessment (TIA) in support of a proposed Mount Hopeful Battery Project (the Project).

The Project is to be located approximately 50 km south of the regional centre of Rockhampton, on land parcels within the Rockhampton Regional Council Local Government Areas (LGAs).

This report has been prepared to determine the level of potential impacts of both the construction and operational phases of the Project on the operation of the surrounding road network. The outcomes of the TIA will be used in support of the development application for the Project with Rockhampton Regional Council (RRC).

The assessment identified that the Project's construction phase was the most critical in terms of traffic impact, with only negligible traffic volumes (and therefore impacts) expected to be generated by the Project's operational phase.

The assessment identified that the proposed construction works were conservatively forecast to generate the following peak daily traffic volumes on the external network, noting that these are peak daily volumes and unlikely to be realised every day:

Stage 1

- Up to 92 vehicles per day (vpd) (46vpd each direction) on the state-controlled road network (section of Bruce Highway 10E between South Ulam Road and Rockhampton).
- Up to 106vpd (53 vpd each direction) on the RRC controlled link of South Ulam Road.

Stage 2

- Up to 56 vehicles per day (vpd) (28vpd each direction) on the state-controlled road network (section of Bruce Highway 10E between South Ulam Road and Rockhampton).
- Up to 64vpd (32 vpd each direction) on the RRC controlled link of South Ulam Road.

Based on the identified increases in traffic volumes forecast, the construction and operations phases of the Project are expected to have a minor impact to the surrounding road network, with the technical assessment completed identifying the requirement for the following upgrade works and mitigation treatments to be provided as part of the Project to maximise the safety and operational performance of the surrounding road network:

- Completion of minor works along the identified transport route to accommodate the swept paths of the OSOM transport vehicles, as identified in the Preliminary Transport Route Assessment for the Project. It is noted that the exact extents and scope of these works will be determined in subsequent detailed design phases of the Project once the transport vehicle configurations are confirmed.
- Construct new site access from South Ulam Road (LHS approx. Ch. 16.800km) to cater for Project volumes. The new site access is to be provided in accordance with the requirements for a bitumen road (<300vpd) as per Standard Drawing CMDG-R-040 (Rural Road Access and Property Access Over Table Drains).
- Installation of advisory "truck turning" signage be installed on the approaches to the proposed new site access on South Ulam Road during the construction phase, to highlight to motorists the presence of the Project access locations and the potential for turning vehicles to/from the side roads.

In addition to the traffic assessments completed, a preliminary desktop pavement impact assessment of the relevant road network was also undertaken for the construction phase of the Project. The results of the assessment indicate that the heavy vehicle movements associated with Stages 1 and 2 of the Project are

expected to lead to negligible increases in pavement loadings on all identified sections of the state-controlled road network, with calculated values of loading increase generally below the typical 5% increase trigger threshold.

The results also indicated that the additional heavy vehicle movements from the Stage 1 and Stage 2 construction works was anticipated to lead to a significant (>5%) increase in pavement loadings on the RRC controlled road link of South Ulam Road.

Further to this, while no percentage increase could be established due to the lack of current traffic data for the identified Gladstone Regional Council (GRC) controlled Red Rover Road and Don Young Drive it is anticipated that the limited use of these local roads for small number (approx. 5) OSOM movements for the transformer (x2) and switchroom (x3) component transport operations for the Project will have a negligible increase in pavement loadings on these road links.

Based on this, it is recommended that the proponent enter into an Infrastructure Agreement with RRC regarding the required mitigation works on South Ulam Road to offset the calculated pavement impacts of the Project. It also recommended that this infrastructure agreement include a reference to the requirement for pre and post dilapidation inspections to be undertaken on the relevant sections of South Ulam Road (RRC) by representatives of the proponent and the Council (RRC). These inspections are required to identify and document the current condition of the roads (pre construction) and establish the required maintenance and/or rehabilitation works (to be completed by the proponent at no cost to Council) deemed necessary to reinstate the roads to their documented condition prior to the introduction of Project traffic (post construction).

In light of the information provided above, it can be considered that conditional to the provision of the identified upgrade works and the proponent entering into a suitable infrastructure agreement with RRC to mitigate the construction phase pavement impacts to South Ulam Road, that the construction (Stage 1 and Stage 2) and operations phases of the proposed Mount Hopeful Battery will have minimal impact on the relevant sections of the local government and state controlled road networks.

Therefore it is recommended that the Project be approved from a traffic engineering perspective.

1.0 Introduction

1.1 Project Background

Neoen Australia Pty Ltd (Neoen), is the proponent of the Mount Hopeful Battery Project (the Project), which is an advanced battery energy storage system (BESS) project with a capacity to deliver up to 600 megawatts of power for a duration of up to 4 hours.

The Project is located near the rural town of Bajool, approximately 50 kilometres (km) south of Rockhampton and 70 km west of Gladstone, Queensland, within the Rockhampton Region Local Government Area (LGA). The Project is mapped within the Rural Zone of the Rockhampton Region Planning Scheme 2015 (planning scheme) and predominately used for low intensity agricultural activities, including cattle grazing.

The Project is proposed to occur within the bounds of the 'Study Area' which covers an area of 49 hectares (ha) and occurs across three freehold land parcels and two local roads, being South Ulam Road and an unnamed road reserve.

The Study Area also accommodates a Powerlink transmission easement that comprises an existing 275 kilovolt (kV) transmission line, of which the Project will connect into. The Study Area is sparsely vegetated with predominately non-remnant vegetation and is intersected by an unnamed tributary of Eight Mile Creek. The Project gains access via South Ulam Road to the east of the Study Area.

The Project is proposed to be delivered over two stages, which are indicatively described as follows:

- Stage 1: Indicative capacity of 430 MW, with construction expected to commence mid-2026 and to be completed by end of 2028.
- Stage 2: Indicative additional capacity of 170 MW, with construction expected to commence in 2028 and to be completed by end of 2029.

1.2 Scope and Study Area

Access Traffic Consulting was commissioned by Umwelt (Australia) Pty Ltd on behalf of Neoen to undertake a Traffic Impact Assessment (TIA) for the Project.

This TIA was carried out to identify the expected Project traffic volumes and establish the anticipated level of potential traffic impacts of both the construction and operations phases of the Project on the operation of the surrounding state and local government controlled road networks.

Further to this, the outcomes of this preliminary TIA will be used in support of the development application for the BESS to Rockhampton Regional Council (RRC) (the assessment manager).

The following methodology was adopted to undertake the required assessments as part of the TIA, as summarised in the key tasks listed below.

- Broadly identify the existing transport infrastructure which is of relevance to the Project.
- Estimate traffic generation associated with the construction and operations phases of the Project and the distribution of this Project traffic on the identified road network, including the movement of materials, plant and equipment in addition to the construction and operations phase workforce.
- Assess the potential impact of the Project on the surrounding transport infrastructure during both the construction and operations phases.
- Identify potential mitigation and management strategies to be implemented during the construction and operations phases to offset the impact of the proposed Project (if required).



The adopted methodology centres on establishing a background or “without Project” traffic scenario for the identified transport routes and comparing this with a scenario including the Project generated traffic, i.e. the “with Project” scenario. The process allows for the assessment of the traffic impacts of the Project in regard to road safety, access requirements, intersection operations, road link capacity, pavement and other transport infrastructure. Following this, if required, potential mitigation and/or management measures would be formulated to address the potential traffic impacts caused by the proposed Project.

1.2.1 Study Area

As noted above, the Project is located near the rural town of Bajool, approximately 50 kilometres (km) south of Rockhampton and 70 km west of Gladstone, Queensland, within the Rockhampton Region Local Government Area (LGA). The Study Area comprises an area of 49.0 hectares (ha) and occurs across three freehold land parcels and one unnamed road reserve, as shown in **Figure 1**.

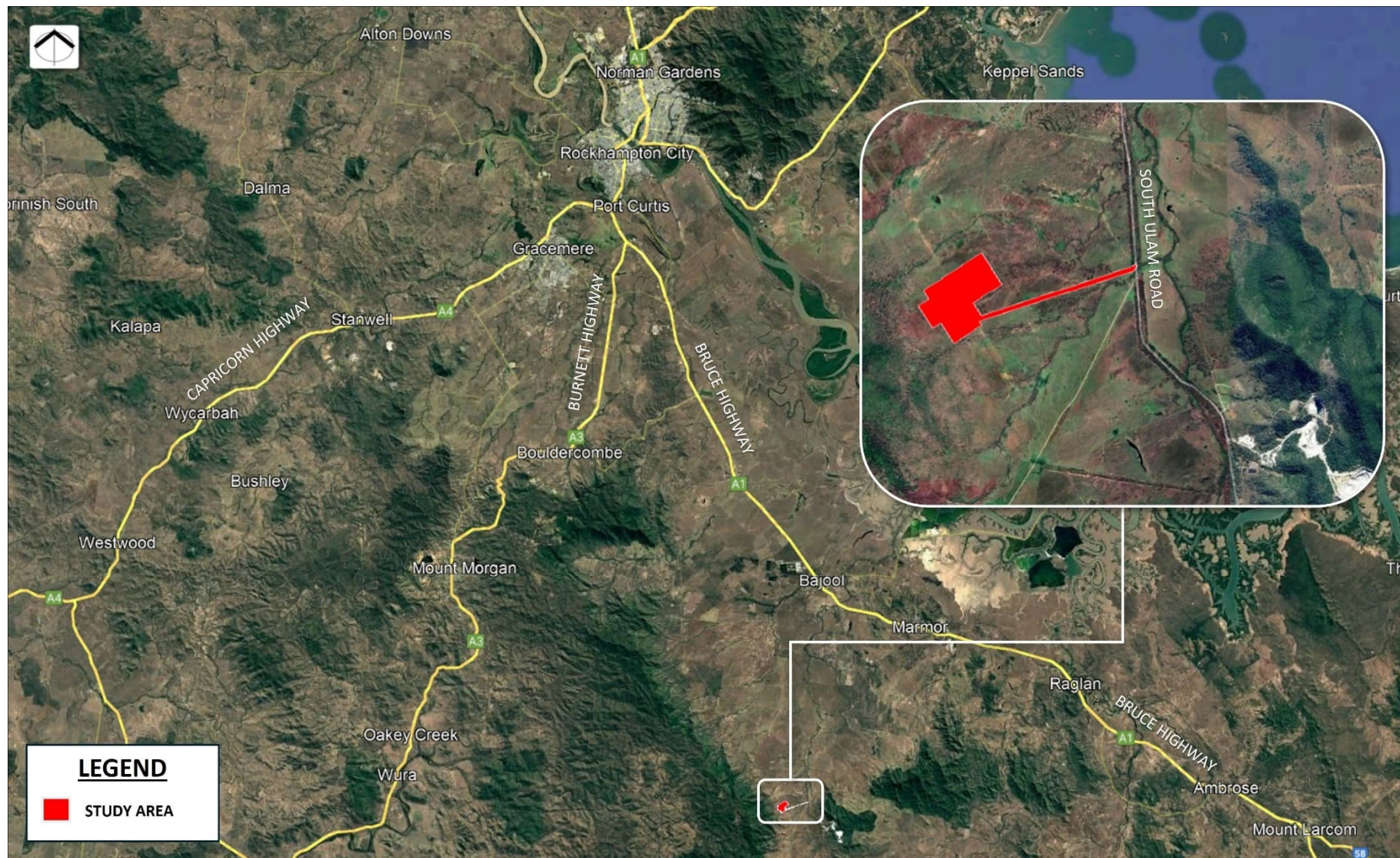


Figure 1 Mount Hopeful Battery Project – Site Location

[Source: Google Earth Pro]

2.0 Existing Conditions

2.1 Land Use and Zoning

Currently the land contained within the identified Study Area is generally used for agricultural purposes, mainly grazing. The land is identified as a “rural” under the zoning mapping contained within the current Rockhampton Regional Council (RRC) planning scheme, as shown in **Figure 2**.

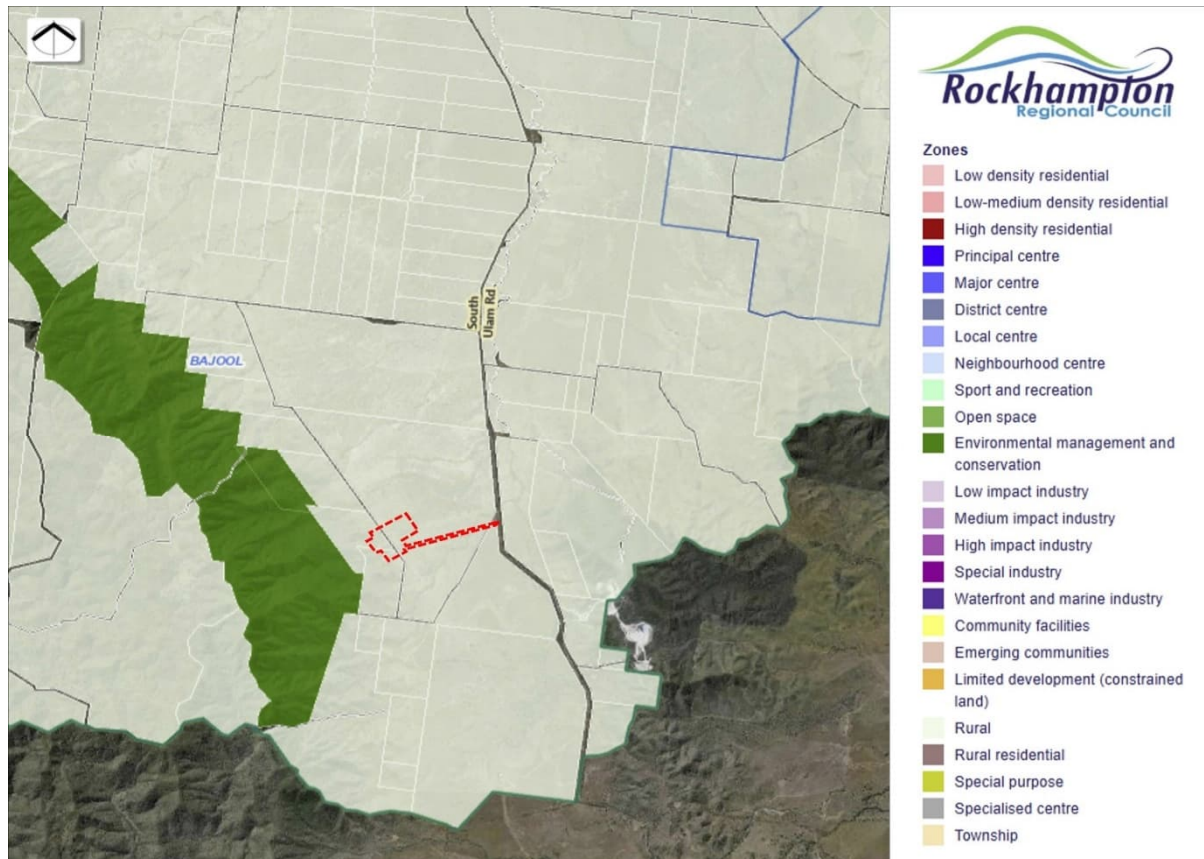


Figure 2 Land Use Zoning

[Source: RRC Online Mapping]

2.2 Adjacent Land Use / Approvals

As shown in **Figure 2** above, all of the adjacent land parcels to the Study Area are currently zoned rural land under the Rockhampton Regional Council planning scheme. Further to this, no active or planned development approvals which could influence this TIA are understood to be currently held over the adjacent properties.

2.3 Surrounding Road Network Details

2.3.1 State Controlled Road Links

2.3.1.1 Gladstone Port Access Road (183)

The Gladstone Port Access Road is an approved B-double route approximately 850m in length and provides a connection from the Port of Gladstone to the external state-controlled road network via Hanson Road (Gladstone-Mount Larcom Road).

The road currently operates as a two-way, two-lane carriageway with a posted speed limit of 60km/h. It is anticipated that this link will be utilised by Project traffic as part of the delivery movements for the battery component and electrical infrastructure components for the Project, which are likely to originate from the Port of Gladstone.

2.3.1.2 Gladstone-Mount Larcom Road (181)

The full length of Gladstone – Mount Larcom Road is expected to be relevant to the Project, with various sections of the link anticipated to be utilised for the delivery of equipment and the battery component and electrical infrastructure components for the Project.

Gladstone – Mount Larcom Road is an approved B-Double route that contains both urban and rural road conditions, with the urban section within Gladstone operating as a two-way, four lane, median divided carriageway with a posted speed limit of 60km/h before transitioning to a higher speed (100 km/h) rural connection with a standard two-way, two-lane configuration.

2.3.1.3 Bruce Highway (10E – Benaraby-Rockhampton)

The section of the Bruce Highway (10E) relevant to the Project is the length between the intersections of the Dawson Highway (TMR Ch. 11.445km) in Calliope and the Capricorn Highway at Yeppen (TMR Ch. 116.961km), which will be utilised by both general (material / equipment) construction vehicles and staff vehicles associated with the Project. In general, this section of the Highway is a two-way, two-lane road approved for B-Double use, with a posted speed limit of 100 km/h, except within built-up areas through townships where the posted speed typically decreases to 60km/h.

2.3.1.4 Dawson Highway (46A – Gladstone-Biloela)

The Dawson Highway is proposed to be utilised as part of a diversion for the oversize overmass (OSOM) transport operations, as the route for these over mass components. The section of the link relevant to the Project spans between the intersection with Don Young Drive (TMR Ch. 7.129km) to the intersection with the Bruce Highway at Calliope (TMR Ch. 19.050km). In general, this section of the Highway is a two-way, two-lane road approved for B-Double use, with a posted speed limit of 100 km/h, except within built-up areas through townships where the posted speed typically decreases to 60km/h.

2.3.2 Local Government Controlled Road Links

2.3.2.1 South Ulam Road (RRC)

South Ulam Road is identified as a minor rural collector road which is controlled by the Rockhampton Regional Council. The section of this road relevant to the Project is the 16.773km section from the Bruce Highway to the proposed secondary site access, which is expected to be utilised by Project traffic (staff and material/equipment delivery heavy vehicles) associated with the construction phase and operations phase of the Project. The link is also an approved B-double route, and currently provides a 6.5m wide two-way two-lane sealed carriageway as shown in **Figure 3** and **Figure 4**.



Figure 3 Northern End of South Ulam Road



Figure 4 Southern End of South Ulam Road

2.3.2.1 Red Rover Road (GRC)

Red Rover Road is an industrial collector style road controlled by Gladstone Regional Council. The length of the link relevant to the Project is the full 3.390 km length between the Gladstone-Mount Larcom Road and Don Young Drive, which is proposed to be utilised as part of the transport route for the OSOM components. The link is an approved B-double route with the current configuration providing a two-way two-lane sealed carriageway with a typical width of 11m.

2.3.2.2 Don Young Drive (GRC)

Similarly, Don Young Drive is also an industrial collector style road controlled by Gladstone Regional Council, which in conjunction with Red Rover Road provides a connection between Gladstone-Mount Larcom Road and the Dawson Highway. The full length of the link is considered relevant to the Project and is proposed to be utilised as part of the transport route for the OSOM components. The link is also an approved B-double route, providing an 11m wide two-way two-lane sealed carriageway.

2.3.3 Intersections

In terms of the traffic impact assessment for the Project, the critical intersections on the external road network were identified to be the access intersection from the state-controlled road network to the proposed Study Area being the existing Bruce Highway / South Ulam Road intersection. Further details of the current configuration of this intersection are provided below. All other intersections on the external road network were noted to either only be primarily utilised by OSOM transport vehicles or higher order intersections whose use is in accordance with existing approved heavy vehicle routes.

Furthermore, the movements of OSOM vehicles for the Project are only temporary and expected to travel out of hours and under full escort. Apart from any required route works to cater for the OSOM vehicles, they are not anticipated to have a significant impact on the operation of the external intersections. As such, no further assessment of the capacity or operational performance of the other external network intersections was deemed warranted.

2.3.3.1 Bruce Highway / South Ulam Road

The current configuration of the Bruce Highway / South Ulam Road intersection is a standard three-way priority controlled (give way) rural intersection. A single approach and departure lane is provided on each approach to the intersection, with a full length channelised right turn (CHR) and short auxiliary left turn (AULs) treatments provided on the northern and southern Bruce Highway approach respectively for the turning movements into South Ulam Road, as shown in **Figure 7**. In addition, based on site observations it is noted that suitable site distances are available to/from South Ulam Road in both directions of travel along the Bruce Highway (refer **Figure 5** and **Figure 6**).



Figure 5 North on Bruce Highway from South Ulam Rd



Figure 6 South on Bruce Highway from South Ulam Rd



Figure 7 Bruce Highway / South Ulam Road - Existing Configuration

[Source: Qld Globe]

2.4 Traffic Volumes

2.4.1 Road Link Volumes

The existing background traffic volumes on the road sections deemed relevant to the Project were typically established using the available AADT segment traffic count data provided by TMR. These road segment volumes were utilised with the identified 10-year growth rates (average growth rate, compounding annually) for the relevant road sections to establish a forecast of the current (2025) traffic volumes. It is noted that for any segments where a historical 10-year growth rate was negative, a conservative growth rate of 1.0% was applied to estimate the volume forecasts.

No traffic count data was available for the relevant sections of the GRC controlled links of Red Rover Road and Don Young Drive. However, as the use of these roads by Project traffic is limited to the OSOM transport vehicles which will be travelling under permit and full escort, the current traffic volumes on the links are not deemed critical for the assessment as the traffic impact is considered minor (due to traffic management controls) and as such these roads have been disregarded in terms of the road link / capacity assessment.

Further to this, as no daily volume traffic count data was available for RRC controlled link of South Ulam Road, an estimate of the daily traffic volumes on this link was established from the total recorded 12-hour inbound and outbound traffic volumes on the approach as identified in the intersection count provided by TMR (refer **Appendix B**).

The daily directional volumes on the approach were then estimated by applying a 12-hour volume to daily (ADT) traffic volume adjustment factor of 1.3 for low volume roads, as specified in Section 5.2.1 of *Austrroads Guide to Pavement Technology: Selection and Design of Sprayed Seals*. A conservative 1% growth rate was then applied to the recorded volumes (2022) to forecast current (2025) volumes on the link.

Based on the volume data and assumptions identified above, estimates of the traffic volumes on the relevant roads forming the Project transport routes were established, as summarised in **Table 1**.



Table 1 Current (2025) AADT Traffic Volumes

AADT Segment			Base Year	Base Year AADT			Base Year HV%		Base Year HVs		10-Yr GR%	Current (2025) AADT			Current (2025) HVs	
ID	Start Ch.	End Ch.		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz
Gladstone Port Access Road (183)																
61605	0.000	0.858	2023	950	886	1,836	31.96%	42.33%	304	375	1.00%	969	904	1,873	310	383
Gladstone – Mount Larcom Road (181)																
160360	0.000	0.175	2023	5,650	5,948	11,598	8.85%	8.60%	500	512	1.00%	5,764	6,068	11,831	510	522
160361	0.175	0.675	2023	5,316	6,043	11,359	14.61%	17.13%	777	1,035	1.00%	5,423	6,164	11,587	792	1,056
60071	0.675	0.919	2023	3,900	3,574	7,474	13.77%	17.32%	537	619	1.00%	3,978	3,646	7,624	548	631
	0.919	1.409	2023	3,900	3,574	7,474	13.77%	17.32%	537	619	1.00%	3,978	3,646	7,624	548	631
60073	1.409	3.258	2023	3,737	3,657	7,394	15.09%	12.33%	564	451	1.00%	3,812	3,731	7,543	575	460
61052	3.258	3.830	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	1.00%	4,270	5,247	9,518	680	1,038
	3.830	4.625	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	1.00%	4,270	5,247	9,518	680	1,038
60074	4.625	12.292	2023	3,207	3,230	6,437	19.17%	20.76%	615	671	1.00%	3,271	3,295	6,566	627	684
60076	12.292	32.140	2023	1,754	1,758	3,512	23.74%	28.18%	416	495	1.00%	1,789	1,793	3,583	425	505
Red Rover Road (GRC)																
GRC	0.000	3.390	-	No Information Available												
Don Young Drive (GRC)																
GRC	0.000	2.280	-	No Information Available												
Dawson Highway (46A Gladstone – Biloela)																
60065	7.150	19.305	2023	3,835	3,659	7,494	17.32%	13.62%	664	498	1.00%	3,912	3,733	7,645	678	508
Bruce Highway (10E Benaraby – Rockhampton)																
60006	11.445	45.420	2023	2,174	2,111	4,285	26.01%	35.67%	565	753	1.00%	2,218	2,153	4,371	577	768
60023	45.420	75.469	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,192	3,226	6,418	996	881
	75.469	85.308	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,192	3,226	6,418	996	881
160954	85.308	86.183	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	1.00%	3,393	3,174	6,566	964	900



AADT Segment			Base Year	Base Year AADT			Base Year HV%		Base Year HVs		10-Yr GR%	Current (2025) AADT			Current (2025) HVs	
ID	Start Ch.	End Ch.		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz
	86.183	87.080	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	1.00%	3,393	3,174	6,566	964	900
61551	87.080	108.938	2023	3,588	3,569	7,157	30.95%	26.82%	1,110	957	1.55%	3,700	3,680	7,381	1,145	987
60130	108.938	114.388	2022	2,861	2,635	5,496	27.44%	33.99%	785	896	1.00%	2,948	2,715	5,663	809	923
60024	114.388	116.961	2023	5,575	5,344	10,919	15.02%	17.15%	837	916	2.21%	5,824	5,583	11,407	875	957
South Ulam Road (RRC)																
RRC	0.000	16.773	2022	87	105	192	43.28%	35.80%	38	38	1.00%	90	108	198	39	39

Red Rover Road chainage assumed to run south from Gladstone-Mount Larcom Road | Don Young Drive chainage assumed to run south from Red Rover Road | South Ulam Road chainage assumed to run south-west from Bruce Highway.

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

2.4.2 Intersection Volumes

2.4.2.1 Bruce Highway / South Ulam Road

An estimate of the current (2025) traffic volumes at the Bruce Highway / South Ulam Road intersection has been established based on the latest available (2022) TMR count for the intersection, with suitable growth rates for the relevant approach roads adopted from **Table 2** to forecast the current (2025) traffic volumes.

As the available count data did not extend to capture the expected PM project peak (6:00-7:00pm), the assessment of the intersection has been undertaken conservatively adopting the AM (8:45-9:45am) and PM (1:00-2:00pm) road network peaks identified within the count.

Further details of the calculations to establish the traffic volumes at the Bruce Highway / South Ulam Road intersection are provided in **Appendix C**, with a summary of the forecast intersection volumes shown in **Figure 8** and **Figure 9**.

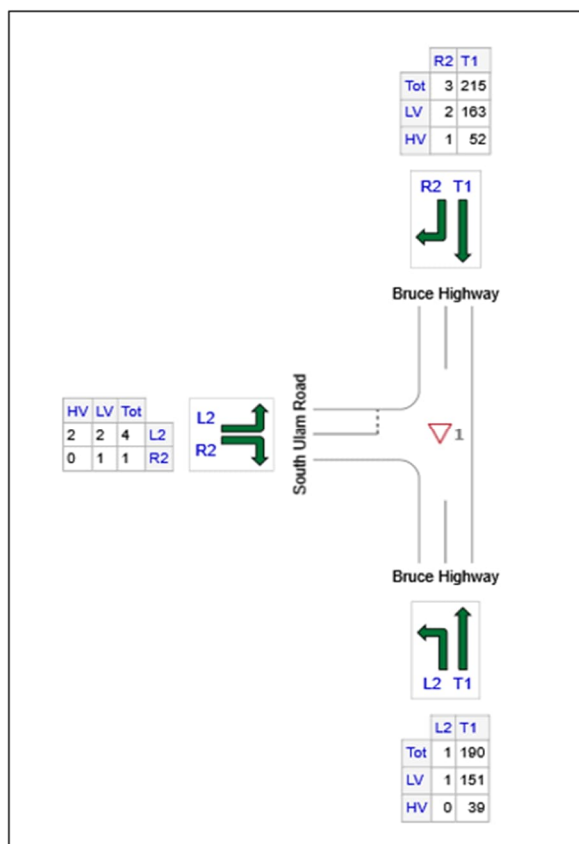


Figure 8 Bruce Highway / South Ulam Road Intersection
2025 AM Peak Hour Traffic Volumes

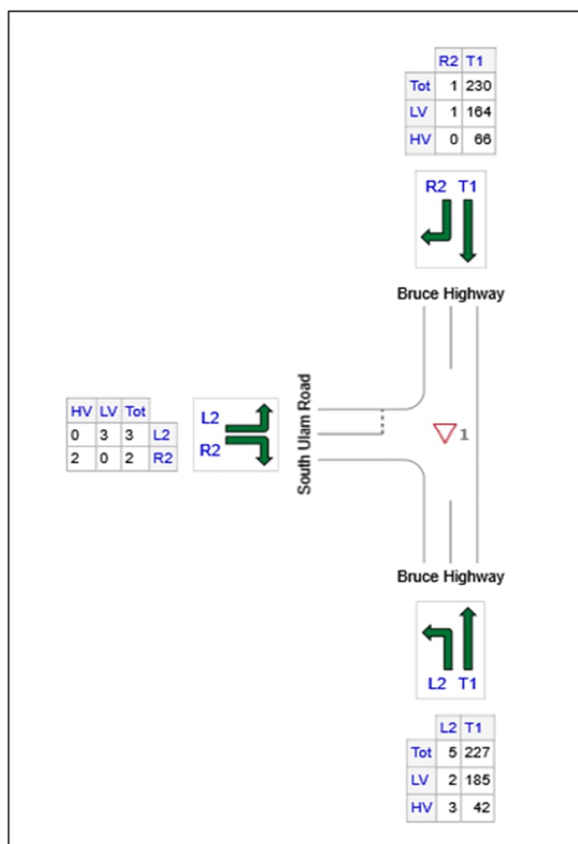


Figure 9 Bruce Highway / South Ulam Road Intersection
2025 AM Peak Hour Traffic Volumes

2.5 Intersection and Network Performance

2.5.1 Road Links

Based on the background traffic volumes forecast and the existing configurations of the road links identified to be relevant to the Project, it is expected that all sections of the proposed Project transport routes would currently be operating satisfactorily and within capacity (based on road type / classification) under existing traffic conditions.

2.5.2 Intersections

2.5.2.1 Performance Metrics

To understand the operational performance of the relevant intersections, detailed intersection analysis was undertaken utilising the Signalised Intersection Design and Research Aid (SIDRA) software package (Ver 9.0). The critical performance metrics of the intersection analysis, and acceptable limits of operation outputs for priority-controlled intersections are provided below.

Degree of Saturation (DOS) – Defined as the ratio of the volume of traffic observed making a movement (in vehicles per hour) compared to the maximum capacity for that movement (vehicles per hour). For priority-controlled intersections, the maximum acceptable degree of saturation is noted to be 80% or 0.800.

Level of Service (LOS) & Average Delay (sec) – Is the qualitative measure describing operational conditions within a traffic stream and the perception by motorists and/or passengers. The LOS is closely linked to the delay time (in seconds), which can be expected over all vehicles making a movement in the peak hour. The different Levels of Service (SIDRA) are summarised in **Table 2**.

Table 2 Intersection Level of Service (LOS) Criteria

LOS	Description	Average Delay
A	Free-flow operation (best conditions)	≤ 14.5 sec
B	Reasonable free-flow operations	14.5 – 28.5 sec
C	At or near free-flow operations	28.5 – 42.5 sec
D	Decreasing free-flow operations	42.5 – 56.5 sec
E	Operations at capacity	56.5 – 70.5 sec
F	A breakdown in vehicular flow (worst conditions)	≥ 70.5 sec

In terms of acceptable limits of operation for priority-controlled intersections, a maximum LOS of C and delay of 42.5 seconds applies.

95th Percentile (95thile) Queue – Defined as the maximum queue length, in metres, that can be expected in 95% of observed queue lengths in the peak hour. For acceptable operation of a priority-controlled intersection, all vehicle queues for individual movements must be contained within the extents of their own lane (in particular for turning lanes), with no vehicle flows or movements to be blocked by queued vehicles.

2.5.2.2 Bruce Highway / South Ulam Road Intersection

An assessment of the current operational performance of the existing configuration of the key Bruce Highway / South Ulam Road intersection has been undertaken, based upon the forecast current (2025) AM peak and PM peak period traffic volumes at the intersection as identified in **Figure 8** and **Figure 9** above.

The results of the completed intersection analysis are summarised in **Table 3**, with the detailed results provided for reference in **Appendix D**.

Table 3 SIDRA Results – Bruce Highway (10E) / South Ulam Road Intersection (Existing Configuration)

Analysis Scenario	Intersection Degree of Saturation	Level of Service**	Intersection Average Delay (sec)	Maximum 95% Back of Queue Length (m)
Bruce Highway (10E) / South Ulam Road				
2025 AM Peak Background	0.133	LOS B	0.2	0.2
2025 PM Peak Background	0.146	LOS B	0.2	0.4

** LOS value identified is for worst movement at the intersection, not the overall intersection.

These results revealed that the current configurations of both intersections are expected to be operate satisfactorily for the forecast current (2025) background or pre project traffic conditions. This is shown by the calculated values of Degree of Saturation (DOS), Level of Service (LOS), average delay and vehicle queue lengths for both intersections being well within acceptable limits of operation for a priority-controlled intersection.

2.6 Road Safety Issues

2.6.1 Road Crash History Review

A review of the road crash history on the sections of the Bruce Highway (500m either side of South Ulam Road) and the relevant length of South Ulam Road, was undertaken using the road crash data available from the Queensland Globe database (2001-2023). From this analysis, 5 recorded crashes were identified on the relevant sections of the network, including the Bruce Highway / South Ulam Road intersection and South Ulam Road. A summary of the details of the recorded crash data is provided for reference in **Table 4**.

Table 4 Summary of Road Crash History

Crash Reference Number	Crash Year	Crash Severity	Crash Type	DCA Code	Crash Description
Bruce Highway & South Ulam Road					
247626	2019	Medical Treatment	Single Vehicle	609	Pass & Misc: Hit Animal
247568	2015	Medical Treatment	Multi Vehicle	303	Vehicles Same Direction: Right Rear
247553	2014	Medical Treatment	Multi Vehicle	303	Vehicles Adjacent Approach: Right-Thru
247545	2013	Hospitalisation	Single Vehicle	805	Off Path Curve: Out of Control on Carriageway
247446	2008	Hospitalisation	Single Vehicle	803	Off Path Curve: Off Carriageway on RT Bend Hit Object

Based on the limited number of crashes recorded, the variety of crash types, lack of crash clusters and the current traffic volumes on the relevant road sections, it can be concluded that there is no specific road feature or design deficiency at either location which is directly contributing to the recorded vehicle crashes, which should be addressed as part of the Project.

2.7 Pavement Loadings

Estimates were generated for the forecast background pavement loadings on each of the identified road segments over the proposed Project duration. Traffic loads on the pavement are defined in terms of Equivalent Standard Axle (ESA) for granular pavements and Standard Axle Repetitions (SAR) for other pavement types.

The ESA for the background traffic heavy vehicle component on the network was calculated based on the identified heavy vehicle percentages for the relevant road sections, with the following assumptions applied to this calculation.

- The existing percentage of heavy vehicles will be maintained for future years.
- The impact of light vehicles can be ignored as the contribution to pavement loading (ESAs) is negligible in comparison to heavy vehicles.
- Equivalent Standard Axles per Heavy Vehicle (ESAs/HV) were adopted as follows (based on advice previously received from TMR for similar pavement impact assessments):
 - 2.9 ESAs/HV for the Bruce Highway.
 - 3.2 ESAs/HV for all other roads (including local government roads).

- The background period of the assessment is the proposed overall duration of the Project i.e. 37 months (not including project float) which equates to approximately 1,125 days.

A summary of the forecast background ESAs for the each of the relevant road segments during the proposed timeframe of the Project (Q3 2026 to Q4 2029) is provided in **Table 5**, with the forecast background ESAs used as the basis for the assessment of the pavement impact of the overall Project, which is detailed further in **Section 5.6.1**.

2.8 Transport Infrastructure

The proposed transport routes for the Project include sections of the state and local government controlled road networks, including Gladstone Port Access Road, Gladstone Mount Larcom Road, Bruce Highway, Dawson Highway, South Ulam Road, Red Rover Road and Don Young Drive. It is noted that these road links include a number of bridge and major culvert structures along their relevant lengths, which may potentially be impacted by loading from the OSOM vehicle movements associated with the Project, in particular the large OSOM transformer transport vehicle configurations.

As such, details of the proposed OSOM vehicle configurations for the Project will need to be provided to TMR so that a structural assessment of the relevant bridge and major culvert structures along the identified transport routes can be undertaken.

Notwithstanding this, it is expected that suitable transport vehicle configurations for the OSOM vehicle movements for the Project can be provided to enable the vehicles to meet any identified loading parameters of the bridge and culvert structures along the identified OSOM transport route for the Project.



Table 5 Forecast Future Background ESAs

Segment ID	AADT Segment		Base Data Year	Base Year HV %		Base Year HV Volume		10 Yr. GR %	2026 HV Volumes		ESAs / HV	No. Days	Background ESAs	
	Start (km)	End (km)		Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz			Gaz	A-Gaz
Gladstone Port Access Road (183)														
61605	0.000	0.858	2023	31.96%	42.33%	304	375	1.00%	313	386	3.2	1,125	1,126,675	1,391,584
Gladstone-Mount Larcom Road (181)														
160360	0.000	0.175	2023	8.85%	8.60%	500	512	1.00%	515	527	3.2	1,125	1,855,321	1,898,003
160361	0.175	0.675	2023	14.61%	17.13%	777	1,035	1.00%	800	1,067	3.2	1,125	2,881,792	3,840,939
60071	0.675	1.409	2023	13.77%	17.32%	537	619	1.00%	553	638	3.2	1,125	1,992,627	2,296,835
60073	1.409	3.258	2023	15.09%	12.33%	564	451	1.00%	581	465	3.2	1,125	2,092,376	1,673,075
61052	3.258	3.830	2023	15.92%	19.78%	666	1,017	1.00%	687	1,048	3.2	1,125	2,472,690	3,775,328
	3.830	4.625	2023	15.92%	19.78%	666	1,017	1.00%	687	1,048	3.2	1,125	2,472,690	3,775,328
60074	4.625	12.292	2023	19.17%	20.76%	615	671	1.00%	633	691	3.2	1,125	2,281,122	2,488,040
60076	12.292	32.140	2023	23.74%	28.18%	416	495	1.00%	429	510	3.2	1,125	1,545,033	1,838,177
Dawson Highway (46A Gladstone – Biloela)														
60065	7.150	19.305	60065	17.32%	13.62%	664	498	1.00%	684	513	3.2	1,125	2,464,567	1,849,128
Bruce Highway (10E Benaraby – Rockhampton)														
60006	11.445	45.420	2023	26.01%	35.67%	565	753	1.00%	583	776	2.9	1,125	1,901,408	2,532,018
60023	45.420	75.469	2023	31.22%	27.30%	972	859	1.27%	1,009	892	2.9	1,125	3,293,262	2,911,221
	75.469	85.308	2023	31.22%	27.30%	972	859	1.27%	1,009	892	2.9	1,125	3,293,262	2,911,221
160954	85.308	86.183	2023	28.42%	28.37%	945	883	1.00%	974	909	2.9	1,125	3,178,497	2,967,801
	86.183	87.080	2023	28.42%	28.37%	945	883	1.00%	974	909	2.9	1,125	3,178,497	2,967,801
61551	87.080	108.938	2023	30.95%	26.82%	1,110	957	1.55%	1,163	1,002	2.9	1,125	3,795,458	3,271,572
60130	108.938	114.388	2022	27.44%	33.99%	785	896	1.00%	817	932	2.9	1,125	2,666,237	3,041,786
60024	114.388	116.961	2023	15.02%	17.15%	837	916	2.21%	894	979	2.9	1,125	2,918,141	3,193,906
South Ulam Road (RRC)														
RRC	0.000	16.773	2022	43.28%	35.80%	38	38	1.00%	39	39	3.2	1,125	141,283	141,283

3.0 Proposed Project Details

3.1 Study Area Plan

A preliminary plan of development for the Project was provided by Neoen. This layout identified the currently proposed Study Area boundaries and site access location, as shown in **Figure 10** overpage.

A detailed copy of this plan is provided for reference in **Appendix E**.

As shown in **Figure 10**, the Project is a BESS comprising of up to 650 battery modules as well as associated infrastructure, proposed to be delivered over two (2) stages. The primary vehicular access point to the proposed BESS facility is proposed to be provided via a new access point to Lot 100 on SP289441, located on the western side of South Ulam Road approximately 16.773km south of the Bruce Highway, and approximately 110m north of McCamley Road. This new access point is anticipated to cater for all Project traffic during both the construction and operations phase of the Project.

The proposed site layout also identifies the proposed alignment of the internal access tracks, as well as the location of the associated electrical infrastructure for the Project, including the battery storage, substation and switchyard areas.

3.2 Project Details

Information regarding the proposed construction activities and ultimate day to day operation of the proposed Mount Hopeful Battery Project has been provided by the proponent (Neoen), with a summary of the key site elements of the Project provided in **Table 6**.

Table 6 Key Elements of Mount Hopeful Battery Project

Element	Quantity	
	Stage 1	Stage2
Accesses	1 (South Ulam Rd)	
Length of Access Tracks (Battery Site)	1,800 m	
Number of Battery Storage Areas	1	
Number of Substation Areas	1	
Number of Switchyards	1	
Number of Battery Modules	466	184
Number of HV Transformers (OSOM)	2	0

3.2.1 Construction Phase

Based on information provided by the proponent (Neoen) it is understood that the construction of the Project is anticipated to be completed in two (2) stages, over an overall period of 40 months, commencing in Q3 (September) 2026 (pending approvals) and concluding in Q4 (December) 2029, with this overall period noted to include provision for 3 months Project float.

Further to this, construction of Stage 1 of the Project is proposed to be completed over 26 months, between Q3 (September) 2026 and Q4 (October) 2028, with the construction of Stage 2 to be completed over 17 months, commencing in Q3 (August) 2028 and concluding in Q4 (December) 2029, noting a slight overlap of approximately three (3) months in the Stage 1 and Stage 2 construction works.

Preliminary details of the proposed construction phase activities have been provided, with a high-level summary of the key construction tasks, the likely order of completion and anticipated timeframes provided in **Table 7**.



Figure 10 Proposed Site Layout – Mount Hopeful Battery Project

[Source: Umwelt]



Based on the proposed schedule, the peak period of construction for Stage 1 is expected to occur between Q2 and Q4 2027, while the peak period of construction for Stage 2 is expected to occur between Q3 2028 and Q2 2029

Further to this, the proposed hours of the construction operations for both stages of the Project are anticipated to typically be 12 hours per day (6:30am to 6:30pm) Monday to Saturday, equating to approximately 24 working days per month.

3.2.2 Operations Phase

The operations phase of the Project will commence upon completion of the construction works, with the BESS to be operated by a relatively small number of staff (up to 10 staff), with heavy vehicle movements to/from the Project during the operations phase expected to be limited to occasional movements (in the order of 1 vehicle per week) associated with maintenance activities, routine removal of waste or deliveries to the site operations facility.

Table 7 Proposed Construction Schedule – Mount Hopeful Battery Project

[Source: Neoen]

ID	TASK	DURATION (MONTHS)	MONTH																																																																																											
			Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29																																																				
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40																																																				
Q3																																											Q4 2026				Q1 2027				Q2 2027				Q3 2027				Q4 2027				Q1 2028				Q2 2028				Q3 2028				Q4 2028				Q1 2029				Q2 2029				Q3 2029				Q4 2029			
STAGE 1 – CONSTRUCTION PHASE																																																																																														
1A	Mobilisation	1	1																																																																																											
1B	Site Access & Internal Access Road	2	1 2																																																																																											
1C	Civil Works	6	1 2 3 4 5 6																																																																																											
1D	Electrical Installation (BESS)	9	1 2 3 4 5 6 7 8 9																																																																																											
1E	Substation Works	9	1 2 3 4 5 6 7 8 9																																																																																											
1F	Switchyards Works	19	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19																																																																																											
1G	Testing and Commissioning	9	1 2 3 4 5 6 7 8 9																																																																																											
1H	Finalisation / Commissioning / Demobilisation	3	1 2 3																																																																																											
1I	Project Float	3	1 2 3																																																																																											
STAGE 2 – CONSTRUCTION PHASE																																																																																														
2A	Civil Works	3	1 2 3																																																																																											
2B	Electrical Installation (BESS)	6	1 2 3 4 5 6																																																																																											
2C	Substation Works	1	1																																																																																											
2D	Testing and Commissioning	3	1 2 3																																																																																											
2E	Finalisation / Commissioning / Demobilisation	2	1 2																																																																																											
2F	Project Float	3	1 2 3																																																																																											

3.3 Project Transport Routes

3.3.1 Project Construction Phase

The following transport routes are anticipated to be utilised for the construction phase of both Stage 1 and Stage 2 of the Project:

- The main workforce during construction will consist of local workers commuting generally from Rockhampton, and specialist FIFO workers, who will commute daily to/from the Study Area from Rockhampton via the relevant sections of the Bruce Highway and the RRC controlled link of South Ulam Road.
- Construction equipment (bulk earthworks plant, prefabricated buildings) and materials (such as concrete, reinforcing steels and road gravels) will primarily be sourced locally (as far as reasonably practical) and travel to/from the Study Area via the Bruce Highway and the RRC controlled link of South Ulam Road.
 - General equipment and materials (including concrete) for the Project will be sourced from Rockhampton.
 - Gravel materials for the Project are expected to be sourced from local quarry operations in Marmor (via Bills Road).
 - Site water, fuel and waste collection services for the Project are all expected to be sourced from Rockhampton.
- Battery components for the BESS and ancillary electrical components for the BESS, substation and switchyard site areas are proposed to be delivered to the Port of Gladstone, before being transported to the Study Area by road using a route consisting of the state-controlled Gladstone Port Access Road, Gladstone-Mount Larcom Road, Bruce Highway and the RRC controlled link of South Ulam Road.
- Larger electrical infrastructure components such as the transformers and the switch rooms for the battery storage facility are proposed to be transported from the Port of Gladstone to both site areas by specialist OSOM transport vehicles.

A preliminary transport route assessment for the largest transformer (200T) and switchroom component from the Port of Gladstone to the Study Area has been undertaken by Rex J Andrews (see **Appendix A**). This report identifies two route options for the transformer dependant on the expected configuration of the transport vehicle, with one for the larger 12x8 12x8 beamset trailer configuration and a second for the shorter (but taller) 16x8 platform trailer configuration

Based on the assessment completed, a general OSOM and two (2) preliminary OSOM transformer transport routes have been identified, with a summary of the identified OSOM routes provided in **Table 8** overpage, with the transformer transport routes indicatively shown in **Figure 11** and **Figure 12**.

Further to this, it is noted that the beamset trailer configuration and associated transport route have been adopted for the purpose of the traffic assessment for the Project, while the final transport configuration and transport route will be confirmed in subsequent stages of the Project.

It is also noted that the initial OSOM transformer vehicle configurations identified in the route assessment completed (refer **Appendix A**) will need to be provided to TMR to enable the assessment of the relevant bridge and major culvert structures along the identified transport routes to be undertaken.

Notwithstanding this, it is expected that suitable transport vehicle configurations for the transformer components can be made to enable the vehicles to meet any identified loading parameters of these relevant bridge structures along the identified OSOM transport route for the Project.

Table 8 Preliminary OSOM Component Transport Routes

Mount Hopeful Battery Project - OSOM Component Transport Routes	
OSOM Transport Option 1	
Components	Transformer (12x8 12x8 Beamset Trailer Configuration) & Switchroom
Road Links	Macfarlane Drive (GPC) / John Bates Drive (GPC) / Gladstone Port Access Road (TMR) / Gladstone-Mt Larcom Road (TMR) / Red Rover Road (GRC) / Don Young Drive (GRC) / Dawson Highway (TMR) / Bruce Highway (TMR) / South Ulam Road (RRC)
OSOM Transport Option 2	
Components	Transformer (16x8 Platform Trailer Configuration)
Road Links	Macfarlane Drive (GPC) / Flinders Parade (GRC) / Lord Street (GRC) / Gladstone-Mt Larcom Road (TMR) / Red Rover Road (GRC) / Don Young Drive (GRC) / Dawson Highway (TMR) / Bruce Highway (TMR) / South Ulam Road (RRC)

3.3.2 Project Operations Phase

- The workforce during the operations phase of the Project will consist of a small number of local workers (i.e. up to 10 staff) who are expected to reside locally to the Project (likely in Rockhampton) and commute daily via the Bruce Highway and South Ulam Road.
- Heavy vehicle movements during the operations phase of the Project are anticipated to be extremely low, with only occasional movements to/from site (in the order of 1 vehicle per week from Rockhampton) associated with maintenance activities, routine removal of waste and delivery of consumables to the site operations facility.

3.4 Site Access

The key element of the proposed access arrangements for the site is the connection to the Bruce Highway, which is proposed to be gained via the existing Bruce Highway / South Ulam Road intersection. This intersection is located on the left-hand side of the carriageway (gazettal direction) at approximate TMR chainage 86.183 km (10E). From this intersection, Project traffic is proposed to travel along the RRC controlled South Ulam Road to the proposed Project site entrance, located approximately 16.8 km south of the Bruce Highway.

As no access point currently exists at this location, it is proposed that a new site access in accordance with the requirements for a bitumen road (<300vpd) as per Standard Drawing CMDG-R-040 (Rural Road Access and Property Access Over Table Drains) be provided to service the expected Project traffic volumes. Further to this, it is noted that additional hardstand areas will be required at the proposed site access location to accommodate the swept paths of the OSOM transformer transport vehicles, with the exact extents of these additional areas to be confirmed in subsequent detailed design phases of the Project once the final configuration of the transport vehicles is confirmed.

Finally, based on the expected Project traffic volumes, it is anticipated that the current sealed configuration of South Ulam Road will be adequate to cater for the traffic volumes anticipated to be generated by the Project.

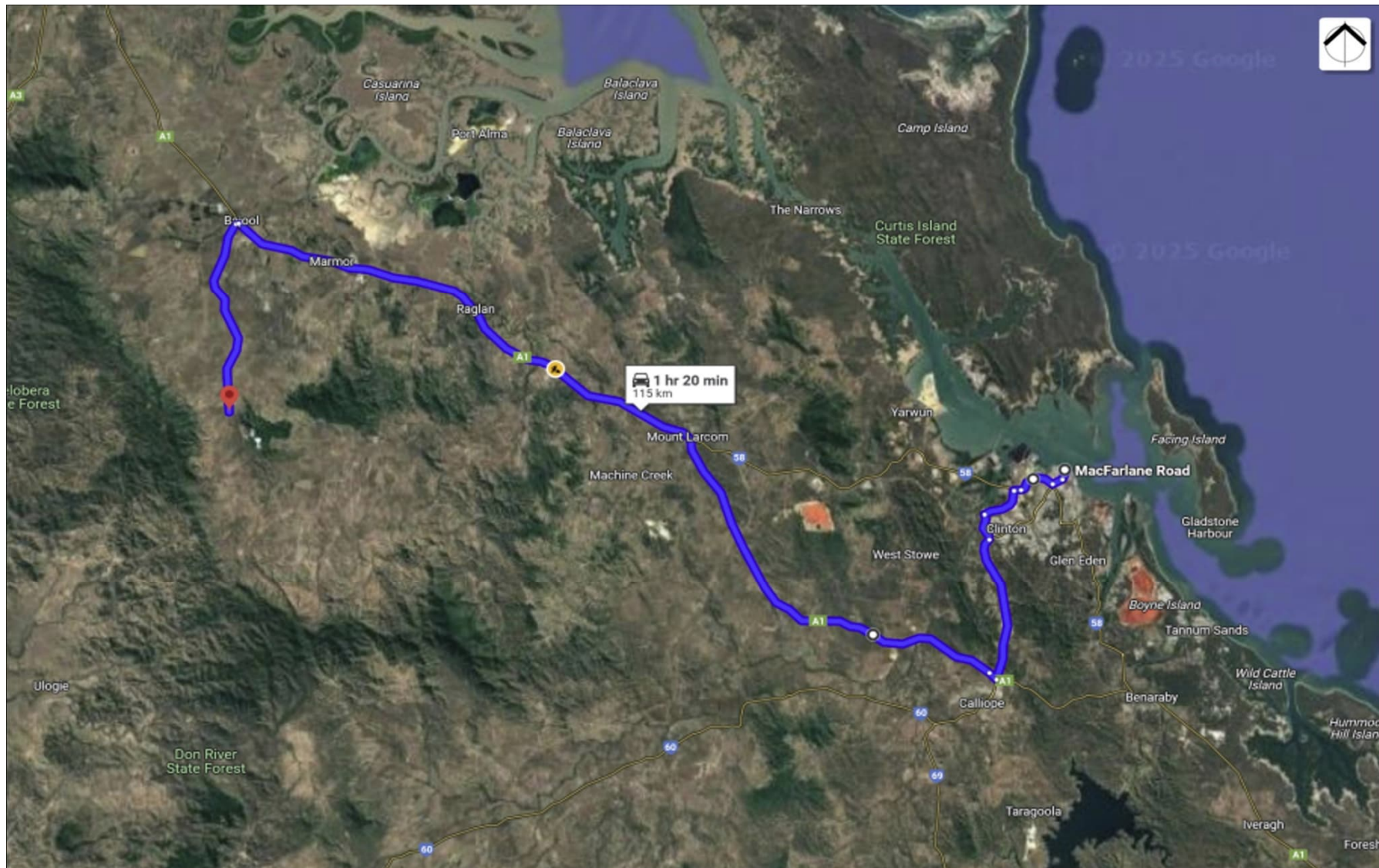


Figure 11 OSOM Transformer (12x8 12x8 Beamset Trailer Configuration) & Switchroom Transport Route

[Source: Rex J Andrews / Neoen]



Figure 12 OSOM Transformer Transport Route (16x8 Platform Trailer Configuration)

[Source: Rex J Andrews / Neoen]

3.5 Internal Site Facilities

As previously identified, the proposed plan of development (refer **Appendix E**) identifies the provision of a single access track (approximately 1.8km in length), which provides vehicular access and a connection between the proposed BESS facility (and associated infrastructure) and the external road network (South Ulam Road). The plan of development for the Project also identifies a number of site facilities, including the proposed battery storage facility, substation and switchyard areas, as shown in Error! Reference source not found. above.

Further to this, whilst not currently shown on the proposed site layout it is understood that the suitable parking facilities will be provided adjacent to the key areas on site (i.e. battery storage facility, substation and switchyard areas) in accordance with the requirements of all relevant standards, guidelines and policies.

Due to the large area of land available within the Study Area for the required internal facilities (including the construction compounds and parking facilities), and the current setback from the external road network, it is not anticipated that either the construction or operations phases of the proposed Mount Hopeful Battery Project will lead to an overspill of parking or vehicle queuing at site accesses that would lead to negative impacts to the operation of the surrounding road network, including South Ulam Road.

3.6 OSOM Transformer Transport Route Upgrades

An OSOM transport route assessment (refer **Appendix A**) has been separately undertaken for the Project by Rex J Andrews Transport to assess route options and potential adjustments to the road network to accommodate the proposed OSOM movements including transport of the large transformer components.

As identified above, this assessment identified two route transport route options dependant on the expected configuration of the transformer transport vehicle. In addition to identifying the proposed transport routes, the assessment also highlighted a number of specific locations or pinch points along the preliminary OSOM transport routes where mitigation works are expected to be required to accommodate the swept paths and vehicle clearance envelopes of the proposed OSOM transformer transport vehicle configurations.

Further details of the route pinch points, and the currently proposed works are outlined in the transport route assessment included for reference in **Appendix A.**, with a summary of the mitigation works requirements for each potential OSOM vehicle configuration provided in **Table 9** and **Table 10**.

Table 9 OSOM Transformer Transport (12x8 12x8 Beamset Trailer) Route Modification Summary

KM Index	Location	Section of Road	Procedure	Comments
0.0	Gladstone	Mac Farlane Road onto John Bates Drive.	Exit port and turn right via bypass on inside of corner	Modifications required: Security required to open gates and exit Port. Loads to use bypass on inside of corner installed for previous projects.
0.9	Gladstone	John Bates Drive onto Port Access Road	Loads to travel to the left onto a temporary hardstand prior to the roundabout.	Modifications required: Corner has been modified for Clarke Creek windfarm. Signs to be removed and replaced and loads to travel over island.
1.6	Gladstone	Port access road under Goondoon Street	Loads are to travel under this structure in the far-left lane.	Modifications required: The transformer transport vehicle will need to be checked for clearance while passing under this structure.
1.8	Gladstone	Port Access Road onto Glenlyon Street	Loads to turn right from the correct side of Port Access Road and onto the incorrect side of Glenlyon Street before travelling back to the correct side of Glenlyon Street before travelling through the break in the median trip and back onto the correct side of the road at walking pace.	Modifications required: Corner has been modified for Clarke Creek windfarm.
2.1	Gladstone	Glenlyon Street onto Hanson Road	Travel directly ahead.	Modifications required: Nil.
4.9	Gladstone	Hanson Road through the Blain Drive roundabout	Loads to travel through the roundabout on the correct side of the road at walking pace.	Modifications required: Roundabout has been modified for Clarke Creek windfarm. Sign to be removed and replaced.
5.5	Gladstone	Hanson Road onto Red Rover Road	Load to travel onto incorrect side of Red Rover Rd using the modified centre island.	Modifications required: Roundabout has been modified for Clarke Creek windfarm. Delineators on centre island to be removed and replaced.
8.8	Gladstone	Red Rover Road onto Don Young Drive	Continue straight ahead.	Modifications required: Nil.
11.1	Gladstone	Don Young Drive onto Dawson Highway	Load to cross to incorrect side of road and cut corner.	Modifications required: Nil.
23.2	Calliope	Dawson Hwy onto Bruce Hwy	Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.	Modifications required: Sign to be relocated or made removable.
98.0	Bajool	Bruce Hwy onto South Ulam Road	Left hand turn	Modifications required: Nil.
115.0	Bajool	South Ulam Road into proposed Site Entry	Right hand turn	Modifications required: Suitable site entry and site access roads to be constructed.

Table 10 OSOM Transformer Transport (16x8 Platform Trailer) Route Modification Summary

KM Index	Location	Section of Road	Procedure	Comments
0.6	Barney Point	Macfarlane Road under Conveyor	Loads will travel directly ahead under the conveyor in the far-right side of the road.	Pinchpoint procedure: Loads to slow to a crawl and pass under this structure in the far right side of the road. Traffic control: Pilots to control local traffic. this section of road. Road furnishings: No cars to be parked on the right side of the road. Modifications required: Nil.
0.8	Barney Point	Exiting Port onto Macfarlane Road	Left hand turn from incorrect side to the incorrect side	Pinchpoint procedure: Security guard to open gate out of port. Traffic control: Pilots to control local traffic. this section of road. Modifications required: Trees to be trimmed.
1.0	Gladstone Central	Macfarlane Road onto Flinders Parade	Travel directly ahead through the security gate	Pinchpoint procedure: Security guard to lower bollards. Traffic control: QPS/Pilots to control local traffic. Modifications required: Trees to be trimmed.
1.0 to 1.3	Gladstone Central	Flinders Parade foreshore	Travel directly on the foreshore access road	Pinchpoint procedure: Security guard to lower bollards. Traffic control: QPS/Pilots to control local traffic. Modifications required: Trees to be trimmed.
1.3	Gladstone	Flinders Parade foreshore onto Flinders Parade	Loads are to travel directly ahead	Pinchpoint procedure: Security guard to lower and raise bollards.
1.6	Gladstone	Goondoon Street onto Lord Street	Loads are to turn right turn from Goondoon Street crossing onto the incorrect side of the road before returning to the correct side of onto Lord Street.	Modifications required: Nil.
1.7	Gladstone	Lord Street Roundabout at Bryan Jordan Drive	Loads are to travel directly ahead on Lord Street on the correct side of the roundabout.	Modifications required: Signs to be relocated or made removable. Median strip and kerb to be made trafficable.
2.15	Gladstone	Lord Street onto Hanson Road	Right hand turn from Lord Street onto Hanson Road.	Modifications required: Nil.
4.5	Gladstone	Hanson Road through the Blain Drive roundabout	Loads to travel through the roundabout on the correct side of the road.	Modifications required: Nil.



KM Index	Location	Section of Road	Procedure	Comments
5.1	Gladstone	Hanson Road onto Red Rover Road roundabout	Loads to turn left at the roundabout onto incorrect side of road using modifications made on centre island.	Modifications required: Delineators to be removed and reinstalled
10.7	Gladstone	Don Young Drive onto Dawson Highway	Right hand turn	Modifications required: Nil.
22.6	Calliope	Dawson Hwy onto Bruce Hwy	Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.	Modifications required: Nil.
97.7	Bajool	Bruce Hwy onto South Ulam Road	Left hand turn	Modifications required: Nil.
114.3	Bajool	South Ulam Road into proposed site entry	Right hand turn	Modifications required: Suitable site entry and site access roads to be constructed.

4.0 Project Traffic Volumes

There will be two distinct periods of development traffic generation for the Project, being the construction (Stage 1 and Stage 2) and operations phases. The expected traffic generation and distribution during all relevant phases of the Project is discussed in the sections below.

4.1 Construction Phase

As identified above, the construction of the Project is anticipated to be completed in two (2) stages, over an overall period of 40 months, commencing in Q3 (September) 2026 (pending approvals) and concluding in Q4 (December) 2029, with this overall period noted to include provision for 3 months Project float.

Construction of Stage 1 of the Project is proposed to be completed over 26 months, between Q3 (September) 2026 and Q4 (October) 2028, with the construction of Stage 2 to be completed over 17 months, commencing in Q3 (August) 2028 and concluding in Q4 (December) 2029, noting a slight overlap of approximately three (3) months in the Stage 1 and Stage 2 construction works.

Based on the proposed schedule (refer **Table 7**), the peak period of construction for Stage 1 is expected to occur between Q2 and Q4 2027, while the peak period of construction for Stage 2 is expected to occur between Q3 2028 and Q2 2029. From information provided by Neoen, it has been identified that the main traffic generating activities occurring within both the Stage 1 and Stage 2 construction phases of the Project are the transport of the various construction materials / equipment to site and the daily construction staff movements. Further details of these activities, including the Project traffic generation and its expected distribution on the surrounding road network, are provided in the following sections.

4.1.1 Materials and Equipment Delivery Movements

Neoen has provided preliminary information and assumptions regarding the expected construction phase of the Project based on their experience in developing similar battery storage facility developments. This information has been used to calculate the expected material and equipment quantities for both the Stage 1 and Stage 2 construction works for the Project and the associated vehicle movements for the delivery of these materials / items, based on the following general assumptions:

- General equipment, plant and materials for the Project are proposed to be imported to site from Rockhampton.
- The BESS components, as well as the general (non OSOM) electrical components for the substation and switchyard site areas are proposed to be imported to site from the port facilities in Gladstone.
- Similarly, the larger OSOM transformer electrical infrastructure and site switch room components are also expected to be imported to site from the port facilities in Gladstone.
- Gravel materials for the internal access roads, site entrance and site areas are conservatively assumed to be 100% imported to site, with no internal sources currently identified within the Study Area.

At this stage, it is indicatively assumed that the gravel materials for the Study Area will be sourced from local quarries to the south on the Bruce Highway at Marmor.

- Construction water requirements for the site have also conservatively been assumed to be 100% imported. For the purpose of this assessment, it has been assumed that the construction water will be sourced standpipe facilities in Rockhampton.
- Concrete for the Project is also proposed to be imported to site as wet concrete in trucks from commercial suppliers in Rockhampton.

A calculated breakdown of the Project generated traffic movements by construction task, including the duration of transport, is summarised in **Table 11** with the detailed calculations completed to convert operational / construction information into vehicle movements included for reference in **Appendix F**.



Table 11 Summary of Total Project Material / Equipment Delivery Heavy Vehicle Movement Volumes

Task	Duration	Total Vehicles	Type of Vehicles	Max Vehicles per Day
STAGE 1 - CONSTRUCTION				
Task A – Site Mobilisation	1 month	40 vehicles (external), including: • 40 semi/low loader movements from Rockhampton.	Semi / Low Loaders	2 vehicles / day
Task B – Site Access and Internal Access Roads	2 months	148 vehicles (external), including: • 137 truck and dog movements from local quarry. • 11 water cart movements from Rockhampton.	Truck & Dog Trailers Water Cart	4 vehicles / day
Task C – Civil Works	6 months	1,329 vehicles (external), including: • 338 concrete truck movements from Rockhampton. • 68 water cart movements from Rockhampton. • 923 truck and dog movements from local quarry.	Concrete Trucks Water Truck Truck & Dog Trailers	10 vehicles / day
Task D – Electrical Installation (BESS)	9 months total <u>Transport</u> 6 months	644 vehicles (external), including: • 466 BESS module transport movements from Port of Gladstone. • 168 semi-trailer movements from Port of Gladstone. • 10 truck and dog movements from local quarry.	Special Transport Vehicles (Permit) Semi-Trailers Truck & Dog Trailers	5 vehicles / day
Task E – Substation Works	9 months total <u>Transport</u> 6 months	15 vehicles (external), including: • 5 OSOM movements (2x transformer and 3x switch rooms) from Port of Gladstone. • 10 truck and dog movements from local quarry.	OSOM Special Transport Vehicles (Permit) Truck & Dog Trailer	1 vehicle / day
Task F – Switchyard Works	19 months total <u>Transport</u> 6 months	110 vehicles (external), including: • 100 semi-trailer movements from Port of Gladstone. • 10 truck and dog movements from local quarry.	Semi-Trailers Truck & Dog Trailers	1 vehicle / day
Task G – Testing and Commissioning	9 months	50 vehicles total (external), including: • 50 rigid truck movements from Rockhampton.	Rigid Truck	1 vehicle / day



Task	Duration	Total Vehicles	Type of Vehicles	Max Vehicles per Day
Task H – Finalisation / Commissioning / Demobilisation	9 months total <u>Transport</u> 3 months	100 vehicles total (external), including: • 100 semi-trailer movements from Rockhampton.	Semi-Trailers	2 vehicles / day
Site Water <i>(Does not include internal water truck movements)</i>	26 months total	237 vehicles total (external) • 237 water cart movements from Rockhampton.	Water Cart	1 vehicle / day
STAGE 2 - CONSTRUCTION				
Task 2A – Civil Works	3 months	308 vehicles (external), including: • 79 concrete truck movements from Rockhampton. • 16 water cart movements from Rockhampton. • 213 truck and dog movements from local quarry.	Concrete Trucks Water Truck Truck & Dog Trailers	5 vehicles / day
Task 2B – Electrical Installation (BESS)	6 months total <u>Transport</u> 4 months	255 vehicles (external), including: • 184 BESS module transport movements from Port of Gladstone. • 66 semi-trailer movements from Port of Gladstone. • 5 truck and dog movements from local quarry.	Special Transport Vehicles (Permit) Semi-Trailers Truck & Dog Trailers	3 vehicles / day
Task 2C– Substation Works	1 month	5 vehicles (external), including: • 5 truck and dog movements from local quarry.	Truck & Dog Trailer	1 vehicle / day
Task 2D – Testing and Commissioning	3 months	25 vehicles total (external), including: • 25 rigid truck movements from Rockhampton.	Rigid Truck	1 vehicle / day
Task 2E – Finalisation / Commissioning / Demobilisation	2 months	35 vehicles total (external), including: • 35 semi-trailer movements from Rockhampton.	Semi-Trailers	1 vehicle / day
Site Water <i>(Does not include internal water truck movements)</i>	17 months total	78 vehicles total (external) • 78 water cart movements from Rockhampton.	Water Cart	1 vehicle / day



Task	Duration	Total Vehicles	Type of Vehicles	Max Vehicles per Day
OVERALL CONSTRUCTION				
Site Fuel	37 months total	161 vehicles total (external) • 161 semi tanker movements from Rockhampton.	Semi Fuel Tanker	1 vehicle / day
Site Waste Collection	37 months total	161 vehicles total (external) • 161 semi-trailer movements from Rockhampton.	Semi-Trailers	1 vehicle / day

4.1.2 Construction Staff Movements

The proponent has also provided the following information and assumptions regarding the proposed staff movements for the Stage 1 and Stage 2 construction phases of the Project:

- Maximum (peak) construction daily workforce for Stage 1 is expected to be 150 staff, which is expected to occur over a nine (9) month period (Q2 to Q4 2027).
- Outside of peak construction the daily staff numbers for the Stage 1 works will vary between 20-75 staff.
- Maximum (peak) construction daily workforce for Stage 2 is expected to be 50 staff, which is expected to occur over a six (6) month period (Q4 2028 to Q2 2029).
- Outside of peak construction the daily staff numbers for the Stage 2 works will vary between 20-30 staff.
- The main workforce during construction will consist of local workers commuting generally from Rockhampton, and specialist FIFO workers, who will commute daily to/from the Study Area from Rockhampton via the relevant sections of the Bruce Highway and South Ulam Road.
- Construction staff for the Project to are expected to commute to site using a mixture of private vehicles (light vehicles and 4WDs) and minibuses, with an average capacity of 2 staff per vehicle and 20 staff members per bus.
- The split of private vehicles and minibus usage by staff is anticipated to be approximately 50% / 50% for staff. Furthermore, it is noted that it has been assumed that if the staff numbers are less than 100, that 100% of staff are expected to travel to/from the subject site using private vehicles.

Based on these general staff assumptions, the expected local and non-local staff numbers and associated vehicle movements were established, with **Table 12** summarising the expected staff vehicle movement numbers for the Project and the cumulative overall (staff and heavy vehicle) vehicle movements for the Project .

Table 12 Mount Hopeful Battery Project - Forecast Daily Project Vehicle Movements (Construction Phase)

ID	Task	MONTH																																							
		Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
		Q3	Q4 2026			Q1 2027			Q2 2027			Q3 2027			Q4 2027			Q1 2028			Q2 2028			Q3 2028			Q4 2028			Q1 2029			Q2 2029			Q3 2029			Q4 2029		
STAGE 1 – CONSTRUCTION PHASE																																									
1A	Mobilisation	2																																							
1B	Site Access & Internal Access Road	3 3																																							
1C	Civil Works	8 8 8 8 8 8																																							
1D	Electrical Installation (BESS)	4 4 4 4 4 4 4 4 4 4 4 4 4 4																																							
1E	Substation Works	1 1 1 1 1 1 1 1 1 1 1 1 1 1																																							
1F	Switchyards Works	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1																																							
1G	Testing and Commissioning	1 1 1 1 1 1 1 1 1																																							
1H	Finalisation / Commissioning / Demobilisation	2 2 2																																							
1W	Site Water	1 1																																							
STAGE 2 – CONSTRUCTION PHASE																																									
2A	Civil Works	4 4 4																																							
2B	Electrical Installation (BESS)	3 3 3 3 3 3																																							
2C	Substation Works	1																																							
2D	Testing and Commissioning	1 1 1																																							
2E	Site Water	1 1																																							
2W	Site Water	1 1 1 1 1 1 1 1 1 1 1																																							
GENERAL CONSTRUCTION TRAFFIC																																									
F	Site Fuel	1 1																																							
WC	Site Waste Collection	1 1																																							
Total Maximum Daily Heavy Vehicles		5	14	14	11	12	12	12	9	9	9	9	9	9	10	10	10	10	10	10	5	5	5	10	10	10	6	6	6	6	6	7	4	4	4	4	4	0	0	0	

				MONTH																																																
				Sep-26	Oct-26	Nov-26	Dec-26	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28	Jan-29	Feb-29	Mar-29	Apr-29	May-29	Jun-29	Jul-29	Aug-29	Sep-29	Oct-29	Nov-29	Dec-29									
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40									
				Q3	Q4 2026				Q1 2027				Q2 2027				Q3 2027				Q4 2027				Q1 2028				Q2 2028				Q3 2028				Q4 2028				Q1 2029				Q2 2029				Q3 2029			
Stage 1 Staff Numbers				10	50	50	50	75	75	75	150	150	150	150	150	150	150	150	75	75	75	75	75	75	75	20	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
Stage 2 Staff Numbers				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	30	30	50	50	50	50	50	50	50	20	20	20	20	20	20	0	0	0	0							
Total Staff Numbers				10	50	50	50	75	75	75	150	150	150	150	150	150	150	150	75	75	75	75	75	75	75	50	50	50	50	50	50	50	50	50	20	20	20	20	20	20	0	0	0	0								
Staff	Vehicle	100%		10	50	50	50	75	75	75	150	150	150	150	150	150	75	75	75	75	75	75	75	50	50	50	50	50	50	50	50	50	20	20	20	20	20	0	0	0	0											
		Capacity	Utilisation by Staff																																																	
Local Staff (Rockhampton)	100%			10	50	50	50	75	75	75	150	150	150	150	150	150	150	75	75	75	75	75	75	75	50	50	50	50	50	50	50	50	20	20	20	20	20	20	0	0	0	0										
	Mini Bus	20	50%	0	0	0	0	0	0	4	4	4	4	4	4	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0											
	LV	2	50%	5	25	25	25	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	25	25	25	25	25	25	25	25	25	25	25	10	10	10	10	10	0	0	0	0								
Daily Construction Staff Vehicle Movements				5	25	25	25	38	38	38	42	42	42	42	42	42	42	38	38	38	38	38	38	38	25	25	25	25	25	25	25	25	25	25	25	10	10	10	10	10	0	0	0	0								
Daily Project (Construction)Vehicle Movements				10	39	39	36	50	50	50	51	51	51	51	51	51	51	52	52	48	48	48	48	43	43	43	35	35	35	31	31	31	31	31	31	32	14	14	14	14	14	0	0	0	0							

4.2 Operations Phase

The proponent (Neoen) has also advised that the workforce during operations phase of the Project (i.e. following the completion of the construction stages) will only consist of a small number of local workers (up to 10 staff) who are expected to reside locally to the Study Area (most likely in Rockhampton).

Further to this, the heavy vehicle movements during the operations phase of the Project are likely to be extremely low (approx. 1 HV per week), associated with maintenance activities, routine removal of waste or deliveries to the site operations facility, and considered to be negligible from a traffic engineering or transport planning perspective.

In light of the information regarding the Project traffic volumes provided above, it can clearly be seen that the construction stage of the Project is critical in terms of the impact upon the public road network and has been used as the basis of the assessment of this impact considering road safety, road capacity, and pavement impact.

4.3 Project Traffic Volumes on the Network

The volumes of traffic forecast to be generated by staff and equipment / materials delivery as part of the Stage 1 and Stage 2 construction phases have been distributed onto the public road network based upon an understanding of the locations from which these equipment / materials are intended to be sourced / delivered, and other Project operational information provided by the proponent.

4.3.1 Road Links

As previously identified, the use of the external road network by typical day to day Project traffic is anticipated to be generally limited to the state controlled network and the RRC controlled link of South Ulam Road.

Notwithstanding this, it is also noted that a small number of local roads controlled by GRC (Red Rover Road, Don Young Drive) are also proposed to be utilised as part of the proposed transport route for the larger OSOM transformer and switchroom component movements from the Port of Gladstone to the Study Area.

Detailed calculations were undertaken to establish the peak daily Project traffic volumes on the relevant sections of the road network (refer **Appendix F**), with the identified peak volumes experienced during the peak construction phases of Stage 1 and Stage 2 of the Project noted to occur at the following times as per **Table 12** above:

- **Stage 1** - Month 8-16 (April - December 2027) - Where heavy vehicle movements for construction tasks 1D,1E,1F,1G and the site water and fuel transport and waste collection are being completed concurrently with peak staff movements to the Project.
- **Stage 2** - Month 27-32 (November 2028 – April 2029) - Where heavy vehicle movements for construction tasks 2B, 2C and the site water and fuel transport and waste collection are being completed concurrently with peak staff movements to the Project.

A summary of the calculated Project traffic volumes (conservatively based on the total of the individual maximum movements from concurrently scheduled construction activities) for each identified road link is provided in **Table 13** overpage.



Table 13 Forecast Maximum Project Traffic Volumes on External Road Network

Road ID	Road Description	AADT Segment ID	AADT Segment		Stage 1 Construction Maximum Daily Project Traffic			Stage 2 Construction Maximum Daily Project Traffic		
			Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
183	Gladstone Port Access Road	61605	0.000	0.858	7	7	14	3	3	6
181	Gladstone - Mount Larcom Road	160360	0.000	0.175	0	0	0	0	0	0
		160361	0.175	0.675	7	7	14	3	3	6
		60071	0.675	1.409	7	7	14	3	3	6
		60073	1.409	3.258	7	7	14	3	3	6
		61052	3.258	3.830	7	7	14	3	3	6
			3.830	4.625	6	6	12	3	3	6
		60074	4.625	12.292	6	6	12	3	3	6
		60076	12.292	32.140	6	6	12	3	3	6
GRC	Red Rover Road	GRC	0.000	3.390	1	0	1	0	0	0
GRC	Don Young Drive	GRC	0.000	2.280	1	0	1	0	0	0
46A	Dawson Highway (Gladstone - Biloela)	60065	7.150	19.305	1	0	1	0	0	0
10E	Bruce Highway (Benaraby - Rockhampton)	60006	11.445	45.420	1	0	1	0	0	0
		60023	45.420	75.469	7	7	14	3	3	6
			75.469	85.308	7	7	14	4	4	8
		160954	85.308	86.183	7	7	14	4	4	8
			86.183	87.080	46	46	92	28	28	56
		61551	87.080	108.938	46	46	92	28	28	56
		60130	108.938	114.388	46	46	92	28	28	56
		60024	114.388	116.961	46	46	92	28	28	56
RRC	South Ulam Road	RRC	0.000	16.773	53	53	106	32	32	64

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

4.3.2 Intersections

From the information regarding the proposed staff and heavy vehicle movement numbers during the critical construction phase of Stage 1 and Stage 2 of the Project, the peak hour volumes at the key Bruce Highway / South Ulam Road intersection were established.

A summary of the resultant peak hour Project traffic volumes at this intersection for the peak Stage 1 and Stage 2 construction periods is outlined in **Figure 13** and **Figure 14** (Stage 1) as well as **Figure 15** and **Figure 16** (Stage 2), with further details of the calculations undertaken to establish these volumes are provided for reference in **Appendix C**.

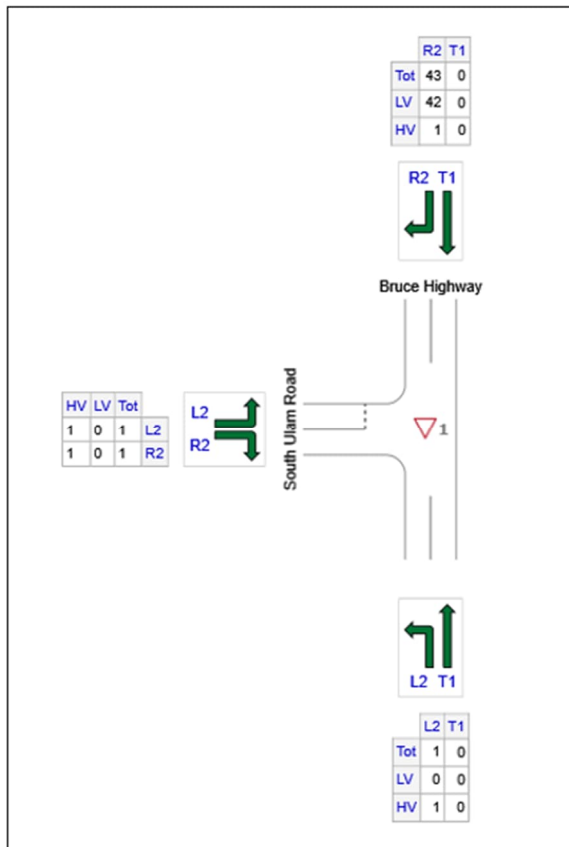


Figure 13 Bruce Highway / South Ulam Road Intersection
AM Peak Stage 1 (Peak Construction) Volumes

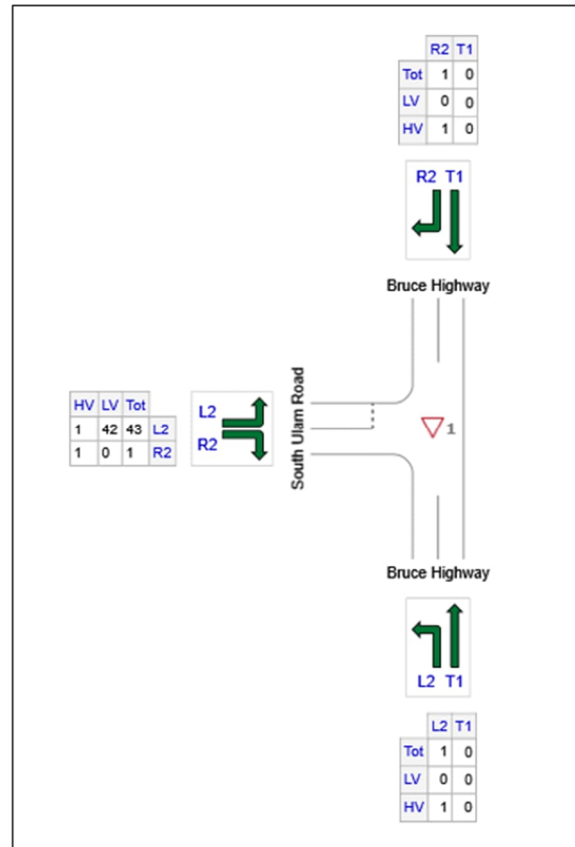


Figure 14 Bruce Highway / South Ulam Road Intersection
PM Peak Stage 1 (Peak Construction) Volumes

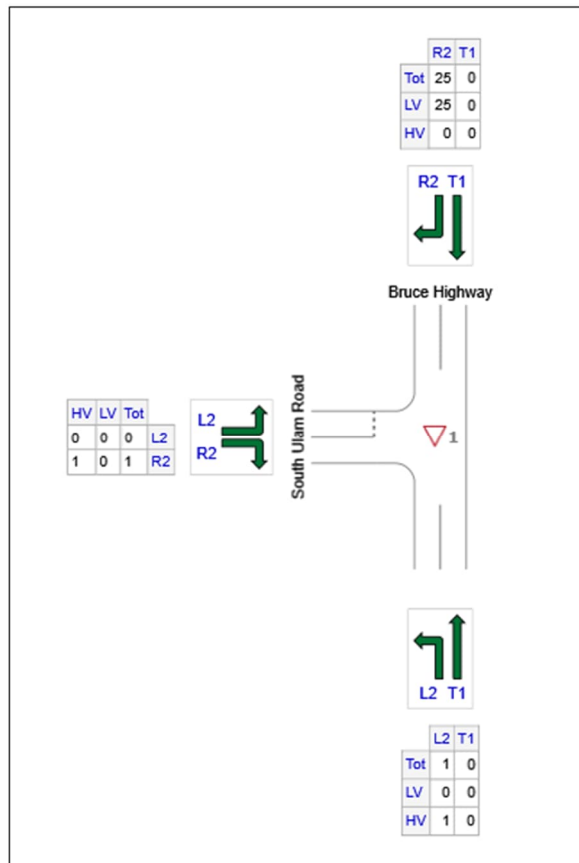


Figure 15 Bruce Highway / South Ulam Road Intersection
AM Peak Stage 2 (Peak Construction) Volumes

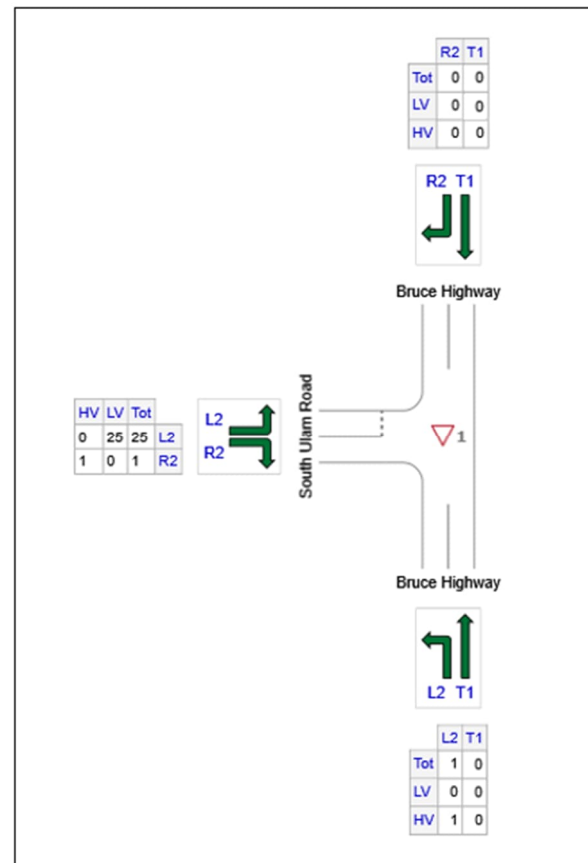


Figure 16 Bruce Highway / South Ulam Road Intersection
PM Peak Stage 2 (Peak Construction) Volumes

5.0 Impact Assessment and Mitigation

Based on the information provided above, it was determined that the critical elements of the surrounding road network in terms of the potential impact of the Project were the identified road links forming the proposed transport routes for the site, and the key intersection of Bruce Highway / South Ulam Road. Further assessment of the impact of the Project on these elements is provided in the following sections.

5.1 With and Without Project Traffic Volumes

5.1.1 Road Link Volumes

5.1.1.1 Construction Phase

As identified above, the peak traffic generation from the Project is expected to occur during the peak construction period for the Project, with the expected maximum traffic volumes from the site identified in **Table 13** above.

Based on these volumes and the adopted distribution identified in **Section 4.3** above, the forecast pre project and “peak construction” traffic volumes on the relevant sections of the road network during Stage 1 (2027) and Stage 2 (2029) of the Project were established, as summarised in **Table 14** and **Table 15**.

Table 14 Forecast Background and “Peak Construction” Traffic Volumes (Stage 1)

Site ID	Road Segment		Background Daily Volumes			Project Peak Construction Traffic (Daily)			Peak Construction Daily Volumes		
	Start (km)	End (km)	2027			Gaz	A-Gaz	Bi-Dir	2027		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Gladstone Port Access Road (183)											
61605	0.000	0.858	989	922	1,911	7	7	14	996	929	1,925
Gladstone – Mount Larcom Road (181)											
160360	0.000	0.175	5,879	6,190	12,069	0	0	0	5,879	6,190	12,069
160361	0.175	0.675	5,532	6,288	11,820	7	7	14	5,539	6,295	11,834
60071	0.675	1.409	4,058	3,719	7,777	7	7	14	4,065	3,726	7,791
60073	1.409	3.258	3,889	3,805	7,694	7	7	14	3,896	3,812	7,708
61052	3.258	3.830	4,356	5,353	9,709	7	7	14	4,363	5,360	9,723
	3.830	4.625	4,356	5,353	9,709	6	6	12	4,362	5,359	9,721
60074	4.625	12.292	3,337	3,361	6,698	6	6	12	3,343	3,367	6,710
60076	12.292	32.140	1,825	1,829	3,655	6	6	12	1,831	1,835	3,667
Red Rover Road (GRC)											
GRC	0.000	3.390	-	-	-	1	0	1	-	-	-
Don Young Drive (GRC)											
GRC	0.000	2.280	-	-	-	1	0	1	-	-	-
Dawson Highway (46A Gladstone – Biloela)											
60065	7.150	19.305	3,991	3,808	7,798	1	0	1	3,992	3,808	7,799

Site ID	Road Segment		Background Daily Volumes			Project Peak Construction Traffic (Daily)			Peak Construction Daily Volumes		
	Start (km)	End (km)	2027			Gaz	A-Gaz	Bi-Dir	2027		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Bruce Highway (10E Benaraby – Rockhampton)											
60006	11.445	45.420	2,262	2,197	4,459	1	0	1	2,263	2,197	4,460
60023	45.420	75.469	3,273	3,309	6,582	7	7	14	3,280	3,316	6,596
	75.469	85.308	3,273	3,309	6,582	7	7	14	3,280	3,316	6,596
160954	85.308	86.183	3,461	3,237	6,698	7	7	14	3,468	3,244	6,712
	86.183	87.080	3,461	3,237	6,698	46	46	92	3,468	3,244	6,712
61551	87.080	108.938	3,816	3,795	7,611	46	46	92	3,862	3,841	7,703
60130	108.938	114.388	3,007	2,769	5,776	46	46	92	3,053	2,815	5,868
60024	114.388	116.961	6,084	5,832	11,917	46	46	92	6,130	5,878	12,009
South Ulam Road (RRC)											
RRC	0.000	16.773	92	111	202	53	53	106	145	164	308

Table 15 Forecast Background and “Peak Construction” Traffic Volumes (Stage 2)

Site ID	Road Segment		Background Daily Volumes			Project Peak Construction Traffic (Daily)			Peak Construction Daily Volumes		
	Start (km)	End (km)	2029			Gaz	A-Gaz	Bi-Dir	2029		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Gladstone Port Access Road (183)											
61605	0.000	0.858	1,008	941	1,949	3	3	6	1,011	944	1,955
Gladstone – Mount Larcom Road (181)											
160360	0.000	0.175	5,998	6,314	12,312	0	0	0	5,998	6,314	12,312
160361	0.175	0.675	5,643	6,415	12,058	3	3	6	5,646	6,418	12,064
60071	0.675	1.409	4,140	3,794	7,934	3	3	6	4,143	3,797	7,940
60073	1.409	3.258	3,967	3,882	7,849	3	3	6	3,970	3,885	7,855
61052	3.258	3.830	4,444	5,460	9,904	3	3	6	4,447	5,463	9,910
	3.830	4.625	4,444	5,460	9,904	3	3	6	4,447	5,463	9,910
60074	4.625	12.292	3,404	3,429	6,833	3	3	6	3,407	3,432	6,839
60076	12.292	32.140	1,862	1,866	3,728	3	3	6	1,865	1,869	3,734
Red Rover Road (GRC)											
GRC	0.000	3.390	-	-	-	0	0	0	-	-	-
Don Young Drive (GRC)											
GRC	0.000	2.280	-	-	-	0	0	0	-	-	-
Dawson Highway (46A Gladstone – Biloela)											
60065	7.150	19.305	4,071	3,884	7,955	0	0	0	4,071	3,884	7,955

Site ID	Road Segment		Background Daily Volumes			Project Peak Construction Traffic (Daily)			Peak Construction Daily Volumes		
	Start (km)	End (km)	2029			Gaz	A-Gaz	Bi-Dir	2029		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Bruce Highway (10E Benaraby – Rockhampton)											
60006	11.445	45.420	2,308	2,241	4,549	0	0	0	2,308	2,241	4,549
60023	45.420	75.469	3,357	3,393	6,750	0	0	0	3,360	3,396	6,756
	75.469	85.308	3,357	3,393	6,750	3	3	6	3,361	3,397	6,758
160954	85.308	86.183	3,531	3,302	6,833	4	4	8	3,535	3,306	6,841
	86.183	87.080	3,531	3,302	6,833	4	4	8	3,535	3,306	6,841
61551	87.080	108.938	3,935	3,914	7,849	28	28	56	3,963	3,942	7,905
60130	108.938	114.388	3,067	2,825	5,892	28	28	56	3,095	2,853	5,948
60024	114.388	116.961	6,356	6,093	12,449	28	28	56	6,384	6,121	12,505
South Ulam Road (RRC)											
RRC	0.000	16.773	93	113	206	32	32	64	125	145	270

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

5.1.1.2 Operations Phase

As previously outlined, Neoen has advised that the predominant Project traffic volumes during the operations phase will be the movements to/from the site by the relatively small number of local workers (i.e up to 10 staff) who are expected to reside locally to the Project (likely Rockhampton).

Further to this, it has been advised that heavy vehicle movements during the operations phase of the Project will be extremely low (1 per week) and associated with maintenance activities, routine removal of waste or deliveries to the site operations facility.

Based on the above, the increase in traffic volumes on the road network as a result of the operations phase of the Project can be seen to be very minor. As such, the corresponding traffic impacts of the ongoing operation of the Project can be considered negligible, and no further traffic assessment of the relevant road links is deemed necessary.

5.1.2 Intersection Volumes

To establish the anticipated “in construction” traffic volumes at the key Bruce Highway / South Ulam Road intersections, the Project construction traffic volumes identified in **Figure 13** and **Figure 14** (Stage 1) and **Figure 15** and **Figure 16** (Stage 2) (refer **Section 4.3.2**) were added to the estimated 2027 (Stage 1) and 2029 (Stage 2) background or pre project traffic volumes at the intersection.

The resultant background and “peak construction” traffic volumes at the intersection are summarised in **Figure 17** to **Figure 20** (2027) and **Figure 21** to **Figure 24** (2029) respectively.

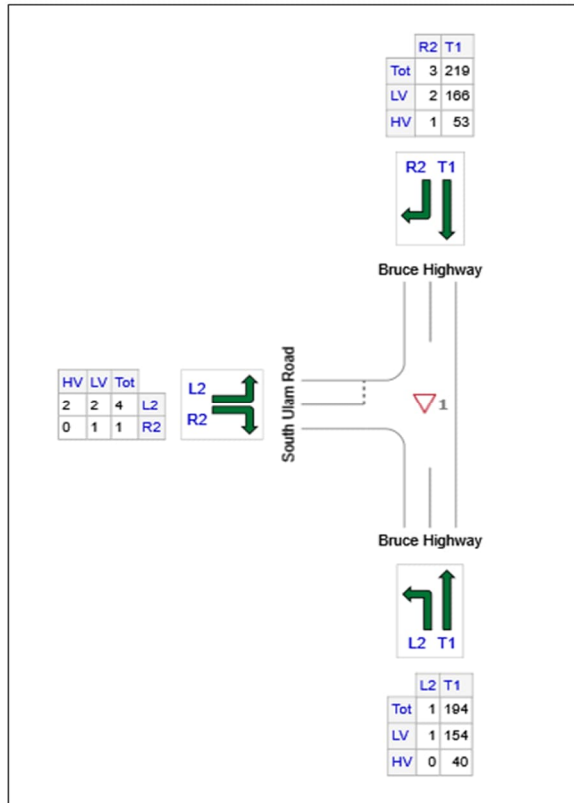


Figure 17 Bruce Highway / South Ulam Road Intersection
2027 AM Peak Background Traffic Volumes

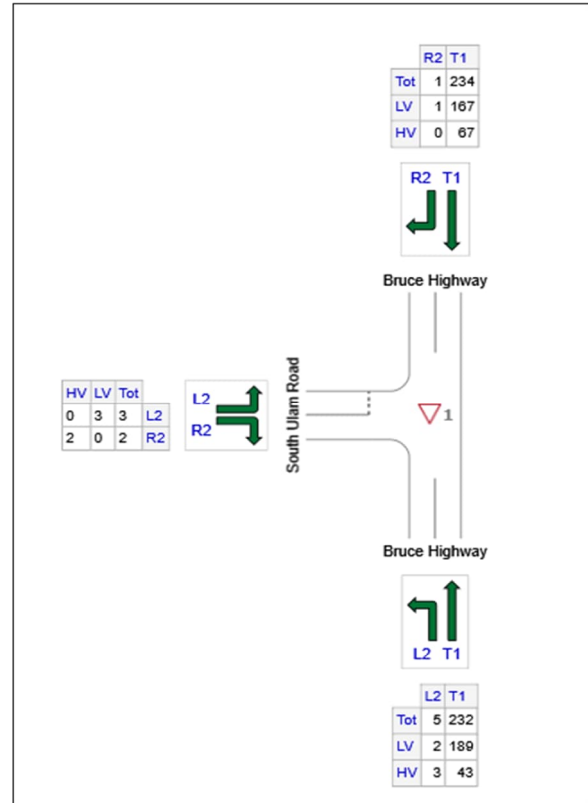


Figure 18 Bruce Highway / South Ulam Road Intersection
2027 PM Peak Background Traffic Volumes

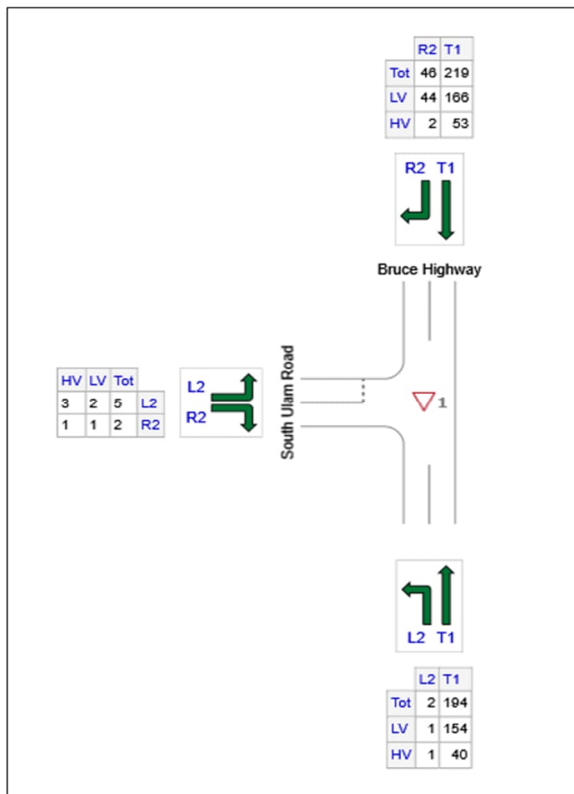


Figure 19 Bruce Highway / South Ulam Road Intersection
2027 AM Peak "Peak Construction" Volumes

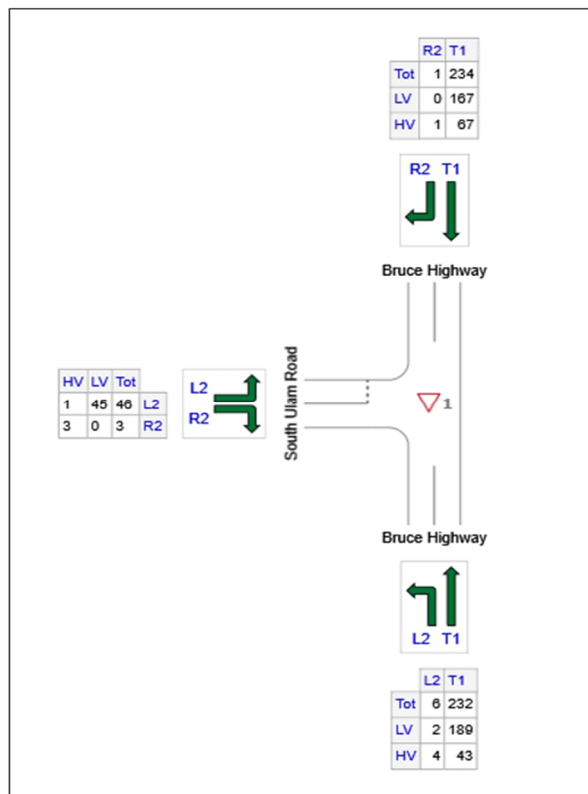


Figure 20 Bruce Highway / South Ulam Road Intersection
2027 PM Peak "Peak Construction" Volumes

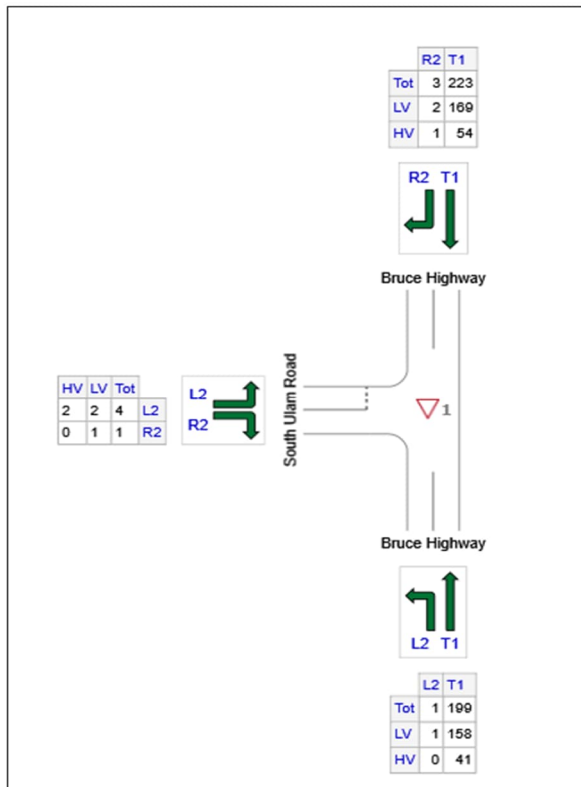


Figure 21 Bruce Highway / South Ulam Road Intersection 2029 AM Peak Background Traffic Volumes

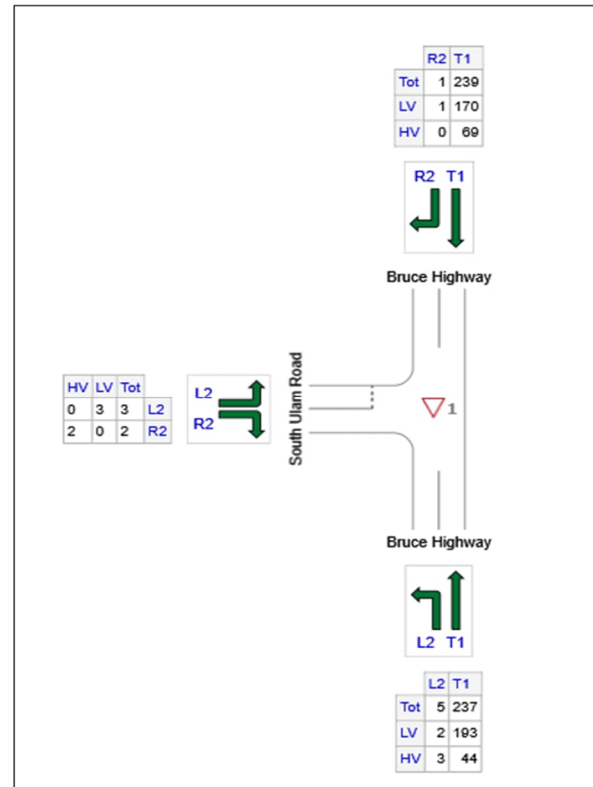


Figure 22 Bruce Highway / South Ulam Road Intersection 2029 PM Peak Background Traffic Volumes

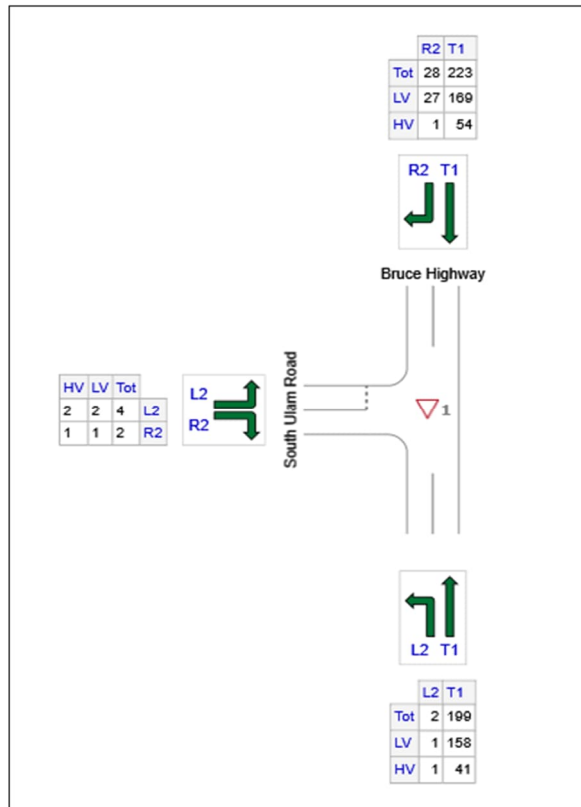


Figure 23 Bruce Highway / South Ulam Road Intersection 2029 AM Peak "Peak Construction" Volumes

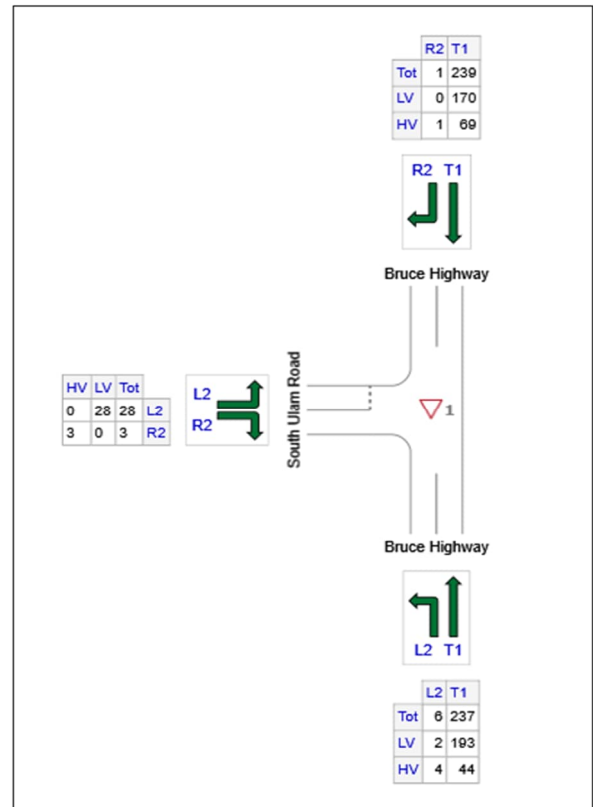


Figure 24 Bruce Highway / South Ulam Road Intersection 2029 PM Peak "Peak Construction" Volumes

5.2 Access and Frontage Impact Assessment and Mitigation

5.2.1 Critical Intersections

An assessment has been undertaken to establish the appropriate turn treatments at the identified intersection of Bruce Highway / South Ulam Road intersections based on the forecasts in construction traffic volumes for both Stage 1 and Stage 2 of the Project. This assessment is based on the turn treatment warrants identified in Figure 2.26(a) of *Austrroads Guide to Traffic Management - Part 6: Intersections, Interchanges and Crossings* for higher speed highway intersections.

The forecast turning movement volumes at the proposed intersections during the peak Stage 1 and Stage 2 construction periods identified in **Figure 19** to **Figure 20** and **Figure 23** and **Figure 24** respectively above have been used as the basis of this assessment, with the results shown in **Figure 25** (Stage 1) and **Figure 26** (Stage 2). Further details of the turn warrant assessment calculations are included for reference as **Appendix G**.

5.2.1.1 Bruce Highway / South Ulam Road

Figure 25 and **Figure 26** below demonstrate that the identified Stage 1 and Stage 2 peak construction traffic volumes require the provision of a channelised right turn (CHR) and basic left turn (BAL) treatments at the key Bruce Highway / South Ulam Road.

Therefore it can be seen that the existing configuration of the intersection which provides both a channelised right turn (CHR) and a higher order short auxiliary left turn (AULs) treatments will be more than adequate to accommodate the minor increases in peak hour volumes associated with the Stage 1 and Stage 2 construction activities for the Project.

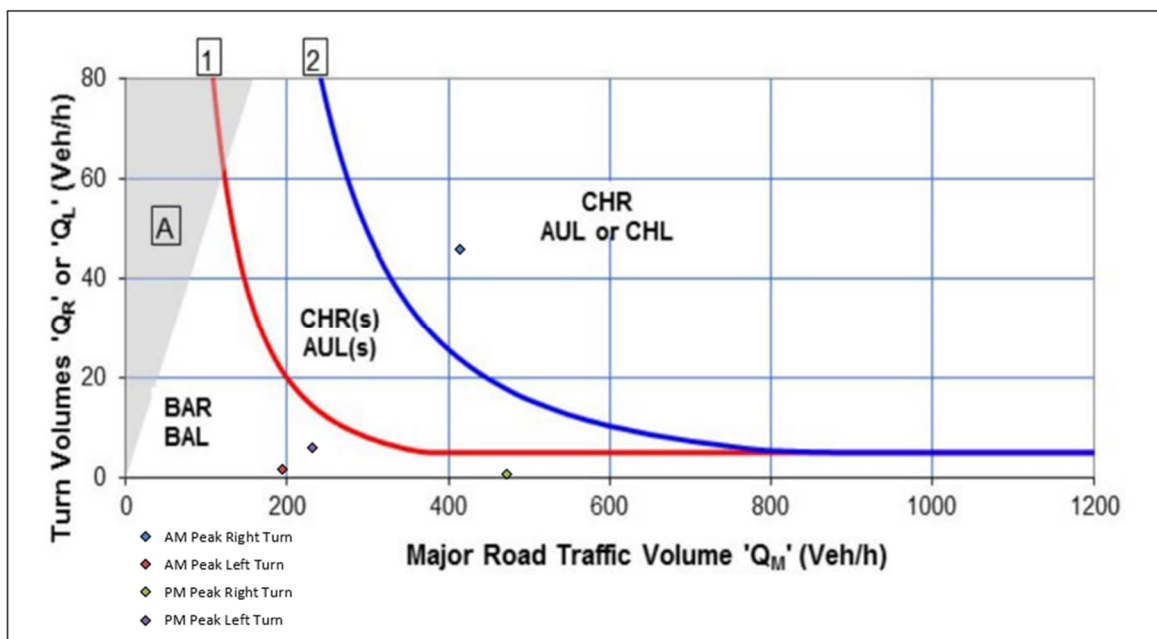


Figure 25 Bruce Highway / South Ulam Road Intersection Turn Warrants – 2027 Stage 1 "Peak Construction"

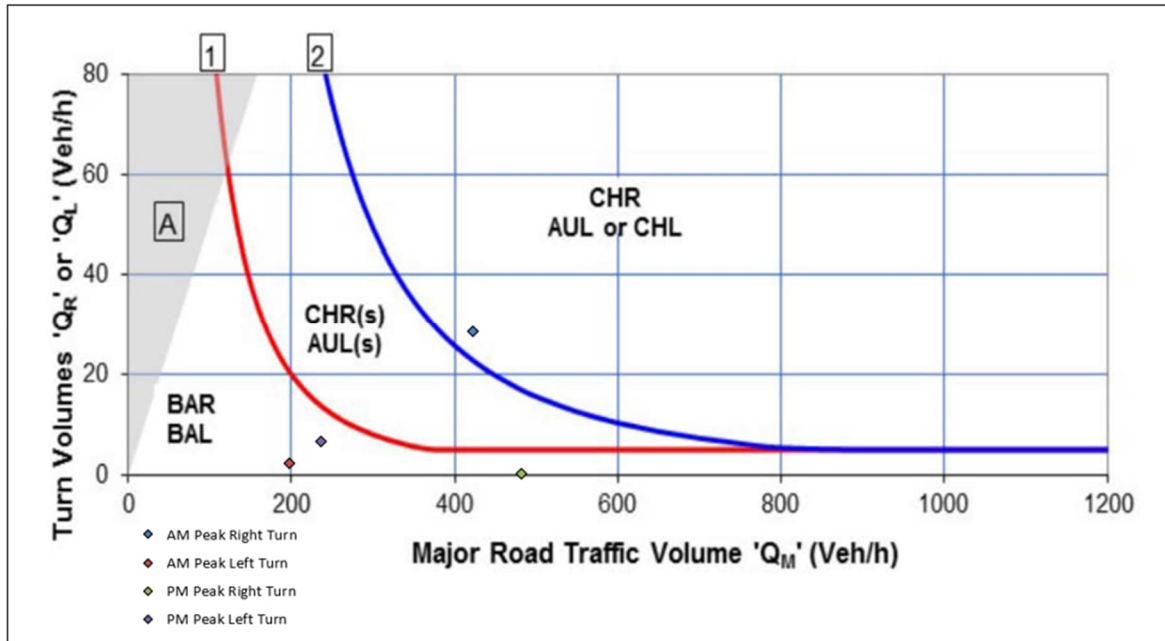


Figure 26 Bruce Highway / South Ulam Road Intersection Turn Warrants – 2029 Stage 2 "Peak Construction"

5.2.2 Site Access

Access to the Project is proposed via a new site access on the western side of South Ulam Road, approximately 16.8 km south of the Bruce Highway. As no access point currently exists at this location, it is proposed that a new site access intersection in accordance with the requirements for an access from a bitumen road (<300vpd) as per Standard Drawing CMDG-R-040 (Rural Road Access & Property Access Over Table Drains) be provided to service the expected Project traffic volumes,

Notwithstanding this, it is noted that additional hardstand areas will be required at the proposed site access location to accommodate the swept paths of the OSOM transformer transport vehicles (indicative extents shown in **Figure 27** below), with the exact extents of these additional areas to be confirmed in subsequent detailed design phases of the Project once the final configuration of the transport vehicles are confirmed.

In addition, it is recommended that advisory "truck turning" signage be installed on the approaches to the new access on South Ulam Road during the construction phase, to highlight to motorists the presence of the Project access and the potential for turning heavy vehicles to/from the site.



Figure 27 Indicative Hardstand Area at Site Access for OSOM Vehicle Swept Paths [Source: Rex J Andrews]

5.3 Road Safety Impact Assessment and Mitigation

Based on the road environments (<8,000vpd) of the relevant sections of the surrounding road network, it was determined that the completion of a lower order road safety assessment would be sufficient to establish the existing and post development road safety risks relevant to the Project, in accordance with the provisions of TMR's *Guide to Traffic Impact Assessment*.

As part of this road safety assessment a site inspection of the existing traffic conditions at the proposed site access locations and the adjacent road network was undertaken by Andrew Barrie (RPEQ / TMR Senior Road Safety Auditor). To establish the level of risk regarding the existing and expected post development road safety considerations identified, a safety risk score matrix as shown in **Figure 28** was utilised, with the results of the road safety risk assessment summarised in **Table 16**.

Figure 9.3.2(a) – Safety risk score matrix

		Potential consequence				
		Property only (1)	Minor Injury (2)	Medical treatment (3)	Hospitalisation (4)	Fatality (5)
Potential likelihood	Almost certain (5)	M	M	H	H	H
	Likely (4)	M	M	M	H	H
	Moderate (3)	L	M	M	M	H
	Unlikely (2)	L	L	M	M	M
	Rare (1)	L	L	L	M	M

L: Low risk
M: Medium risk
H: High risk

Figure 28 Adopted Risk Score Matrix

[Source: TMR GTIA]

Table 16 Project Road Safety Assessment – Mount Hopeful Battery Project

Risk Item		Existing / Pre-Development			In Construction			Mitigation Measure	In Construction with Mitigation		
		Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score		Likelihood	Consequence	Risk Score
1	Both stages of the Project are expected to lead to an increase in turning vehicle movements at the existing Bruce Highway / South Ulam Road intersection. These increases in turning vehicles has the potential to lead to an increase in vehicle conflicts at the proposed intersection location.	Unlikely	Hospitalisation	Medium	Unlikely	Hospitalisation	Medium	No mitigation works required. Detailed intersection analysis identified that existing intersection configuration (CHR / AULs) is adequate to cater for the proposed in construction traffic volumes at the intersection.	Unlikely	Hospitalisation	Medium
2	Both stages of the Project are also expected to lead to an increase in vehicle movements on relevant sections of the Gladstone Port Access Road, Gladstone-Mount Larcom Road, Bruce Highway and South Ulam Road. This increase in vehicle movements has the potential to lead to an increase in vehicle conflicts on the external road network .	Unlikely	Medical Treatment	Medium	Unlikely	Medical Treatment	Medium	No mitigation works required. In general, the forecast additional traffic volumes from Project are relatively low, with the higher volumes during the construction phase of both stages noted to only be temporary. Notwithstanding this, the road link impact assessment undertaken has identified that the current configuration of all relevant road links are expected to be adequate to cater for the temporary increase in traffic volumes on the network as a result of both Stage 1 and Stage 2 of the Project.	Unlikely	Medical Treatment	Medium
3	The Project is also expected to lead to a small number (approx. 5) of OSOM transport vehicle movements on the external road network, including Gladstone Port Access Road, Red Rover Road, Don Young Drive, Dawson Highway, Bruce Highway and South Ulam Road. This increase in large OSOM vehicles has the potential to impact the operation of the external road network.	Unlikely	Medical Treatment	Medium	Moderate	Medical Treatment	Medium	All large OSOM transport vehicle movements to be undertaken under relevant permits, and under escort where required. Furthermore, OSOM movements are to be undertaken in accordance with the procedural requirements as identified in a relevant Traffic Management Plan to be prepared for the OSOM transport operations for the Project.	Unlikely	Medical Treatment	Medium

5.4 Intersection Impact Assessment and Mitigation

SIDRA analysis was undertaken to establish the operational performance of the key Bruce Highway / South Ulam Road intersection, with this analysis considering the 2027 (Stage 1) and 2029 (Stage 2) AM and PM peak periods during the identified peak construction period for the Project.

A summary of the results of the completed intersection analysis is provided in **Table 17** and **Table 18** below, with detailed SIDRA output summaries included for reference in **Appendix D**.

Table 17 Stage 1 (Peak Construction) SIDRA Results – Bruce Highway / South Ulam Road Intersection

Analysis Scenario	Intersection Degree of Saturation	Level of Service**	Intersection Average Delay (sec)	Maximum 95% Back of Queue Length (m)
Bruce Highway / South Ulam Road				
2027 Background AM Peak	0.135	LOS A	0.2	0.2
2027 Background PM Peak	0.148	LOS B	0.2	0.4
2027 "Peak Construction" AM Peak	0.135	LOS A	0.8	1.2
2027 "Peak Construction" PM Peak	0.148	LOS B	0.8	1.6

** LOS value identified is for worst movement at the intersection, not the overall intersection.

Table 18 Stage 2 (Peak Construction) SIDRA Results – Bruce Highway / South Ulam Road Intersection

Analysis Scenario	Intersection Degree of Saturation	Level of Service**	Intersection Average Delay (sec)	Maximum 95% Back of Queue Length (m)
Bruce Highway / South Ulam Road				
2029 Background AM Peak	0.138	LOS A	0.2	0.2
2029 Background PM Peak	0.152	LOS B	0.2	0.4
2029 "Peak Construction" AM Peak	0.138	LOS A	0.6	0.7
2029 "Peak Construction" PM Peak	0.152	LOS B	0.6	1.1

** LOS value identified is for worst movement at the intersection, not the overall intersection.

The results above indicate that the existing configuration (CHR/AULs) of the Bruce Highway / South Ulam Road intersections are expected to operate satisfactorily during both the Stage 1 and Stage 2 peak construction phase traffic scenarios identified of the Project, with all values for DOS, LOS, average delay and vehicle queue length being within acceptable limits of operation for priority-controlled intersections.

As such, it can be concluded that the existing configuration of the Bruce Highway / South Ulam Road can be considered appropriate to cater for the additional traffic volumes generated by the peak construction phase of both Stage 1 and Stage 2 of the proposed Project.

5.5 Road Link Capacity Assessment and Mitigation

A summary of the assessment of the percentage increase in daily traffic volumes on the road network as a result of the critical construction phase traffic from both Stage 1 and Stage 2 of the Project is shown in **Table 19** and **Table 20**, with further details of the calculations undertaken provided in **Appendix F**.

As can be seen by the results, the addition of the forecast construction phase traffic volumes from Stage 1 and Stage 2 of the Project is shown to have a minimal impact on all identified sections of the state-controlled road network, with all increases shown to be well below the standard 5% increase trigger.

In regard to the local government controlled links, the results in **Table 19** and **Table 20** identified significant (>5%) increases in traffic volumes for the relevant lengths of RRC controlled South Ulam Road as part of the Stage 1 and Stage 2 construction works.

Notwithstanding this, the primary reason for the large percentage increases identified on these roads is the relatively low background traffic volume on this link (approx. 202vpd (2027 – Stage 1) and 206vpd (2029 – Stage 2)), with the expected maximum increase in traffic volumes on South Ulam Road during the peak construction phase of the Project in the range of 106vpd (53vpd inbound / 53vpd outbound) for Stage 1 and 64vpd (32vpd inbound / 32vpd outbound) for Stage 2.

Further to this, it is noted that these identified peak increases in Project traffic volumes are only anticipated to be generated for a short period, in the order nine (9) months for Stage 1 and six (6) months for Stage 2, with reduced volumes anticipated from the Project for the remainder of the overall construction period.

Looking closer at the “impacted” sections of local government controlled road network, the total peak “peak construction” volumes on South Ulam Road will be in the order of 306vpd (Stage 1) and 270vpd (Stage 2). Based on these forecast volumes and the temporary nature of the increases in traffic volumes due to the Stage 1 and Stage 2 construction works, it is expected that the existing configuration of South Ulam Road will be adequate to cater for the temporary increases in Project traffic.

Finally, while no percentage increases have been calculated, it is also noted that the limited OSOM transport movements for the Project will also lead to a negligible increase (approx. 1vpd) on the GRC controlled road links of Red Rover Road and Don Young Drive (GRC).

Based on the current configurations of these links, and the fact that the increase in traffic volumes on the links will be limited to the 5 OSOM transport movements travelling under escort, it is anticipated that in general the current configuration and capacity of the these links will be more than suitable to cater for the temporary increase in Project traffic (assuming the mitigation works identified in the Preliminary Transport Route Assessment are undertaken – refer **Appendix A**).

Table 19 Road Link Daily Traffic Volume Comparison (Stage 1 Peak Construction)

Site ID	Road Segment		Background Daily Volumes			Stage 1 Peak Construction Traffic (Daily)			% Increase in Daily Volumes		
	Start (km)	End (km)	2027			Gaz	A-Gaz	Bi-Dir	2027		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Gladstone Port Access Road (183)											
61605	0.000	0.858	989	922	1,911	7	7	14	0.71%	0.76%	0.73%
Gladstone – Mount Larcom Road (181)											
160360	0.000	0.175	5,879	6,190	12,069	0	0	0	0.00%	0.00%	0.00%
160361	0.175	0.675	5,532	6,288	11,820	7	7	14	0.13%	0.11%	0.12%
60071	0.675	1.409	4,058	3,719	7,777	7	7	14	0.17%	0.19%	0.18%
60073	1.409	3.258	3,889	3,805	7,694	7	7	14	0.18%	0.18%	0.18%
61052	3.258	3.830	4,356	5,353	9,709	7	7	14	0.16%	0.13%	0.14%
	3.830	4.625	4,356	5,353	9,709	6	6	12	0.14%	0.11%	0.12%
60074	4.625	12.292	3,337	3,361	6,698	6	6	12	0.18%	0.18%	0.18%
60076	12.292	32.140	1,825	1,829	3,655	6	6	12	0.33%	0.33%	0.33%
Red Rover Road (GRC)											

Site ID	Road Segment		Background Daily Volumes			Stage 1 Peak Construction Traffic (Daily)			% Increase in Daily Volumes		
	Start (km)	End (km)	2027			Gaz	A-Gaz	Bi-Dir	2027		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
GRC	0.000	3.390	-	-	-	1	0	1	-	-	-
Don Young Drive (GRC)											
GRC	0.000	2.280	-	-	-	1	0	1	-	-	-
Dawson Highway (46A Gladstone – Biloela)											
60065	7.150	19.305	3,991	3,808	7,798	1	0	1	0.03%	0.00%	0.01%
Bruce Highway (10E Benaraby – Rockhampton)											
60006	11.445	45.420	2,262	2,197	4,459	1	0	1	0.04%	0.00%	0.02%
60023	45.420	85.308	3,273	3,309	6,582	7	7	14	0.21%	0.21%	0.21%
160954	85.308	86.183	3,461	3,237	6,698	7	7	14	0.21%	0.21%	0.21%
	86.183	87.080	3,461	3,237	6,698	7	7	14	0.20%	0.22%	0.21%
61551	87.080	107.400	3,816	3,795	7,611	46	46	92	1.33%	1.42%	1.37%
	107.400	108.938	3,816	3,795	7,611	46	46	92	1.21%	1.21%	1.21%
60130	108.938	114.388	3,007	2,769	5,776	46	46	92	1.53%	1.66%	1.59%
60024	114.388	116.961	6,084	5,832	11,917	46	46	92	0.76%	0.79%	0.77%
South Ulam Road (RRC)											
RRC	0.000	16.773	92	111	202	53	53	106	57.9%	47.89%	52.42%

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

Table 20 Road Link Daily Traffic Volume Comparison (Stage 2 Peak Construction)

Site ID	Road Segment		Background Daily Volumes			Stage 2 Peak Construction Traffic (Daily)			% Increase in Daily Volumes		
	Start (km)	End (km)	2029			Gaz	A-Gaz	Bi-Dir	2029		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
Gladstone Port Access Road (183)											
61605	0.000	0.858	1,008	941	1,949	3	3	6	0.30%	0.32%	0.31%
Gladstone – Mount Larcom Road (181)											
160360	0.000	0.175	5,998	6,314	12,312	0	0	0	0.00%	0.00%	0.00%
160361	0.175	0.675	5,643	6,415	12,058	3	3	6	0.05%	0.05%	0.05%
60071	0.675	1.409	4,140	3,794	7,934	3	3	6	0.07%	0.08%	0.08%
60073	1.409	3.258	3,967	3,882	7,849	3	3	6	0.08%	0.08%	0.08%
61052	3.258	3.830	4,444	5,460	9,904	3	3	6	0.07%	0.05%	0.06%
	3.830	4.625	4,444	5,460	9,904	3	3	6	0.07%	0.05%	0.06%
60074	4.625	12.292	3,404	3,429	6,833	3	3	6	0.09%	0.09%	0.09%

Site ID	Road Segment		Background Daily Volumes			Stage 2 Peak Construction Traffic (Daily)			% Increase in Daily Volumes		
	Start (km)	End (km)	2029			Gaz	A-Gaz	Bi-Dir	2029		
			Gaz	A-Gaz	Bi-Dir				Gaz	A-Gaz	Bi-Dir
60076	12.292	32.140	1,862	1,866	3,728	3	3	6	0.16%	0.16%	0.16%
Red Rover Road (GRC)											
GRC	0.000	3.390	-	-	-	0	0	0	-	-	-
Don Young Drive (GRC)											
GRC	0.000	2.280	-	-	-	0	0	0	-	-	-
Dawson Highway (46A Gladstone – Biloela)											
60065	7.150	19.305	4,071	3,884	7,955	0	0	0	0.00%	0.00%	0.00%
Bruce Highway (10E Benaraby – Rockhampton)											
60006	11.445	45.420	2,308	2,241	4,549	0	0	0	0.00%	0.00%	0.00%
60023	45.420	75.469	3,357	3,393	6,750	3	3	6	0.09%	0.09%	0.09%
	75.469	85.308	3,357	3,393	6,750	4	4	8	0.12%	0.12%	0.12%
160954	85.308	86.183	3,531	3,302	6,833	4	4	8	0.11%	0.12%	0.12%
	86.183	87.080	3,531	3,302	6,833	28	28	56	0.79%	0.85%	0.82%
61551	87.080	108.938	3,935	3,914	7,849	28	28	56	0.71%	0.72%	0.71%
60130	108.938	114.388	3,067	2,825	5,892	28	28	56	0.91%	0.99%	0.95%
60024	114.388	116.961	6,356	6,093	12,449	28	28	56	0.44%	0.46%	0.45%
South Ulam Road (RRC)											
RRC	0.000	16.773	93	113	206	32	32	64	34.27%	28.34%	31.03%

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

5.6 Pavement Impact Assessment and Mitigation

5.6.1 Construction Phase

The assessment of the potential pavement impact of the Project's construction traffic consists of a comparison of the overall pavement loading (in Equivalent Standard Axles) during the background traffic volumes on the network and those during the identified peak construction periods for the Project, most notably from the associated heavy vehicle movements during these periods.

The pavement loading (in ESAs/SAR₄) for the background traffic within the expected periods was calculated based on the identified heavy vehicle percentages for the relevant sections of the network, adopting the following assumptions:

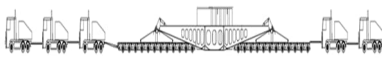
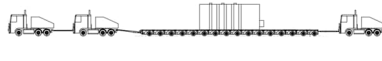
- The percentage of heavy vehicles identified in the available traffic data utilised for the assessment will be maintained for future years, with the overall background traffic numbers assumed to increase each year by the identified 10-year growth rates for each road link as per **Table 1** above.
- The impact of light vehicles can be ignored as the contribution to pavement loading is negligible in comparison to heavy vehicles.

- The adopted values for the Equivalent Standard Axles per Heavy Vehicle (ESAs/HV) for each relevant road link are in accordance with the standard values identified by TMR, being 2.9 ESAs/HV for the Bruce Highway and 3.2 ESAs/HV for all other road links.
- The background period of the assessment for the construction phase is the proposed duration of construction for the overall Project (37 months (not including Project float) or 1,125 days).

The pavement loading generated by the Project construction traffic was then calculated based on the estimated number of heavy vehicle movements during construction and the average loaded and unloaded ESAs/HV values for each vehicle configuration.

It is noted that indicative loading values for the OSOM transformer and switch room movements have been adopted based on calculated values from similar component movements from previous battery projects, noting that the transformer and switch room loading information below will need to be reassessed in subsequent stages of the Project when the transport vehicle configurations have been confirmed. Notwithstanding this, the identified vehicle loadings in **Table 21** are considered adequate to complete the pavement assessment for the Project.

Table 21 Assumed Vehicle Class and ESA/HV Values

Vehicle Class	Vehicle Configuration	Task	Average Loaded ESAs / HV	Average Unloaded ESAs / HV
4 Axle Rigid		Concrete transport. Site water transport. General site deliveries.	4.13	0.36
6 Axle Semi-trailer (GML)		General material and equipment transport / fuel transport / waste collection	5.54	1.68
Truck and 4 Axle Dog (GML)		Gravel material transport	6.15	1.64
3x Prime mover with 12x8 12x8 beamset trailer and 2 x Prime mover		200T transformer transport (Option 1)	70.21	26.57
2x Prime mover with 16x8 platform trailer and 1 x Prime mover		200T transformer transport (Option 2)	72.65	14.55
Prime mover with 10x8 platform trailer		Site switch room transport	6.46	4.79

A summary of the comparison of the background and Project generated pavement loadings is provided in **Table 22** overpage, with further details of the Project pavement loading calculations undertaken included for reference in **Appendix H**.



Table 22 Project Pavement Loading Comparison

Site ID	Road Segment		Background ESA			Project Generated ESA			% Increase in ESAs		
	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Gladstone Port Access Road (183)											
61605	0.000	0.858	1,126,675	1,391,584	2,518,259	1,721	5,611	7,332	0.15%	0.40%	0.29%
Gladstone-Mount Larcom Road (181)											
160360	0.000	0.175	1,855,321	1,898,003	3,753,324	0	0	0	0.00%	0.00%	0.00%
160361	0.175	0.675	2,881,792	3,840,939	6,722,731	5,611	1,721	7,332	0.19%	0.04%	0.11%
60071	0.675	1.409	1,992,627	2,296,835	4,289,462	5,611	1,721	7,332	0.28%	0.07%	0.17%
60073	1.409	3.258	2,092,376	1,673,075	3,765,452	5,611	1,721	7,332	0.27%	0.10%	0.19%
61052	3.258	3.830	2,472,690	3,775,328	6,248,018	5,611	1,721	7,332	0.23%	0.05%	0.12%
	3.830	4.625	2,472,690	3,775,328	6,248,018	5,451	1,653	7,104	0.22%	0.04%	0.11%
60074	4.625	12.292	2,281,122	2,488,040	4,769,162	5,451	1,653	7,104	0.24%	0.07%	0.15%
60076	12.292	32.140	1,545,033	1,838,177	3,383,210	5,451	1,653	7,104	0.35%	0.09%	0.21%
Red Rover Road (GRC)											
GRC	0.000	3.390	-	-	-	160	68	227	-	-	-
Don Young Drive (GRC)											
GRC	0.000	2.280	-	-	-	160	68	227	-	-	-
Dawson Highway (46A Gladstone – Biloela)											
60065	7.150	19.305	2,464,567	1,849,128	2,464,567	160	68	227	0.01%	0.00%	0.01%
Bruce Highway (10E Benaraby – Rockhampton)											
60006	11.445	45.420	1,901,408	2,532,018	4,433,426	160	68	227	0.01%	0.00%	0.01%
60023	45.420	75.469	3,293,262	2,911,221	6,204,483	5,611	1,721	7,332	0.17%	0.06%	0.12%
	75.469	85.308	3,293,262	2,911,221	6,204,483	13,594	3,849	17,443	0.41%	0.13%	0.28%
160954	85.308	86.183	3,178,497	2,967,801	6,146,298	13,594	3,849	17,443	0.43%	0.13%	0.28%



Site ID	Road Segment		Background ESA			Project Generated ESA			% Increase in ESAs		
	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
	86.183	87.080	3,178,497	2,967,801	6,146,298	1,681	5,958	7,638	0.05%	0.20%	0.12%
61551	87.080	108.938	3,795,458	3,271,572	7,067,030	1,681	5,958	7,638	0.04%	0.18%	0.11%
60130	108.938	114.388	2,666,237	3,041,786	5,708,023	1,681	5,958	7,638	0.06%	0.20%	0.13%
60024	114.388	116.961	2,918,141	3,193,906	6,112,047	1,681	5,958	7,638	0.06%	0.19%	0.12%
South Ulam Road (RRC)											
RRC	0.000	16.773	141,283	141,283	282,566	19,551	5,530	25,082	13.84%	3.91%	8.88%

TMR Chainage 0.175km (181) – Intersection of Gladstone-Mount Larcom Road / Gladstone Port Access Road | TMR Chainage 0.919km (181) – Intersection of Gladstone-Mount Larcom Road / Lord Street | TMR Chainage 3.830km (181) – Intersection of Gladstone-Mount Larcom Road / Red Rover Road | TMR Chainage 7.150km (46A) – Intersection of Dawson Highway / Don Young Drive | TMR Chainage 19.305km (46A) – Intersection of Dawson Highway / Bruce Highway | TMR Chainage 45.420km (10E) – Intersection of Bruce Highway / Gladstone-Mount Larcom Road | TMR Chainage 75.469km (10E) – Intersection of Bruce Highway / Bills Road | TMR Chainage 86.183km (10E) – Intersection of Bruce Highway / South Ulam Road

The results in **Table 22** indicate that the heavy vehicle movements associated with the construction phase of Stage 1 and Stage 2 of the Project are expected to lead to negligible increases in pavement loadings on all of the identified sections of the state-controlled road network, with calculated values of loading increase well below the typical 5% increase trigger threshold.

In addition to the state-controlled road network, the results indicated that the additional heavy vehicle movements from the Stage 1 and Stage 2 construction works was anticipated to lead to a significant (>5%) increase in pavement loadings on the RRC controlled road link of South Ulam Road.

Further to this, while no percentage increase could be established due to the lack of current traffic data for the identified GRC controlled Red Rover Road and Don Young Drive it is anticipated that the limited use of these local roads for small number (approx. 5) OSOM movements for the transformer (x2) and switchroom (x3) component transport operations for the Project will have a negligible increase in pavement loadings on these road links.

Based on this, it is recommended that the proponent enter into an Infrastructure Agreement with RRC regarding the required mitigation works on South Ulam Road to offset the calculated pavement impacts of the Project.

It also recommended that this infrastructure agreement include a reference to the requirement for pre and post dilapidation inspections to be undertaken on the relevant sections of South Ulam Road (RRC) by representatives of the proponent and the appropriate Council (RRC / GRC). These inspections are required to identify and document the current condition of the roads (pre construction) and establish the required maintenance and/or rehabilitation works (to be completed by the proponent at no cost to Council) deemed necessary to reinstate the roads to their documented condition prior to the introduction of Project traffic (post construction).

5.6.2 Operations Phase

As identified above, it is understood that the operations phase of the Project will only generate relatively low traffic volumes on the network (up to 10 light vehicles to/from site daily), with negligible heavy vehicle movements (approximately 1 HV per week) associated with maintenance activities, routine removal of waste or deliveries to the site operations facility.

Therefore, it can be considered that this phase of the Project will have a negligible impact to the operation (and pavement loadings) of all relevant road links.

5.7 Transport Infrastructure Impact Assessment and Mitigation

5.7.1 Bridge Structures

As identified above, the OSOM transformer vehicle configurations identified in the route assessment will need to be provided to TMR to enable the assessment of the relevant bridge and major culvert structures along the identified transport routes to be undertaken.

Notwithstanding this, it is expected that suitable transport vehicle configurations for the transformer components can be made to enable the vehicles to meet any identified loading parameters of these relevant bridge structures along the identified OSOM transport route for the Project.

6.0 Conclusions and Recommendations

6.1 Summary of Impacts and Mitigation Measures Proposed

6.1.1 Traffic Impacts

Based on the identified increase in traffic numbers anticipated as a result of the construction (Stage 1 and Stage 2) and operations phases of the proposed Project, it is anticipated that the Project will have a minimal impact on the traffic operation of the surrounding road network, from a capacity perspective.

Notwithstanding this, the following mitigation treatments are recommended to maximise vehicle safety on the sections of the road network utilised by Project traffic:

- Completion of minor works along the identified transport route to accommodate the swept paths of the OSOM transformer transport vehicles, as identified in the Preliminary Transport Route Assessment for the Project (refer **Appendix A**). It is noted that the exact extents and scope of these works will be determined in subsequent detailed design phases of the Project once the transformer transport vehicle configurations are confirmed.
- Construct new site access from South Ulam Road (LHS approx. Ch. 16.800km) to cater for Project volumes. The new site access is to be provided in accordance with the requirements for a bitumen road (<300vpd) as per Standard Drawing CMDG-R-040 (Rural Road Access and Property Access Over Table Drains), noting that additional hardstand area will be required at the proposed site access location to accommodate the swept paths of the OSOM transformer transport vehicles, with the exact extents of these additional areas to be confirmed in subsequent detailed design phases of the Project once the final configuration of the transport vehicles are confirmed.
- Installation of advisory “truck turning” signage be installed on the approaches to the proposed new site access on South Ulam Road during the construction phase, to highlight to motorists the presence of the Project access locations and the potential for turning vehicles to/from the side roads.

6.1.2 Pavement Impacts

In addition to the traffic assessments completed, a preliminary desktop pavement impact assessment of the relevant road network was also undertaken for the construction phase of the Project. The results of the assessment indicate that the heavy vehicle movements associated with Stages 1 and 2 of the Project are expected to lead to negligible increases in pavement loadings on all identified sections of the state-controlled road network, with calculated values of loading increase generally below the typical 5% increase trigger threshold.

The results also indicated that the additional heavy vehicle movements from the Stage 1 and Stage 2 construction works was anticipated to lead to a significant (>5%) increase in pavement loadings on the RRC controlled road link of South Ulam Road.

Further to this, while no percentage increase could be established due to the lack of current traffic data for the identified GRC controlled Red Rover Road and Don Young Drive it is anticipated that the limited use of these local roads for small number (approx. 5) OSOM movements for the transformer (x2) and switchroom (x3) component transport operations for the Project will have a negligible increase in pavement loadings on these road links.

Based on this, it is recommended that the proponent enter into an Infrastructure Agreement with RRC regarding the required mitigation works on South Ulam Road to offset the calculated pavement impacts of the Project. It also recommended that this infrastructure agreement include a reference to the requirement for pre and post dilapidation inspections to be undertaken on the relevant sections of South Ulam Road (RRC) by representatives of the proponent and the Council (RRC). These inspections are required to identify

and document the current condition of the roads (pre construction) and establish the required maintenance and/or rehabilitation works (to be completed by the proponent at no cost to Council) deemed necessary to reinstate the roads to their documented condition prior to the introduction of Project traffic (post construction).

6.1.3 Recommendations

In light of the information provided above, it can be considered that conditional to the provision of the identified upgrade works and the proponent entering into a suitable infrastructure agreement with RRC to mitigate the construction phase pavement impacts to South Ulam Road, that the construction (Stage 1 and Stage 2) and operations phases of the proposed Mount Hopeful Battery Project will have minimal impact on the relevant sections of the local government and state controlled road networks.

6.2 Certification Statement and Authorisation

A copy of the RPEQ certification and authorisation statement covering this assessment of the proposed Mount Hopeful Battery Project is included for reference as **Appendix I**.



Appendix A – Preliminary OSOM Transport Route Assessment



MT HOPEFUL BESS

AUGUST 7, 2025

CLIENT: NEOEN

PORT: GLADSTONE

REVISION: REV01

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1.0 Version History

Rev	Date	Change	Responsible	Approved
00	26/06/25	Report compiled	E Novak	✓
00	29/06/25	Report completed	W Andrews	✓
01	08/08/25	Client updates	W Andrews	✓

2.0 Introduction

Rex J Andrews Engineered Transportation have been engaged by NEOEN to undertake a route study for the proposed Mt Hopeful BESS Project in Queensland, Australia.

The Mount Hopeful BESS is a large-scale battery project proposed in Central Queensland, within the Rockhampton and Banana Shire areas.

The final project capacity is expected to be around 600MW.

The study is based on a desktop survey as well as utilising observations and previous experience on sections of the routes to outline the proposed transport of Battery Energy Storage System (BESS) equipment from the port of Gladstone to the Mt Hopeful Windfarm Project.

Should the project proceed a detailed transport study will be required to confirm the route is suitable and quantify the modifications required, in particular the suitability of South Ulam Road.

3.0 Project Data

Date of Latest Route Assessment: 26/06/2025
Survey Undertaken By. (Rex J Andrews P/L)
Project Name. Mt Hopeful Windfarm BESS
Location. Gladstone Port (QLD) to Bajool (QLD)

Transport of a transformer 11000l*4200b*4500h and 200T.

2 different transport methods
1 x 12x8-12x8 Beamset
1 x 16x8 Platform Trailer

Switch room 18100l x 4150b x 3550h and mass 48 T

1 x 10x8 Platform Trailer

4.0 Port of Import - Auckland Point, Gladstone

The BESS equipment is to be imported from various countries and arriving on ships into the Port of Gladstone. The ideal berth for these shipments is the Auckland point berth.

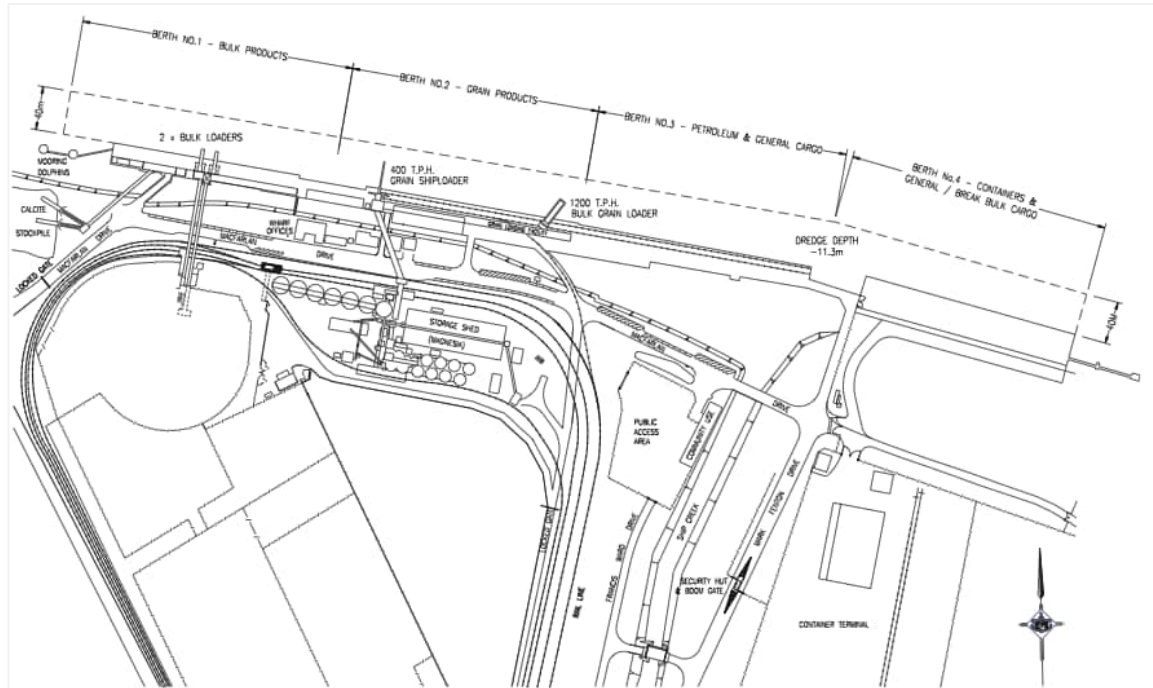


Figure 1 – Auckland Point berths

AUCKLAND POINT BERTH No. 4 DETAILS

Owner	Gladstone Ports Corporation
Operated by	Multi-User
Type of facility	Multi-user wharf designed to handle containerised, breakbulk and general cargoes and heavy lift
Access	By road and rail
Working hours	24/7
Location	Berth 4 is located at the Port Central Precinct before entrance to Auckland Inlet and adjacent to Auckland Hill, 32km from the Fairway Buoy.
Wharf length	220m
Wharf Deck	Reinforced concrete supported on steel piles
Maximum Deck load	5 tonnes per square meter
Design vessel size	70,000 DWT (max), Panamax Class Bulk Carrier and Container Class 10,000 DWT (min)
Max vessel length	255m LOA
Max berthing displacement	85,000 Tonnes (max)
Berth pocket width	40m
Berth pocket length	300m
Berth pocket depth	11.4m (Design), 12.6m declared*
Uniformly Distributed Loads	Wharf deck uniformly distributed load (UDL) of 50kPa Relieving slab (UDL) of 20kPa to 15m landward. Heavy transport access path relieving slabs to 50kPa UDL
Uniformly Distributed Loads	12.5t maximum wheel load
Heavy Lift vehicle	Mega lift truck equivalent load 38kPa
Mobile crane	50t mobile crane outrigger load to 45 tonnes at 5 metres c/c
Wharf Crane	40 tonnes wheel load, 6 wheel per corner
Mobile Harbour Crane	Crane pads manufactured to suit 50kPa deck loading. There are 2 permanent mobile harbour cranes at the Auckland Point 4 berth. 1 x Aurizon LHM550 150T mobile harbour crane 1 x NSS LHM550 150T mobile harbour crane
Vehicle loading	Semi-trailer T44 to AUSTRROADS 1992, B-Double Truck

5.0 Site Location

The project is located near the town of Bajool and lies approximately:

- 45km south of Rockhampton
- 60km west of Gladstone

The project site is in the municipal boundary of Rockhampton.

Entry to the project is from the East via Bajool.



Figure 2 - Site Location

6.0 Transport Summary

The study is based on all components entering Australia via the Port of Gladstone's Auckland Point Berth. The components would be stored on the berth or delivered directly to site.

The below routes have been selected as most likely routes based on previous experience gaining approval to transport similar weight loads from Gladstone Port through to the Bruce Highway.

The study considered the alternate route via Hanson Road and Mt Larcom Road however this route has been rejected on numerous occasions previously with lighter mass loads and was therefore not considered.

The selected routes have previously been used for transporting transformers with weights of up to 230t.

ROUTE 1: GLADSTONE PORT TO MT HOPEFUL BESS

Components: Loads up to 5.1m high. Transformer in Beamset & Switch Room on Platform Trailer.

From: Port of Gladstone Berth No.4

To: Bajool (Mt Hopeful BESS), QLD

Distance: 115.0 kilometres

Route: MacFarlane Road, John Bates Drive, Port Access Road, Glenlyon Street, Hanson Road, Red Rover Road, Don Young Drive, Dawson Highway, Bruce Highway, South Ulam Road.

GPS Link for route: <https://maps.app.goo.gl/nsMq4MHPTLWh8fCw7>

ROUTE 2A: GLADSTONE PORT TO FLINDERS PARADE

Components: Loads over 5.1 metres in overall height. (Max height 6.2m).

Transformer on 16x8 Platform Trailer

From: Port of Gladstone Berth No.4

To: Flinders Parade Gladstone

Distance: 1.3 kilometres

Route: Macfarlane Road, Flinders Parade.

GPS Link for route: <https://maps.app.goo.gl/iidfzS37CtDDopWJA>

ROUTE 2B: FLINDERS PARADE TO MT HOPEFUL BESS

Components: Loads over 5.1 metres in overall height (Max height 6.2m).

Transformer on 16x8 Platform Trailer

From: Flinders Parade Gladstone

To: Bajool (Mt Hopeful BESS), QLD

Distance: 113.0 kilometres

Route: Flinders Parade, Goondoon Street, Lord Street, Hanson Road, Red Rover Road, Don Young Drive, Dawson Highway, Bruce Highway, South Ulam Road.

GPS Link for route: <https://maps.app.goo.gl/FaLX3Kon8CG4AMAJ7>

7.0 Route 1 - Study

ROUTE 1: GLADSTONE PORT TO MT HOPEFUL BESS

Components: Loads up to 5.1m high. transformer in Beamset & Switch Room on Platform Trailer

From: Port of Gladstone Berth No.4

To: Bajool (Mt Hopeful BESS), QLD

Distance: 115.0 kilometres

Route: John Bates Drive, Port Access Road, Glenlyon Street, Hanson Road, Red Rover Road, Dawson Highway, Bruce Highway, South Ulam Road.

GPS Link for route: <https://maps.app.goo.gl/nsMq4MHPTLWh8fCw7>

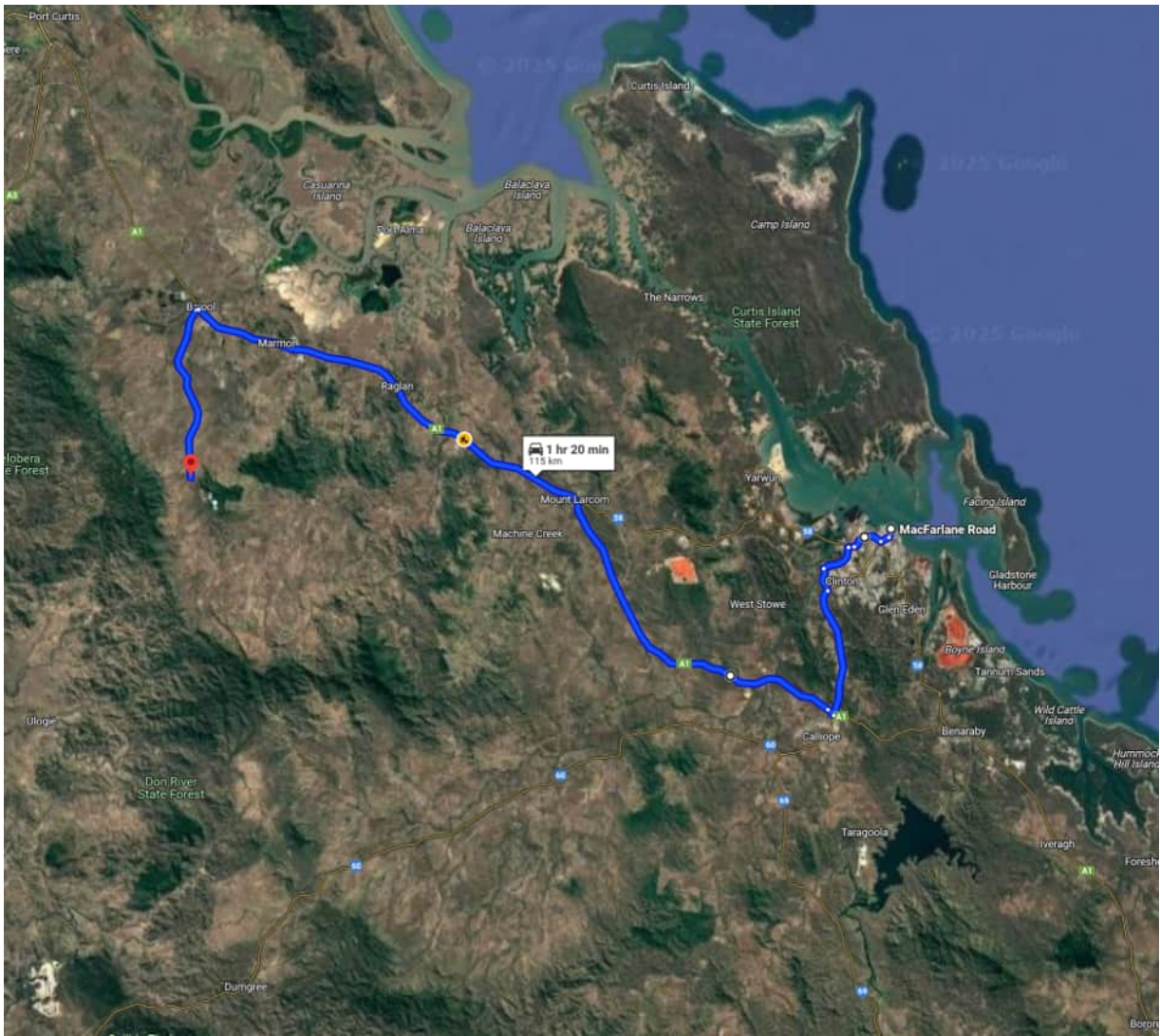


Figure 3 - Route 1

KEY	
CAUTION	
ROAD MODIFICATIONS REQUIRED	

KM index	Location	Section of road	Existing Measurement	Procedure	Notes
0.0	Gladstone	Mac Farlane Road onto John Bates Drive. GPS Link: https://maps.app.goo.gl/9GWnR6n1YvJH7XCr7	Width: 12.0m Length: 80.0m	Exit port and turn right via bypass on inside of corner	Security required to open gates and exit Port. Loads to use bypass on inside of corner installed for previous projects.
0.9	Gladstone	John Bates Drive onto Port Access Road GPS Link: https://qoo.gl/maps/yesGGkaeMqLStLqB7	Width: 13.0m into 9.0m Length: 50.0m	Loads to travel to the left onto a temporary hardstand prior to the roundabout.	Modifications required: Corner has been modified for Clarke Creek windfarm. Signs to be removed and replaced and loads to travel over island.
1.6	Gladstone	Port access road under Goondoon Street GPS Link: https://qoo.gl/maps/DAGZw69gAQhU7hdQ9	Width: 7.0m Height: L: 5.402m C: 5.32m R: 5.175m	Loads are to travel under this structure in the far-left lane. Loads that exceed 5.1 metres are not to travel under this structure and must use routes 2A&B.	Modifications required: This blade will need to be checked for clearance while passing under this structure.
1.8	Gladstone	Port Access Road onto Glenlyon Street GPS Link: https://qoo.gl/maps/7apkuHTU4xtRsrAn9	Width: 10.0m into 11.0m Length: 50.0m	Loads to turn right from the correct side of Port Access Road and onto the incorrect side of Glenlyon Street before travelling back to the correct side of Glenlyon Street before travelling through the break in the median strip and back onto the correct side of the road at walking pace.	Modifications required: Corner has been modified for Clarke Creek windfarm
2.1	Gladstone	Glenlyon Street onto Hanson Road GPS Link: https://qoo.gl/maps/j2QFDRG6kcvExWUv7	Width: 8.0m	Travel directly ahead.	No problems with this section of road.

MT HOPEFUL BESS

KM index	Location	Section of road	Existing Measurement	Procedure	Notes
4.9	Gladstone	Hanson Road through the Blain Drive roundabout GPS Link: https://goo.gl/maps/6C49zBakKJXZickw9	Width: 8.0m into 8.0m Length: 50.0m	Loads to travel through the roundabout on the correct side of the road at walking pace.	Modifications required: Roundabout has been modified for Clarke Creek windfarm. Sign to be removed and replaced.
5.5	Gladstone	Hanson Road onto Red Rover Road GPS Link: https://goo.gl/maps/o2UqPC9cvomkR2nZ7	Width: 8.0m into 8.0m Length: 50.0m	Load to travel onto incorrect side of Red Rover Rd using the modified centre island.	Modifications required: Roundabout has been modified for Clarke Creek windfarm. Delineators on centre island to be removed and replaced.
8.8	Gladstone	Red Rover Road onto Don Young Drive GPS Link: https://goo.gl/maps/j21AWjo6brmQKiz98	Width: 7.0m Length: 120.0m	Continue straight ahead	Modifications required: Nil.
11.1	Gladstone	Don Young Drive onto Dawson Highway GPS Link: https://goo.gl/maps/zn6AY8WmiG7YXpcC9	Width: 8.50m Length: 50.0m	Load to cross to incorrect side of road and cut corner.	Modifications required: Nil.
23.2	Calliope	Dawson Hwy onto Bruce Hwy GPS Link: https://maps.app.goo.gl/Viewed210FLCkvAo?	Width: 6.50m Length: 45.0m	Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.	Sign to be relocated or made removable.
98.0	Bajool	Bruce Hwy onto South Ulam Road GPS Link: https://maps.app.goo.gl/Jr9qAe45W9hFx2d8	Width: 12.0m Length: 60.0m	Left hand turn	Modifications required: Nil.
South Ulam Road has only been assessed by desktop study. Should the project proceed a detailed study is required to ensure the route can accommodate the height, weight, swept path and vertical curves of all proposed loads.					
115.0	Bajool	South Ulam Road into proposed site entry GPS Link: https://maps.app.goo.gl/Viewed210FLCkvAo?	TBD	Right hand turn	Modifications required: Suitable site entry and site access roads to be constructed.
Site entries and all site roads to constructed to appropriate standards to accommodate the height, weight, swept path and vertical curves of all proposed loads. Unsealed roads to be maintained for the duration of deliveries and may become un trafficable during periods of wet weather.					

0.0 Km's: MacFarlane Road onto John Bates Drive

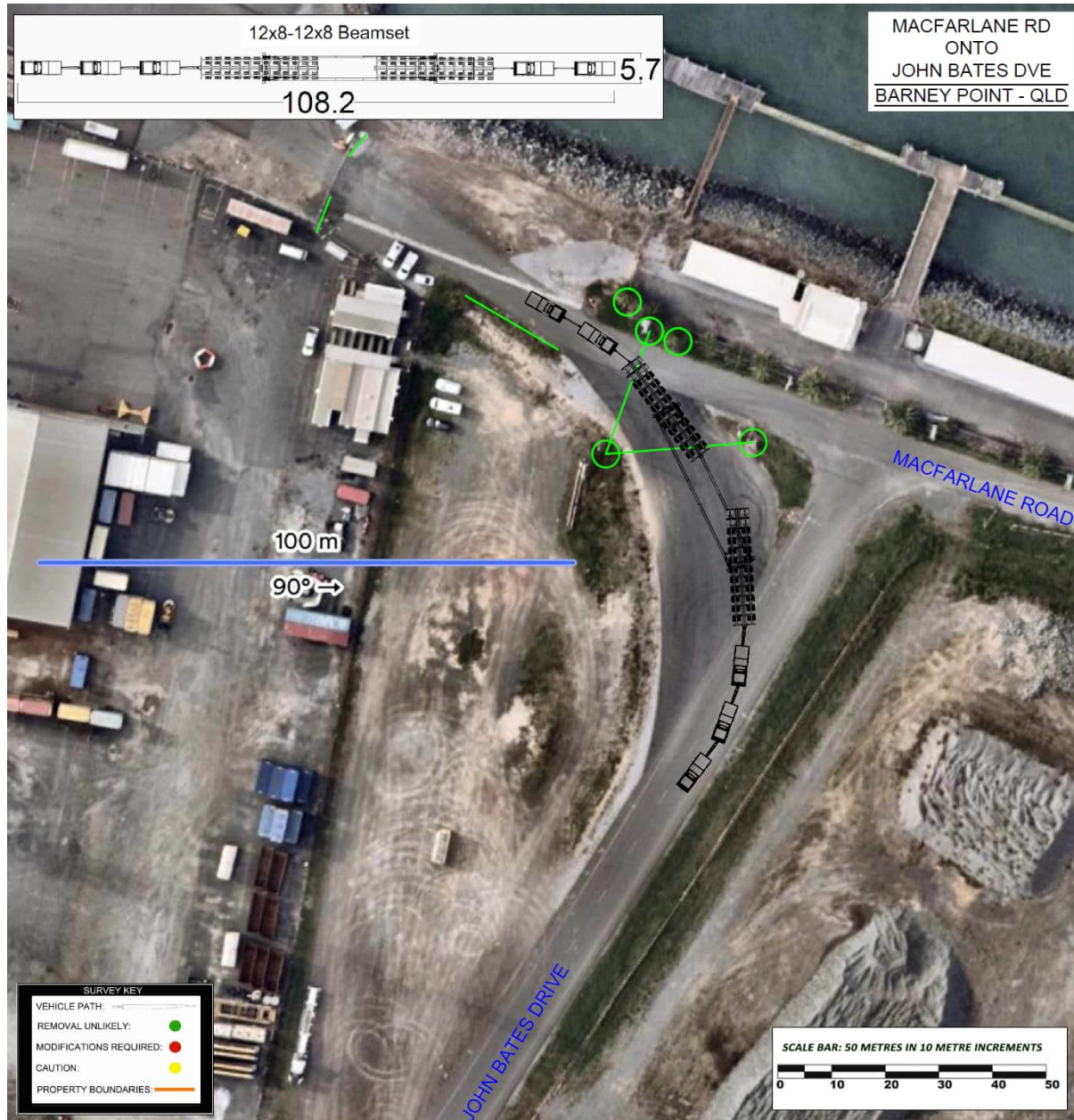


Figure 4 - MacFarlane Road onto John Bates Drive

GPS Link: <https://maps.app.goo.gl/9GWnR6n1YvJH7XCr7>

Procedure: Exit port and turn right via bypass on inside of corner. Security required to open gates and exit Port.

Modifications required: Nil.

0.9 Km's: John Bates Drive onto Port Access Road

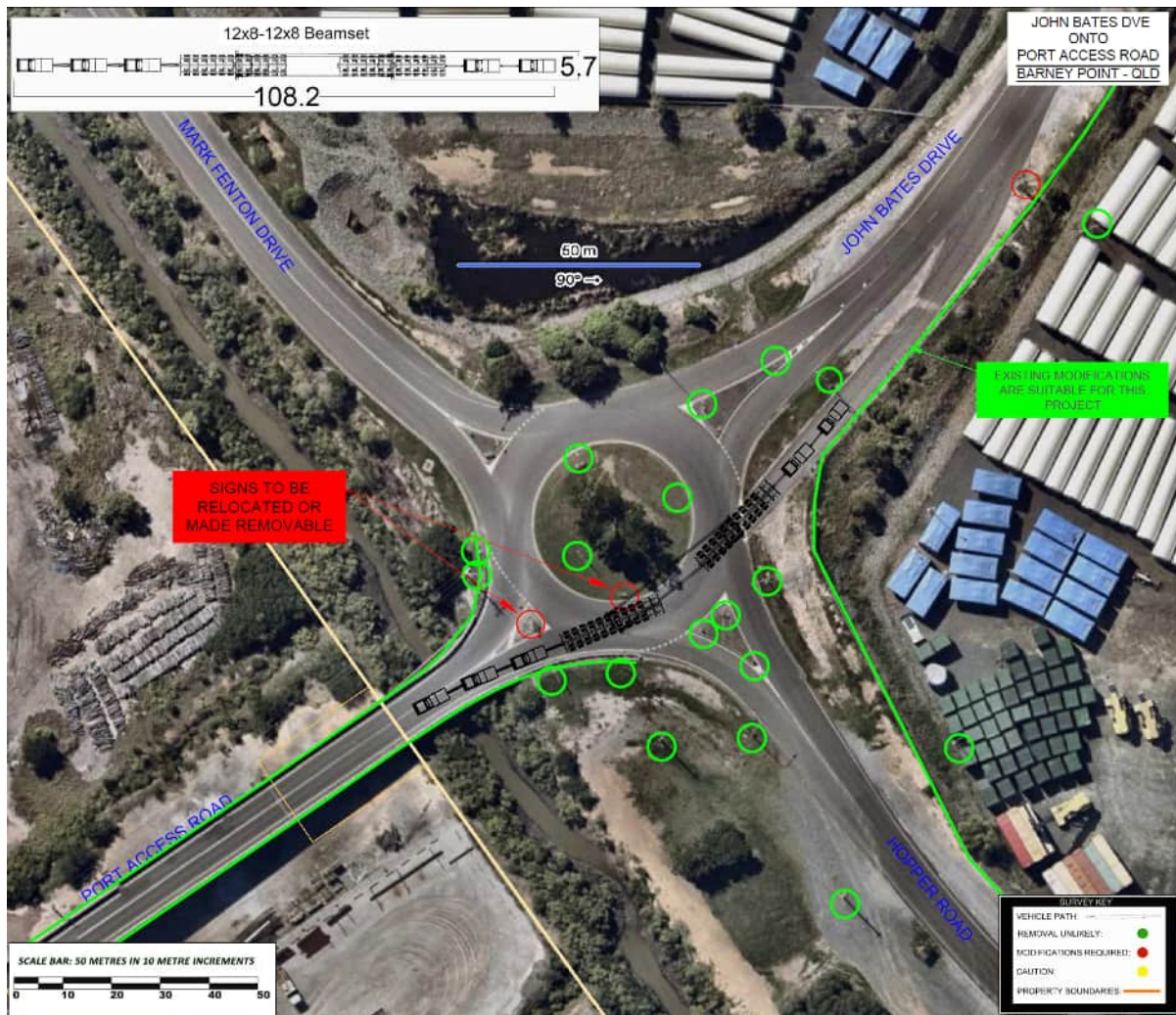


Figure 5 - John Bates Drive onto Port Access Road

GPS Link: <https://goo.gl/maps/yesGGkaeMqLStLqB7>

Procedure: Loads to travel to the left onto a temporary hardstand prior to the roundabout.

Modifications required: Corner has been modified for Clarke Creek windfarm. Signs to be removed and replaced and loads to travel over island.

1.6 Km's: Port Access Road under Goondoon St Overbridge

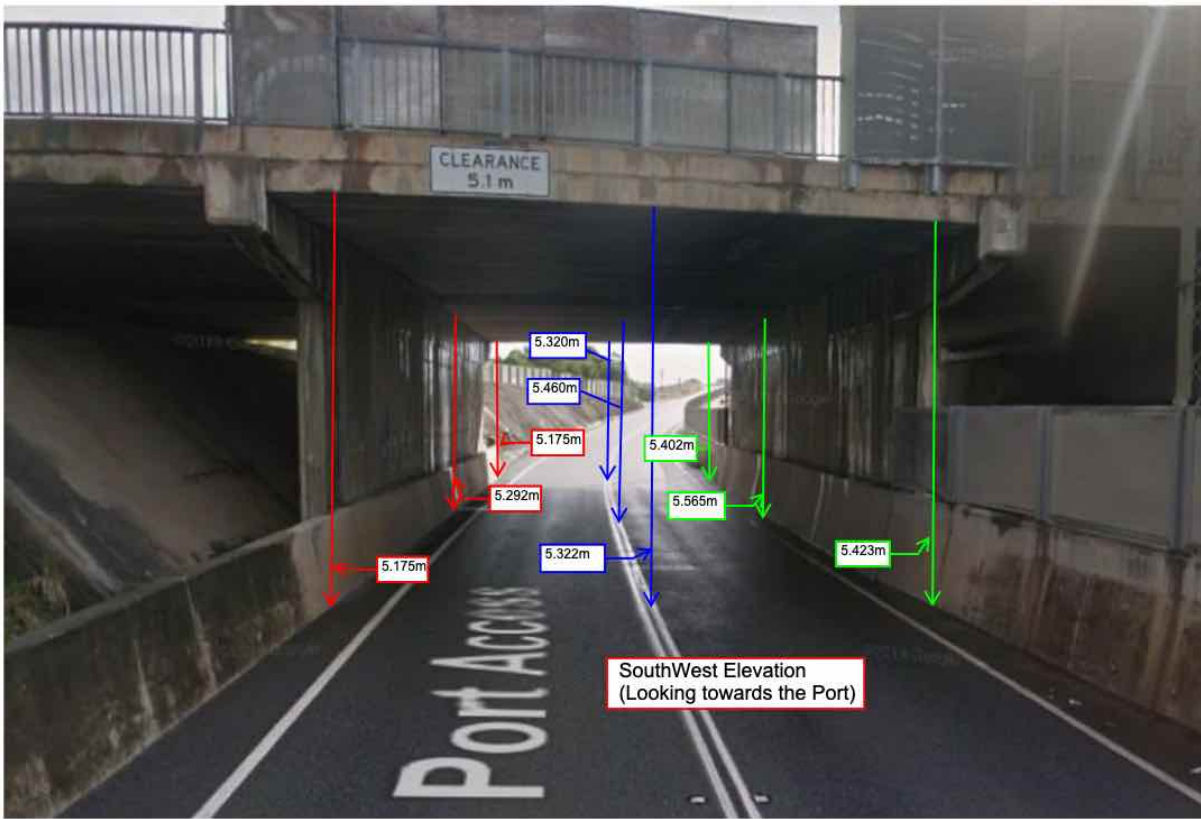


Figure 6 - Bridge Clearance Measurements



Road modifications: Nil.

17

1.8 Km's: Port Access Road onto Glenlyon Street

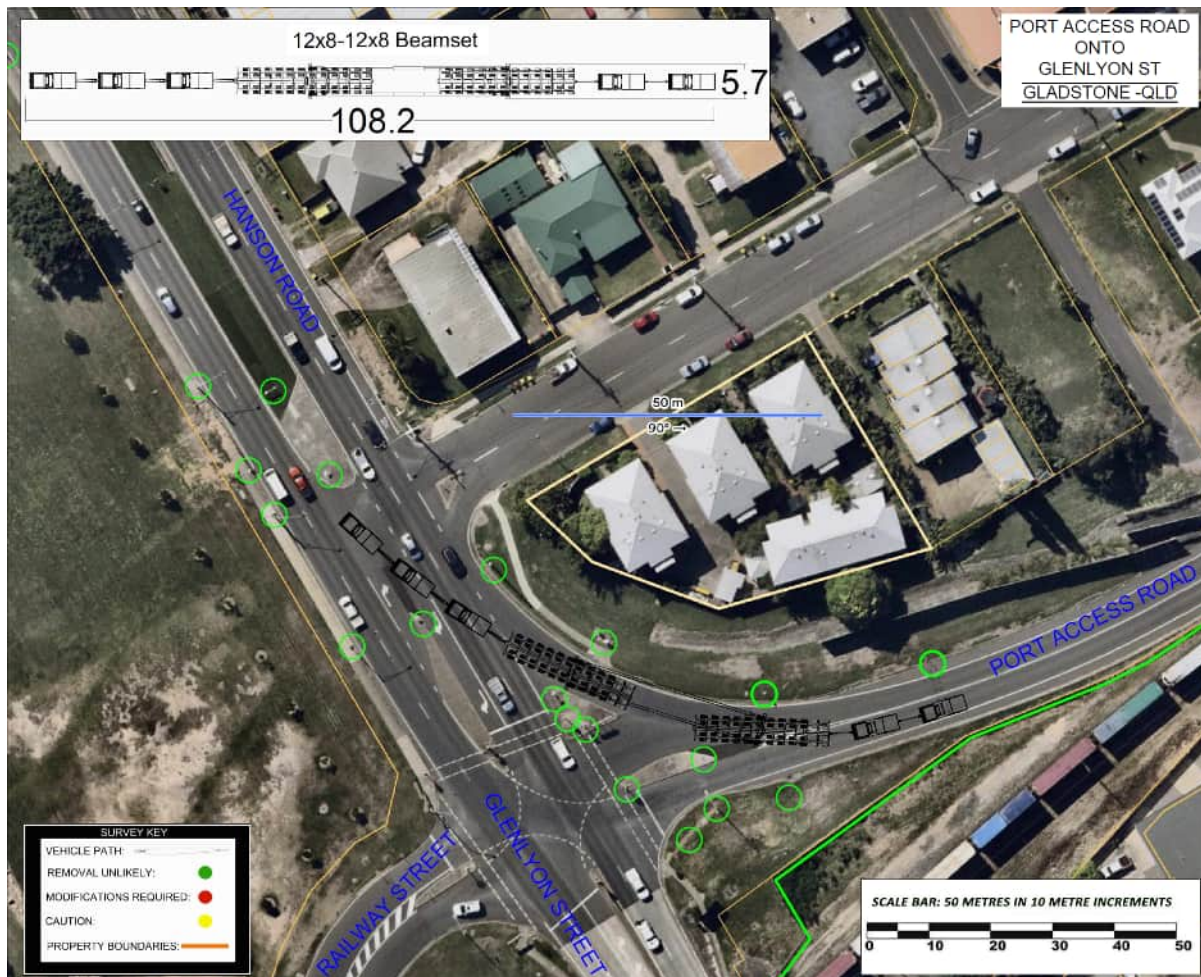


Figure 8 - Port Access Road onto Glenlyon Street

GPS Link: <https://goo.gl/maps/7apkuHTU4xtRsrAn9>

Procedure: Loads to turn right from the correct side of Port Access Road and onto the incorrect side of Glenlyon Street before travelling back to the correct side of Glenlyon Street before travelling through the break in the median strip and back onto the correct side of the road at walking pace.

Modifications required: Corner has been modified for Clarke Creek windfarm

4.9 Km's: Hanson Road Through Roundabout at the Intersection of Blain Drive

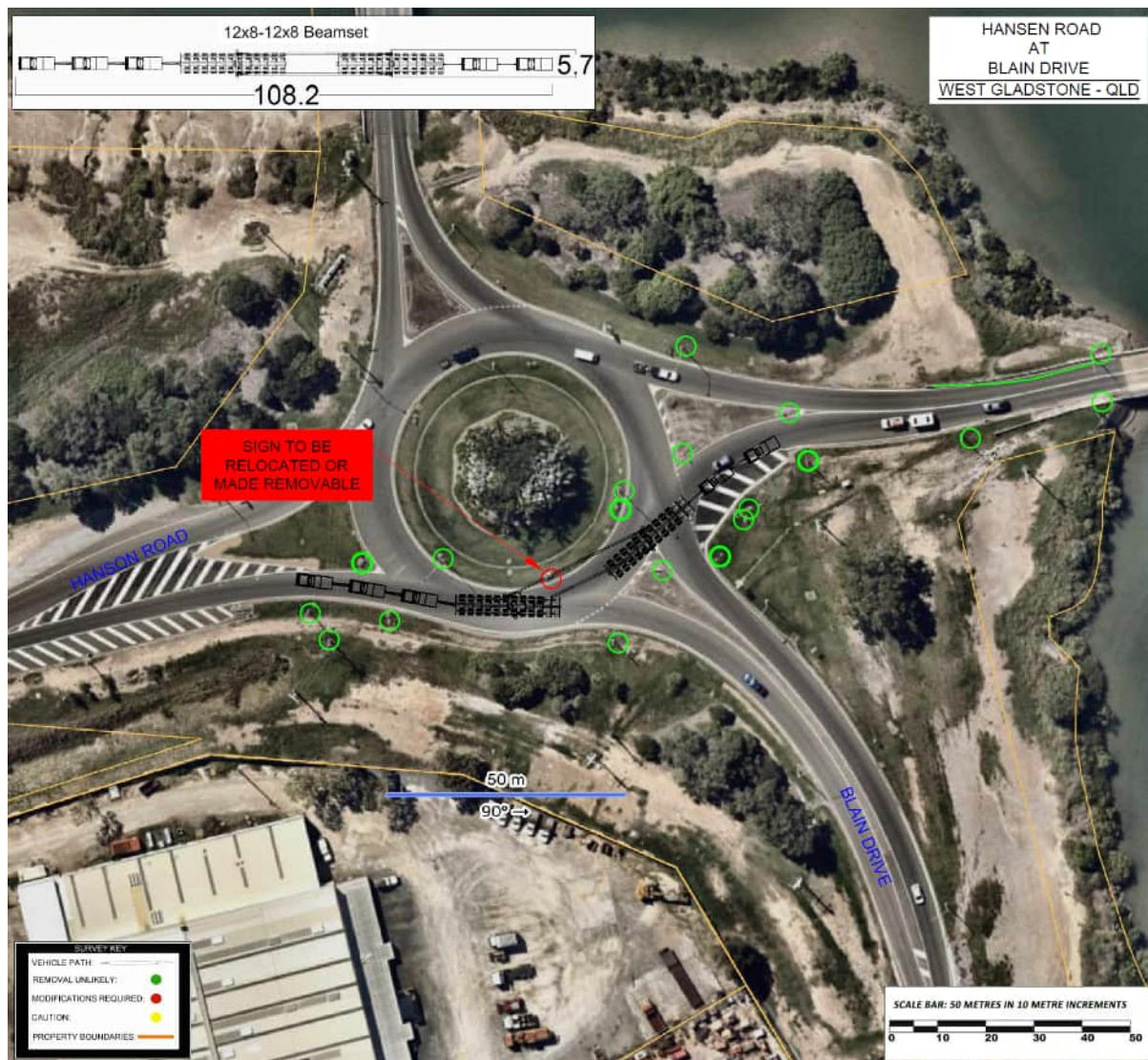


Figure 9 - Hanson Road through roundabout at the intersection of Blain Drive

GPS Link: <https://goo.gl/maps/6C49zBakKJXZjckw9>

Procedure: Loads to travel through the roundabout on the correct side of the road at walking pace.

Modifications required: Roundabout has been modified for Clarke Creek windfarm. Sign to be removed and replaced.

5.5 Km's: Hanson Road Through Roundabout at the Intersection of Red Rover Road

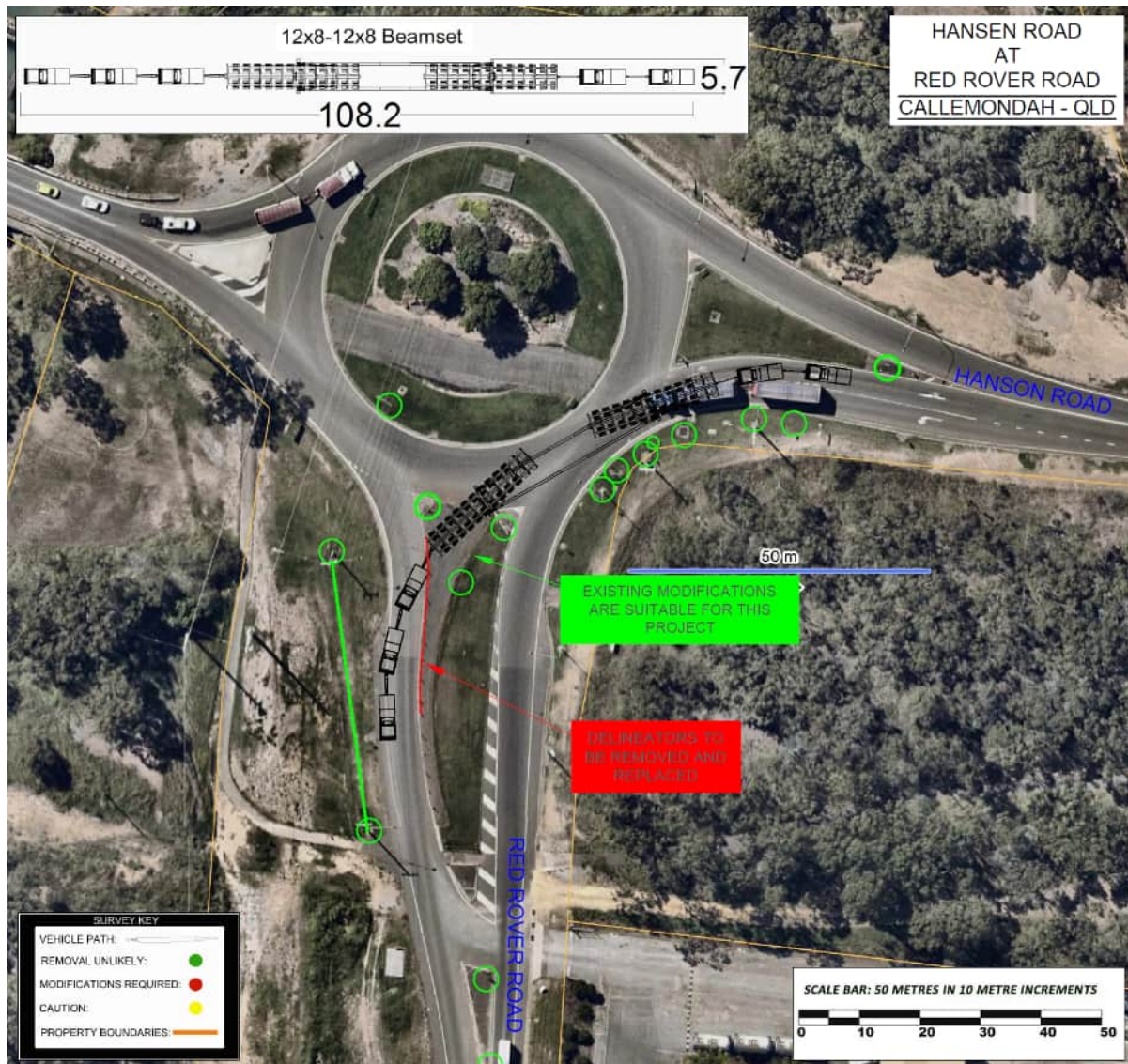


Figure 10 - Hanson Road through roundabout at the intersection of Red Rover Road

GPS Link: <https://goo.gl/maps/o2UqPC9cvomkR2nZ7>

Procedure: Load to travel onto incorrect side of Red Rover Rd using the modified centre island.

Modifications required: Roundabout has been modified for Clarke Creek windfarm. Delineators on centre island to be removed and replaced.

11.1 Km's: Don Young Drive onto Dawson Highway

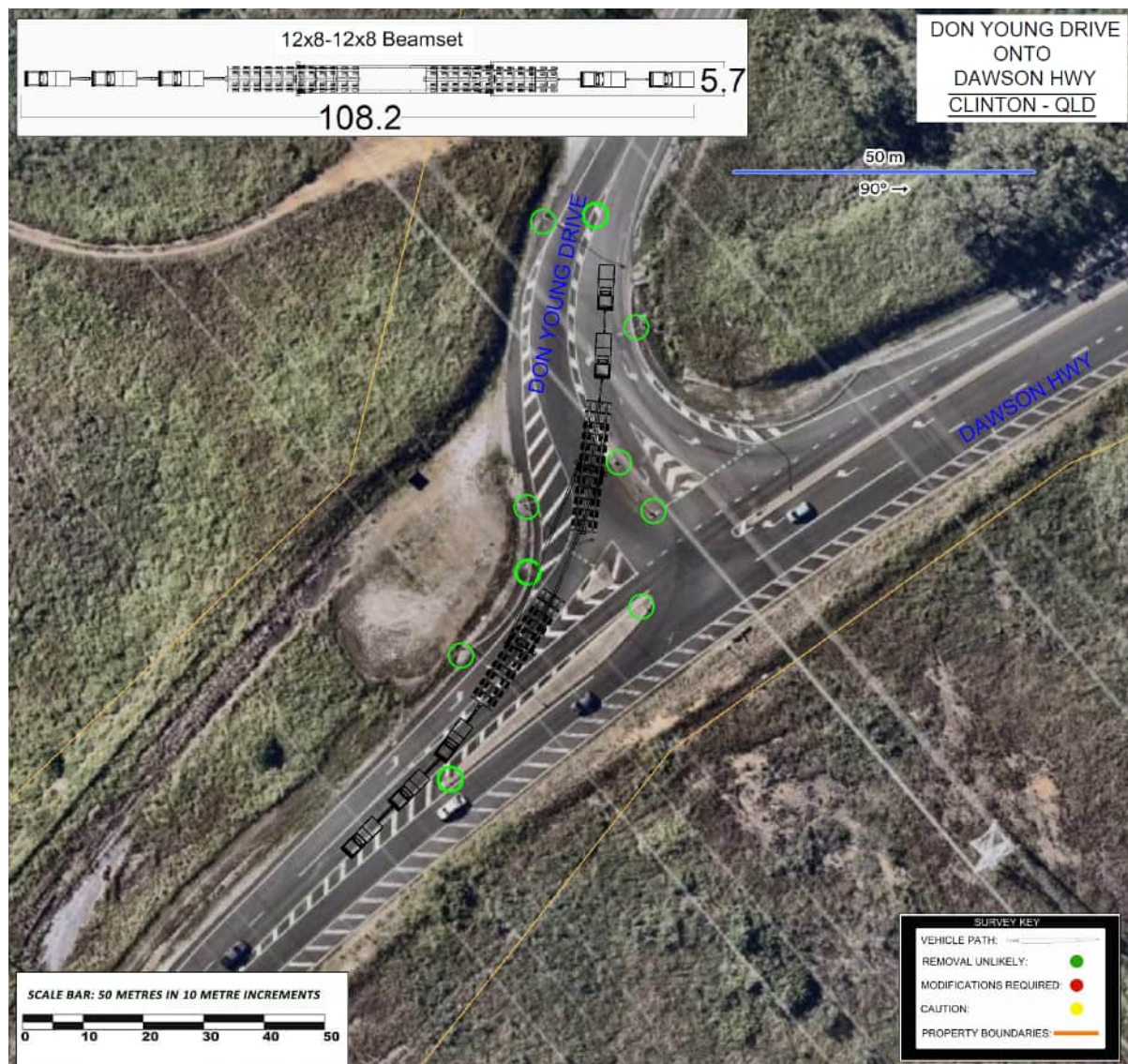


Figure 11 - Don Young Drive onto Dawson Highway

GPS Link: <https://goo.gl/maps/zn6AY8WmiG7YXpcC9>

Procedure: Load to cross to incorrect side of road and cut corner.

Modifications required: Nil.

23.2 Km's: Dawson Highway onto Bruce Highway

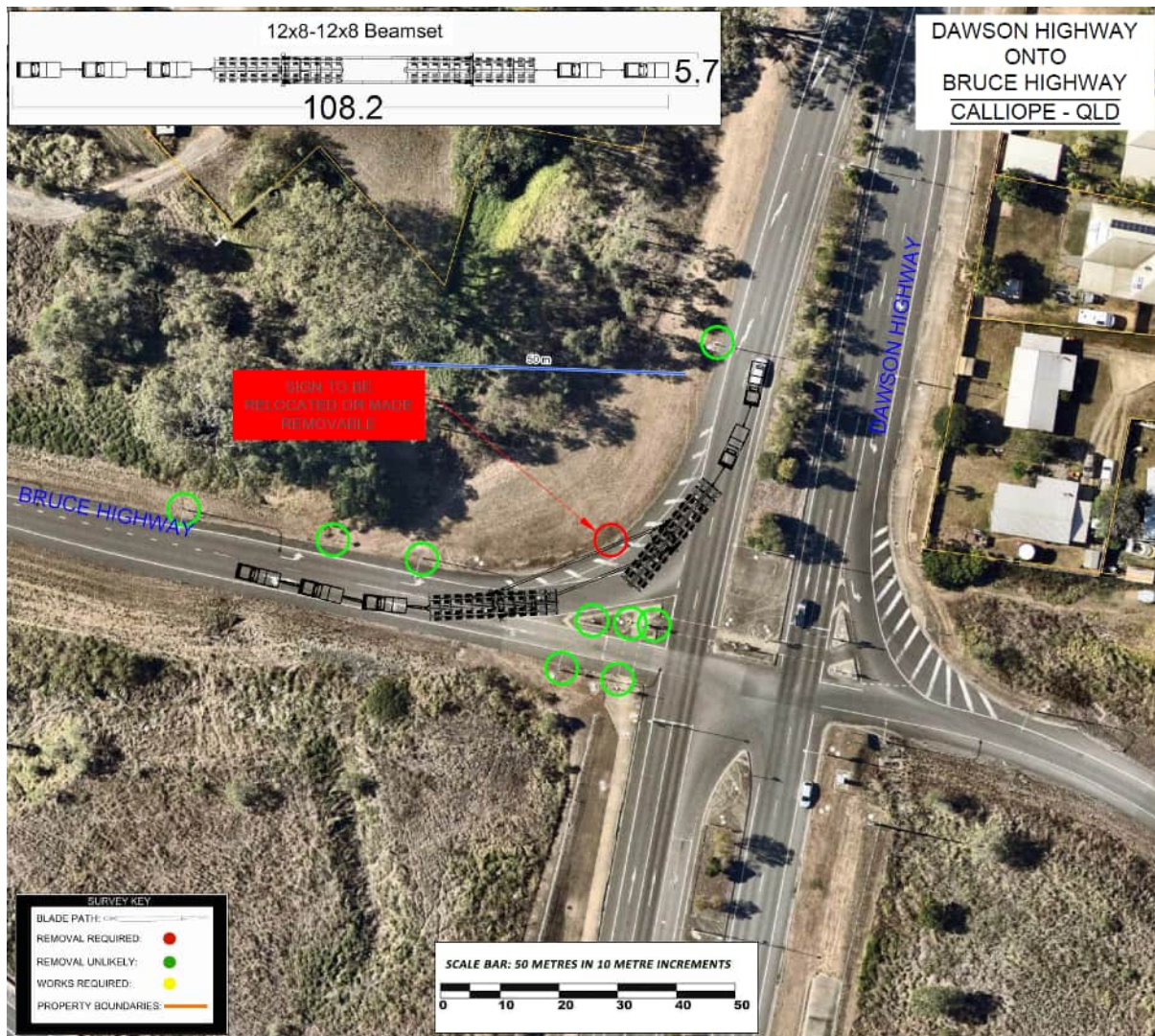


Figure 12 - Dawson Highway onto Bruce Highway

GPS Link: <https://maps.app.goo.gl/Xrevwd2DDFCakVAp7>

Procedure: Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.

Modifications required: Sign to be relocated or made removable.

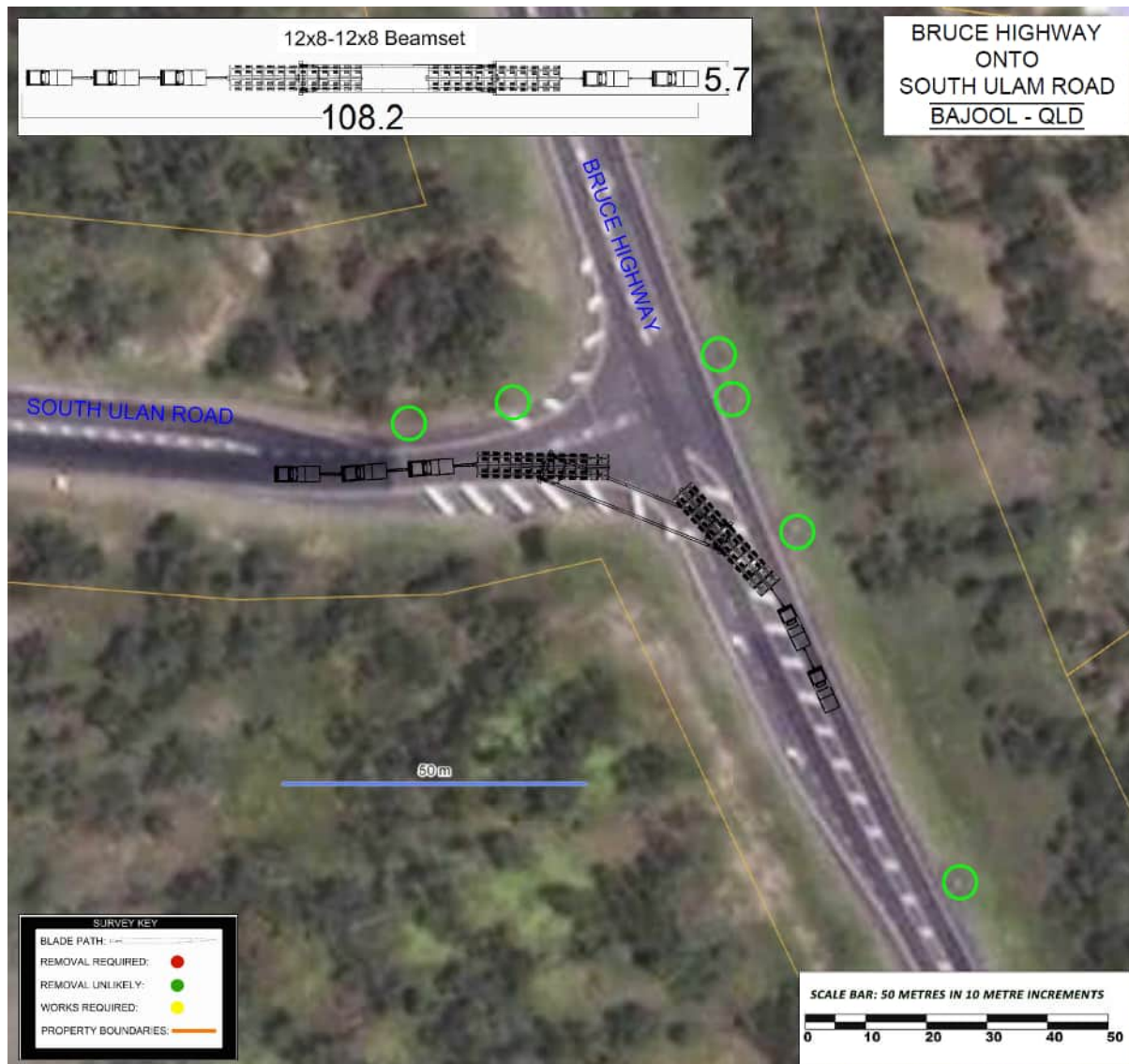
98.0 Km's: Bruce Highway onto South Ulam Road

Figure 13 - Bruce Highway onto South Ulam Road

GPS Link: <https://maps.app.goo.gl/Jrr9qAe45W9hFx2d8>**Procedure:** Left hand turn**Modifications required:** Nil.

115.0 Km's: South Ulam Road into Proposed Site Entry



Figure 14 - South Ulam Road into Proposed Site Entry

GPS Link: <https://maps.app.goo.gl/LwmzM1FYZd1fSo9jZ>

Procedure: Right hand turn

Modifications required: Suitable site entry and site access roads to be constructed. Site entries and all site roads to be constructed to appropriate standards to accommodate the height, weight, swept path and vertical curves of all proposed loads. Unsealed roads to be maintained for the duration of deliveries and may become untrafficable during periods of wet weather.

8.0 Route 1 - Conclusion

SWEPT PATH

- modifications shown in above to be undertaken as a minimum. Many modifications have been undertaken for a previous project and need it needs to be confirmed they are still in effect for the time period proposed for this project.

SITE ENTRANCES AND SITE ROADS

- All site access roads are to be constructed to appropriate standards to accommodate the swept path, vertical curve and weight requirements of all proposed loads. Roads are to be maintained during the life of the project.

DIMENSION-WEIGHT:

- All bridges structures will need to be assessed for capacity of the loads that will use this route.

DIMENSION-WIDTH:

- Route is suitable for loads up to 6.5 Metres in width.

DIMENSION-HEIGHT UNDER STRUCTURES

- Loads that exceed 5.1 metres in height cannot travel on this route. The lowest structure on route is the Port Access Road overpass which has 5.2 metres in the centre of the road and 5.3 metres in the left hand lane.
- Loads that exceed 5.1m will need to use Route 2.

OVERHEAD UTILITIES:

- The route will need to be approved for a travel height of 5.2 metres.

RAIL CROSSINGS/CORRIDORS:

- Approval required from rail managers to cross rail lines or access rail corridors.

PAVEMENT:

- The road pavement is of Highway quality up to the site entries.
- Unsealed roads will need to be upgraded to an all-weather material, with a suitable road width and maintained for the duration of the project.

VEGETATION

- Minor trimming is required on sections of the route. The report shows these locations.

ROADWORKS:

- There are currently several sections of roadwork on route that are okay for these size loads. TMR will need to discuss any future roadworks with the project if they are likely to conflict with these movements.

TRAVEL RESTRICTIONS:

- All routes are listed as daytime travel only. No travel restrictions are in place on these routes except for Statewide public holidays and the Easter and Christmas curfew periods. More data is available through the QLD Main Roads website: <https://www.service.transport.qld.gov.au/ExcessMassExternal/PublicConditionReport.jsp>
- Night travel is possible on this route, but will need to be applied for through a TMP and specific trip permits.

SOUTH ULAM ROAD

- South Ulam Road has only been assessed by desktop study. Should the project proceed a detailed study is required to ensure the route can accommodate the height, weight, swept path and vertical curves of all proposed loads.

9.0 Route 2A – Study

ROUTE 2A: GLADSTONE PORT TO FLINDERS PARADE

Components: Loads over 5.1 metres in overall height. (Max height 6.2m).

Transformer on 16x8 Platform Trailer

From: Port of Gladstone Berth No.4

To: Flinders Parade Gladstone

Distance: 1.3 kilometres

Route: Macfarlane Road, Flinders Parade.

GPS Link for route: <https://maps.app.goo.gl/iidfzS37CtDDopWJA>

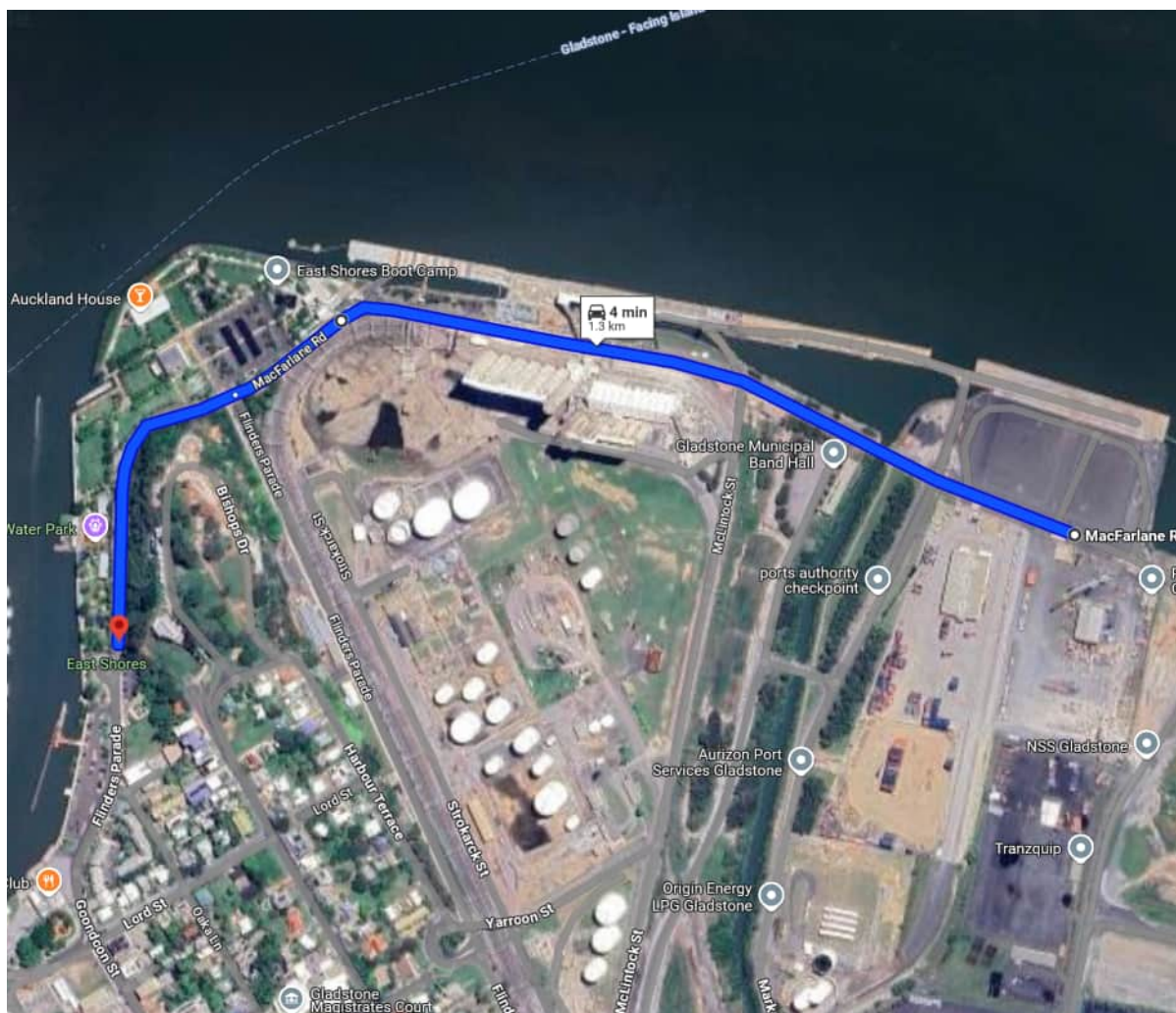


Figure 15 - Route 2A

KEY	
CAUTION	
ROAD MODIFICATIONS REQUIRED	

KM index	Location	Section of road	Existing Measurement	Procedure	Notes
0.6	Barney Point	Macfarlane Road under conveyor GPS Link: https://goo.gl/maps/1LvCfMGy3xhaenrZA	HEIGHTS: Left fogline: 5.31 Left lane centre: 5.8 Centre of road: 6.1 Right lane centre: 6.6 Right fogline: 7.6	Loads will travel directly ahead under the conveyor in the far-right side of the road.	Pinchpoint procedure: Loads to slow to a crawl and pass under this structure in the far-right side of the road. Traffic control: Pilots to control local traffic, this section of road. Road furnishings: No cars to be parked on the right side of the road. Modifications required: Nil.
0.8	Barney Point	Exiting Port onto Macfarlane Road GPS Link: https://goo.gl/maps/9WYdTeC8277WVW4A8	Width: 10.0m into 5.5m Length: 50.0m	Left hand turn from incorrect side to the incorrect side	Pinchpoint procedure: Security guard to open gate out of port. Traffic control: Pilots to control local traffic, this section of road. Modifications required: Trees to be trimmed.
1.0	Gladstone Central	Macfarlane Road onto Flinders Parade foreshore GPS Link: https://goo.gl/maps/ferNxxImooJAL56v7	Width: 6.0m Length: 50.0m	Travel directly ahead through the security gate	Pinchpoint procedure: Security guard to lower bollards. Traffic control: QPS/Pilots to control local traffic. Modifications required: Trees to be trimmed.
1.0 to 1.3	Gladstone Central	Flinders Parade foreshore GPS Link: https://goo.gl/maps/7Y5gxTeNo3U1tJ89	Width: 6.0m Length: 50.0m	Travel directly on the foreshore access road	Pinchpoint procedure: Security guard to lower and raise bollards. Traffic control: QPS/Pilots to control local traffic. Modifications required: Trees to be trimmed.

0.6 Km's: Gladstone Port Conveyor No.1

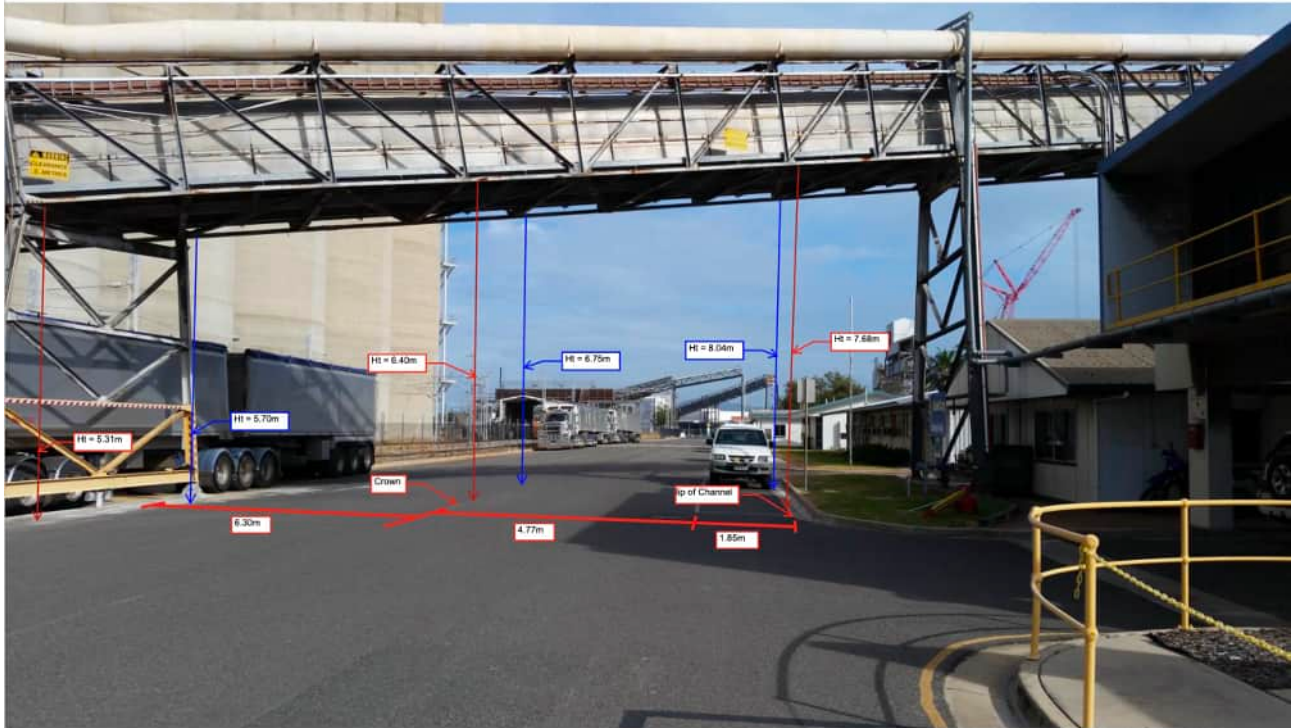


Figure 16 - Conveyor Clearance Measurements

GPS Link: <https://goo.gl/maps/1LvCfMGy3xhaenrZA>

Clearances under the conveyor:

Left fogline: 5.31

Left lane centre: 5.8

Centre of road: 6.1

Right lane centre: 6.6

Right fogline: 7.6

Procedure: Loads are to travel under this structure in the far-right lane at walking pace and under the guidance of a spotter.

Pilot 1: Warn all oncoming traffic inside the port.

Pilot 2: Warn all traffic behind the load.

Road furnishings requiring removal: No cars are to be parked on the right-hand side of the road.

Modifications required: Nil.

0.8 Km's: Exiting Port onto Macfarlane Road

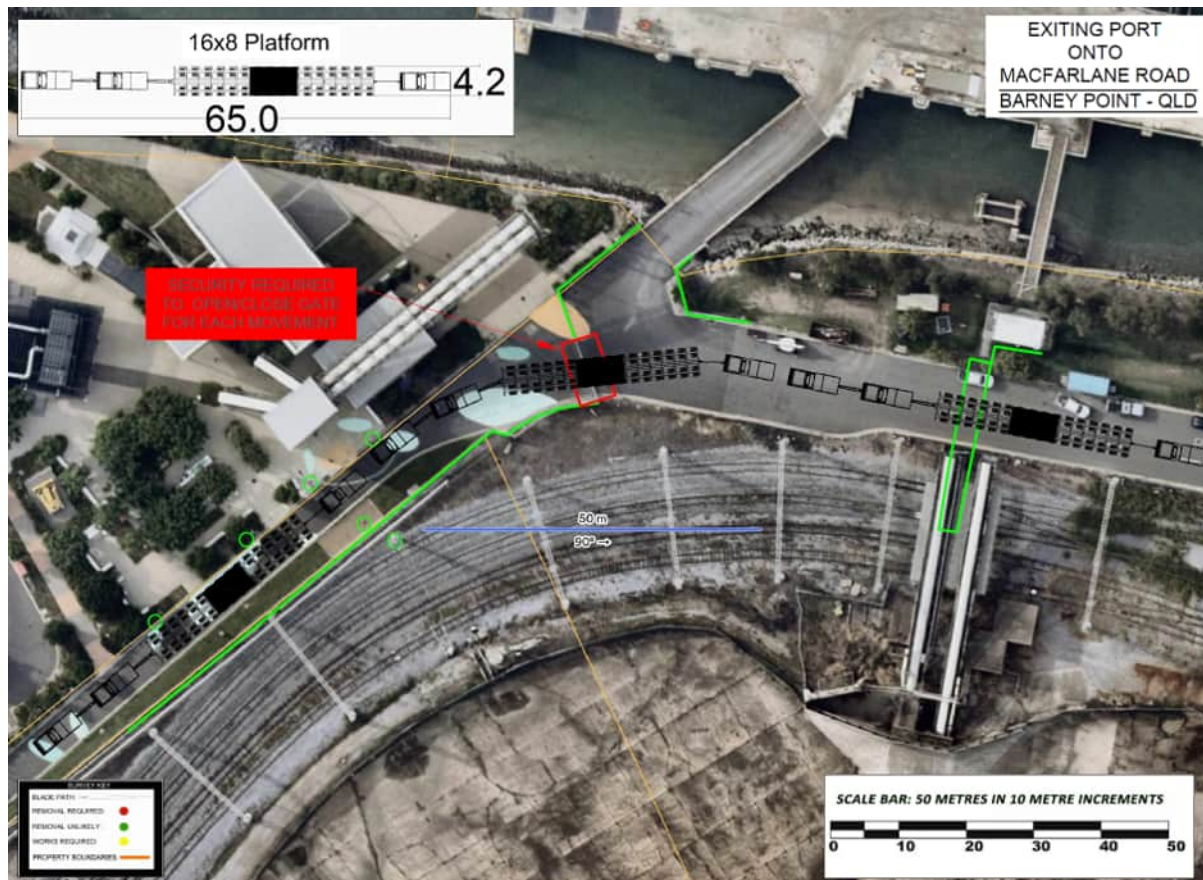


Figure 17 - Macfarlane Road at Gladstone

GPS Link: <https://goo.gl/maps/WYdTeC8277tiWW4A8>

Procedure: Towers to turn left from the incorrect side to the incorrect side. Security guard to open gate out of port.

Modifications required: Vegetation to be trimmed as required.

1.0 Km's: Macfarlane Road onto Flinders Parade Foreshore

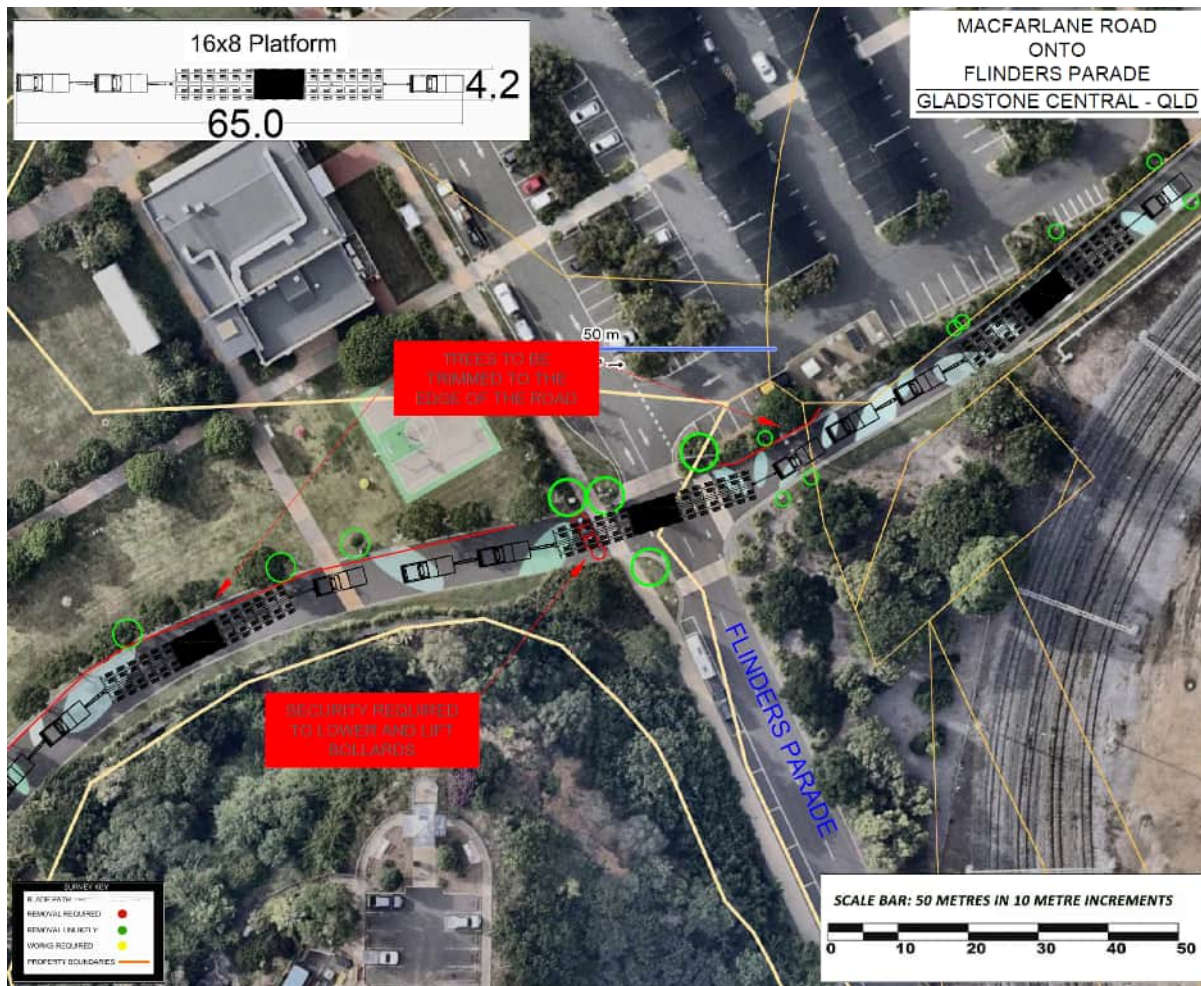


Figure 18 - Macfarlane Road at Gladstone

GPS Link: <https://goo.gl/maps/icriXxJmoqJAL56v7>

Procedure: Loads are to travel directly ahead from Macfarlane Road onto Flinders Parade foreshore.

Road furnishings requiring removal: Security guard to lower bollards and raise them after load passes through.

Modifications required: Trees will need to be trimmed.

1.1 Km's: Flinders Parade Foreshore

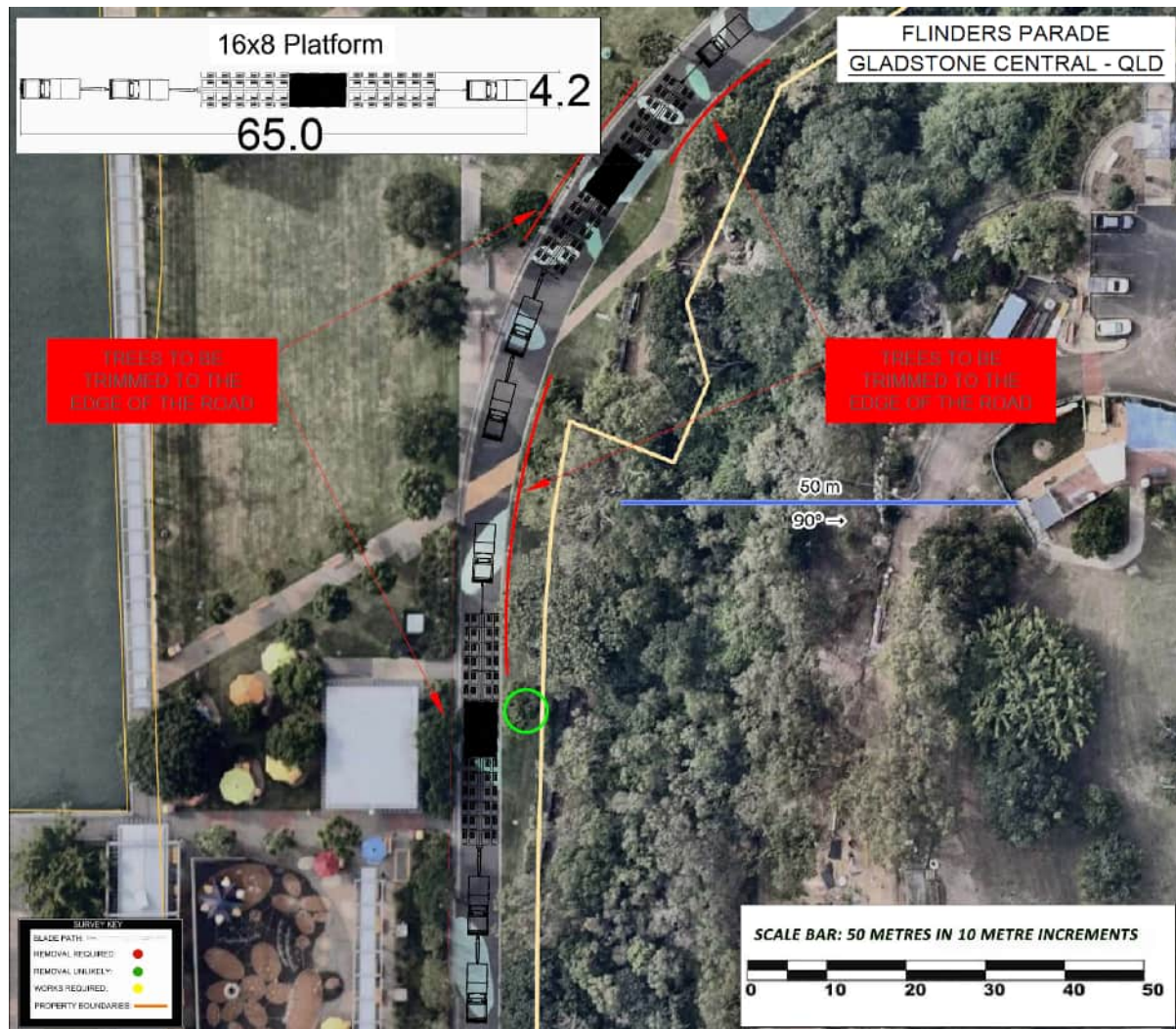


Figure 19 - Flinders Parade Foreshore

GPS Link: <https://goo.gl/maps/eRVdG2Cmnd1JFBjm8>

Procedure: Loads are to travel around a left-hand bend on Flinders Parade foreshore.

Modifications required: Trees will need to be trimmed.

1.3 Km's: Flinders Parade Foreshore

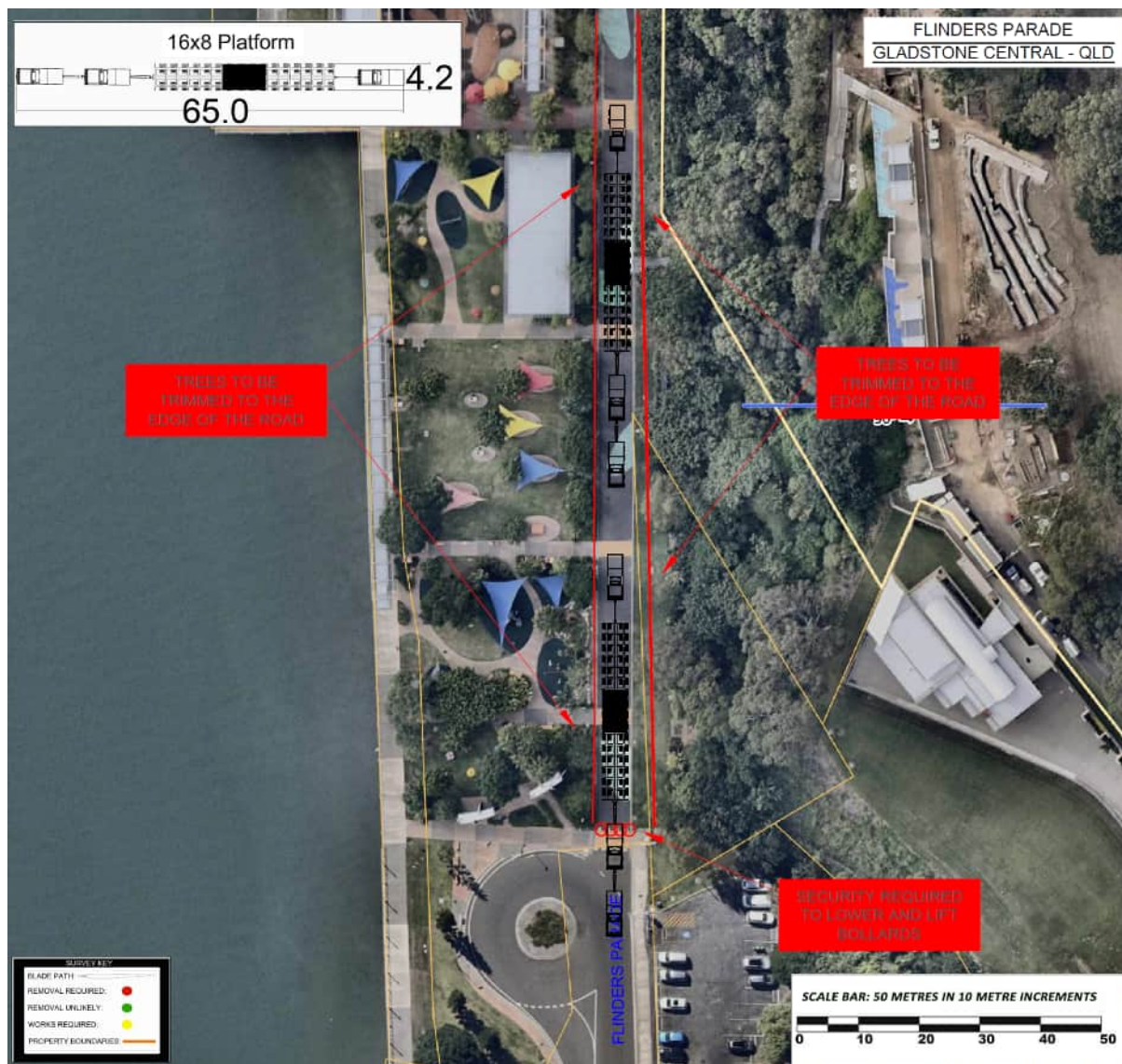


Figure 20 - Flinders Parade Foreshore

GPS Link: <https://goo.gl/maps/W92yQL7dKuo4Qf5A8>

Procedure: Loads are to travel directly ahead on Flinders Parade foreshore and onto Flinders Parade.

Modifications required: Trees will need to be trimmed.

10.0 Route 2B - Study

ROUTE 2B: FLINDERS PARADE TO MT HOPEFUL BESS

Components: Loads over 5.1 metres in overall height (Max height 6.2m).

Transformer on 16x8 Platform Trailer

From: Flinders Parade Gladstone

To: Bajool (Mt Hopeful BESS), QLD

Distance: 113.0 kilometres

Route: Flinders Parade, Goondoon Street, Lord Street, Hanson Road, Red Rover Road, Don Young Drive, Dawson Highway, Bruce Highway, South Ulam Road.

GPS Link for route: <https://maps.app.goo.gl/FaLX3Kon8CG4AMaj7>

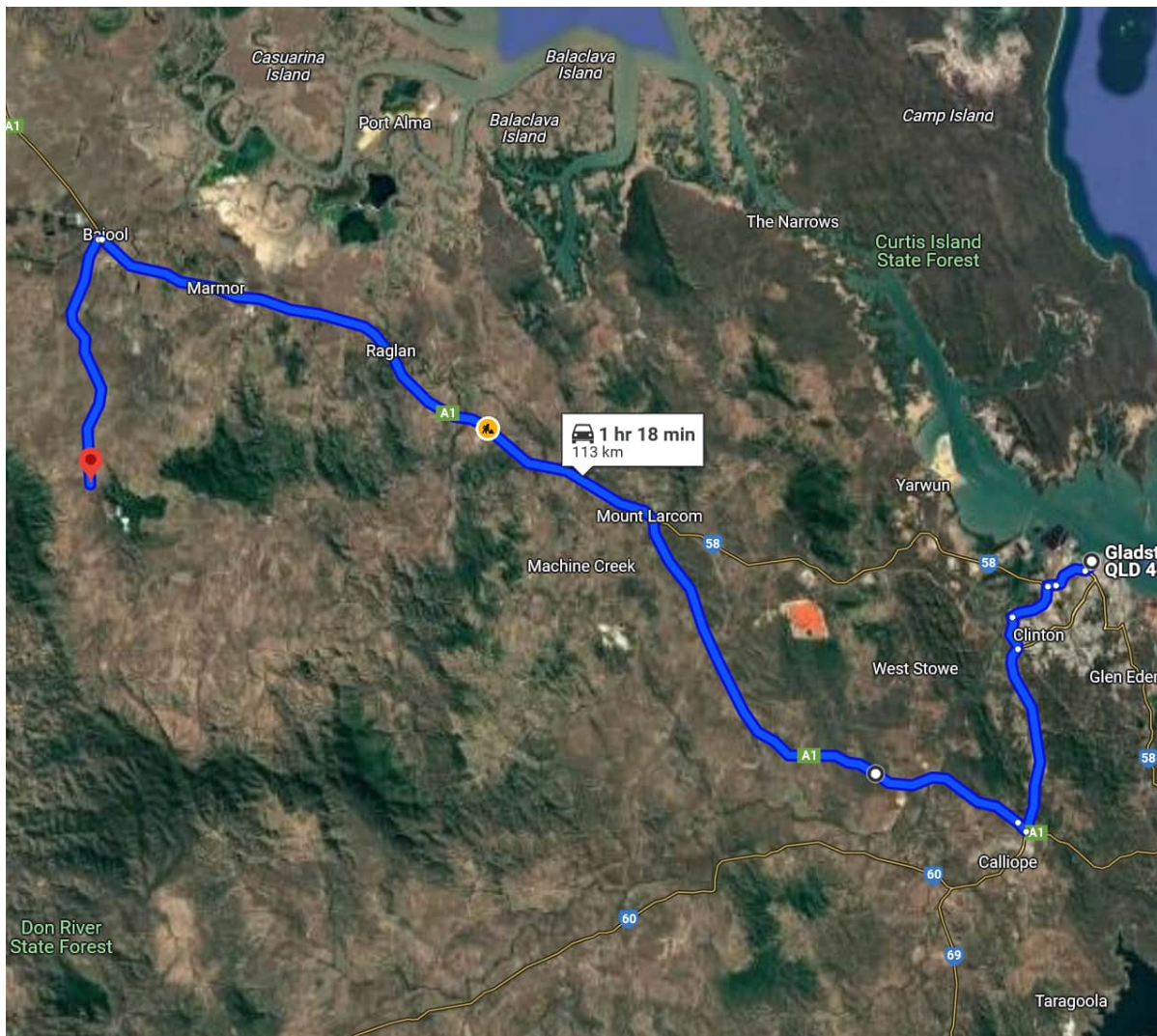


Figure 21 - Route 2B

KEY	
CAUTION	
ROAD MODIFICATIONS REQUIRED	

KM index	Location	Section of road	Existing Measurement	Procedure	Notes
0.00	Gladstone	Flinders Parade foreshore onto Flinders Parade GPS Link: https://goo.gl/maps/2f9CLTivviSUhYuf6	Width: 7.0m Length: 50.0m	Loads are travel directly ahead	Pinchpoint procedure: Security guard to lower and raise bollards.
0.25	Gladstone	Flinders Parade onto Goondoon Street GPS Link: https://goo.gl/maps/2f9CLTivviSUhYuf6	Width: 7.0m Length: 50.0m	Travel directly ahead	No problems with this section of road.
0.3	Gladstone	Goondoon Street onto Lord Street GPS Link: https://goo.gl/maps/21ifRBqgvXYSo718	Width: 7.0m Length: 42.0m	Loads are to turn right turn from Goondoon Street crossing onto the incorrect side of the road before returning to the correct side of onto Lord Street.	No problems with this section of road.
0.4	Gladstone	Lord Street Roundabout at Bryan Jordan Drive GPS Link: https://goo.gl/maps/EwpNK5k5vRBoJv39	Width: 6.5m Length: 50.0m	Loads are to travel directly ahead on Lord Street on the correct side of the roundabout.	Signs to be relocated or made removable. Median strip and kerb to be made trafficable.
0.85	Gladstone	Lord Street onto Hanson Road GPS Link: https://goo.gl/maps/nXE6q9uBKThUaEFC7	Width: 7.0m Length: 40.0m	Right hand turn from Lord Street onto Hanson Road.	No problems with this section of road.
3.2	Gladstone	Hanson Road through the Blain Drive roundabout GPS Link: https://goo.gl/maps/6C49zBakKJXZjckw9	Width: 8.0m into 8.0m Length: 50.0m	Loads to travel through the roundabout on the correct side of the road.	No problems with this section of road.
3.8	Gladstone	Hanson Road onto Red Rover Road roundabout GPS Link: https://goo.gl/maps/o2UgPC9cvomkR2nZ7	Width: 8.0m into 8.0m Length: 50.0m	Loads to turn left at the roundabout onto incorrect side of road using modifications made on centre island.	Delineators to be removed and reinstalled.

MT HOPEFUL BESS

KM index	Location	Section of road	Existing Measurement	Procedure	Notes
7.2	Gladstone	Red Rover Road onto Don Young Drive GPS Link: https://goo.gl/maps/5Wv3CWxQC399vrpUA	Width: 8.0m	Travel directly ahead	No problems with this section of road.
9.4	Gladstone	Don Young Drive onto Dawson Highway GPS Link: https://goo.gl/maps/ZifcCqBpnaDRWet6	Width: 8.0m Length: 50.0m	Right hand turn	No problems with this section of road.
21.3	Calliope	Dawson Hwy onto Bruce Hwy GPS Link: https://maps.app.goo.gl/Xrevwd2DDFCakVAp7	Width: 6.50m Length: 45.0m	Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.	No problems with this section of road.
96.4	Bajool	Bruce Hwy onto South Ulam Road GPS Link: https://maps.app.goo.gl/Jrr9qAe45W9hFx2d8	Width: 12.0m Length: 60.0m	Left hand turn	Modifications required: Nil.
South Ulam Road has only been assessed by desktop study. Should the project proceed a detailed study is required to ensure the route can accommodate the height, weight, swept path and vertical curves of all proposed loads.					
113.0	Bajool	South Ulam Road into proposed site entry GPS Link: https://maps.app.goo.gl/6wczM1FY2d1f5oik7	TBD	Right hand turn	Modifications required: Suitable site entry and site access roads to be constructed.
Site entries and all site roads to constructed to appropriate standards to accommodate the height, weight, swept path and vertical curves of all proposed loads. Unsealed roads to be maintained for the duration of deliveries and may become un trafficable during periods of wet weather.					

0.3 Km's: Flinders Parade onto Lord Street

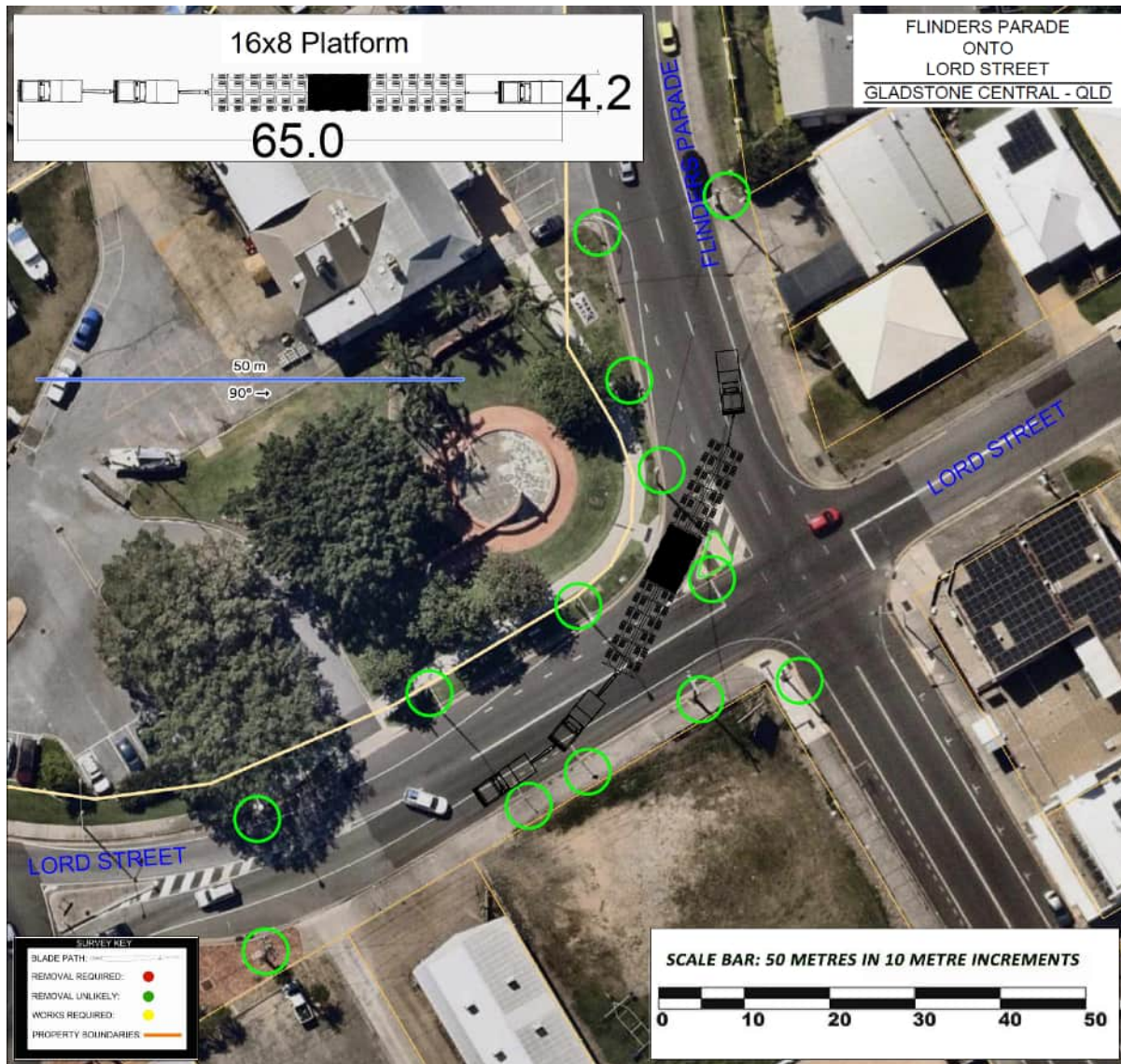


Figure 22 - Goondoon Street onto Lord Street at Gladstone

GPS Link: <https://goo.gl/maps/2f9CLTjvyjSUhYuf6>

Procedure: Loads are to turn right turn from Goondoon Street crossing onto the incorrect side of the road before returning to the correct side of onto Lord Street.

Modifications required: Nil.

0.4 Km's: Lord Street through roundabout at the intersection of Bryan Jordan Drive



Figure 23 - Lord Street through roundabout at the intersection of Bryan Jordan Drive in Gladstone

GPS Link: <https://goo.gl/maps/FwpNKS5ykBBnJyR9>

Procedure: Load will need to cross over the centre median strip and over the edge of the paved area on the correct side of the road.

Modifications required: Signs to be relocated or made removable. Median strip and kerb to be made trafficable.

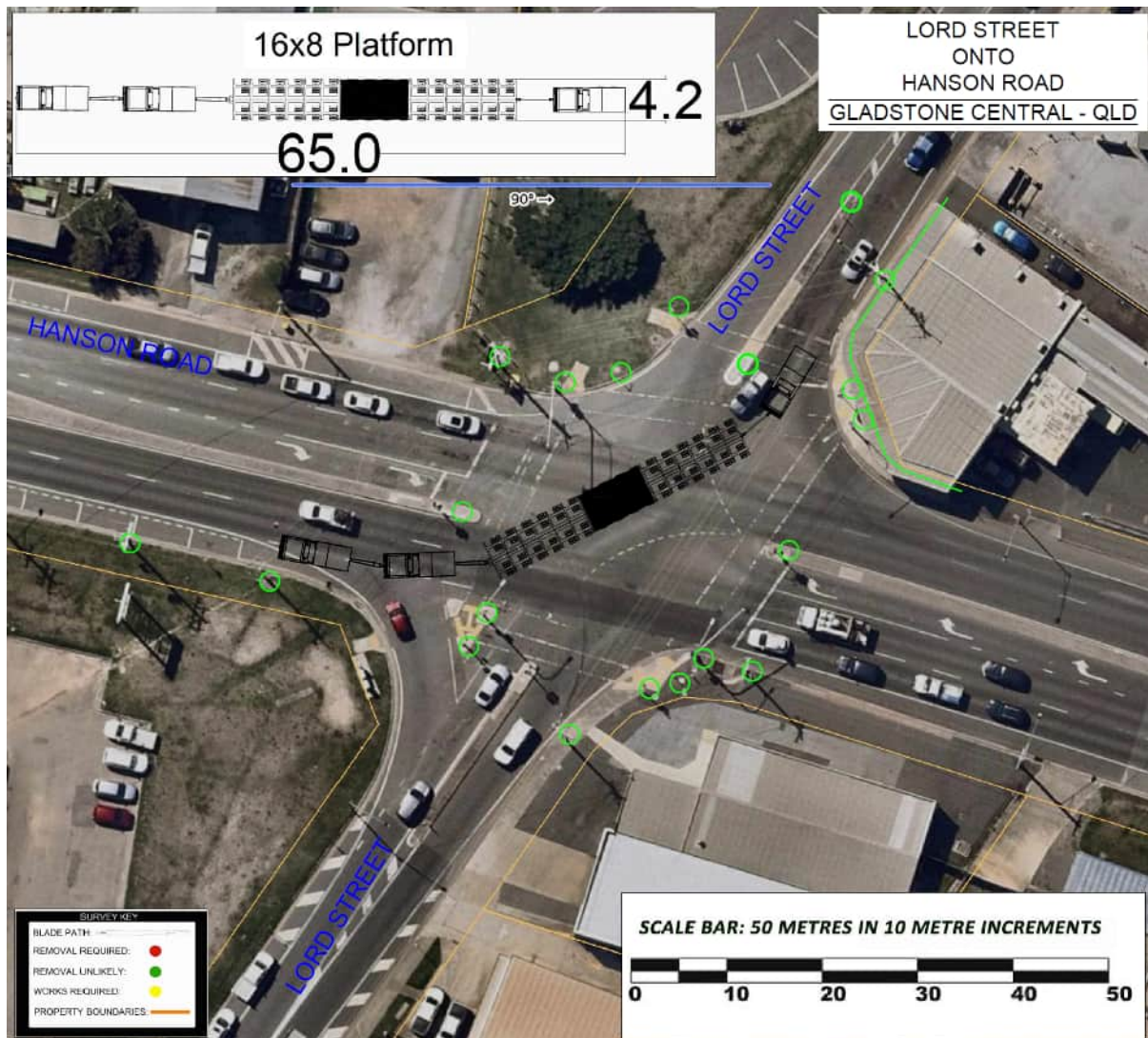
0.85 Km's: Lord Street onto Hanson Road

Figure 24 - Lord Street onto Hanson Road at Gladstone

GPS Link: <https://goo.gl/maps/nXE6q9uBKThUaEFC7>**Procedure:** Right hand turn from Lord Street onto Hanson Road.**Modifications required:** Nil

3.2 Km's: Hanson Road Through Roundabout at the Intersection of Blain Drive

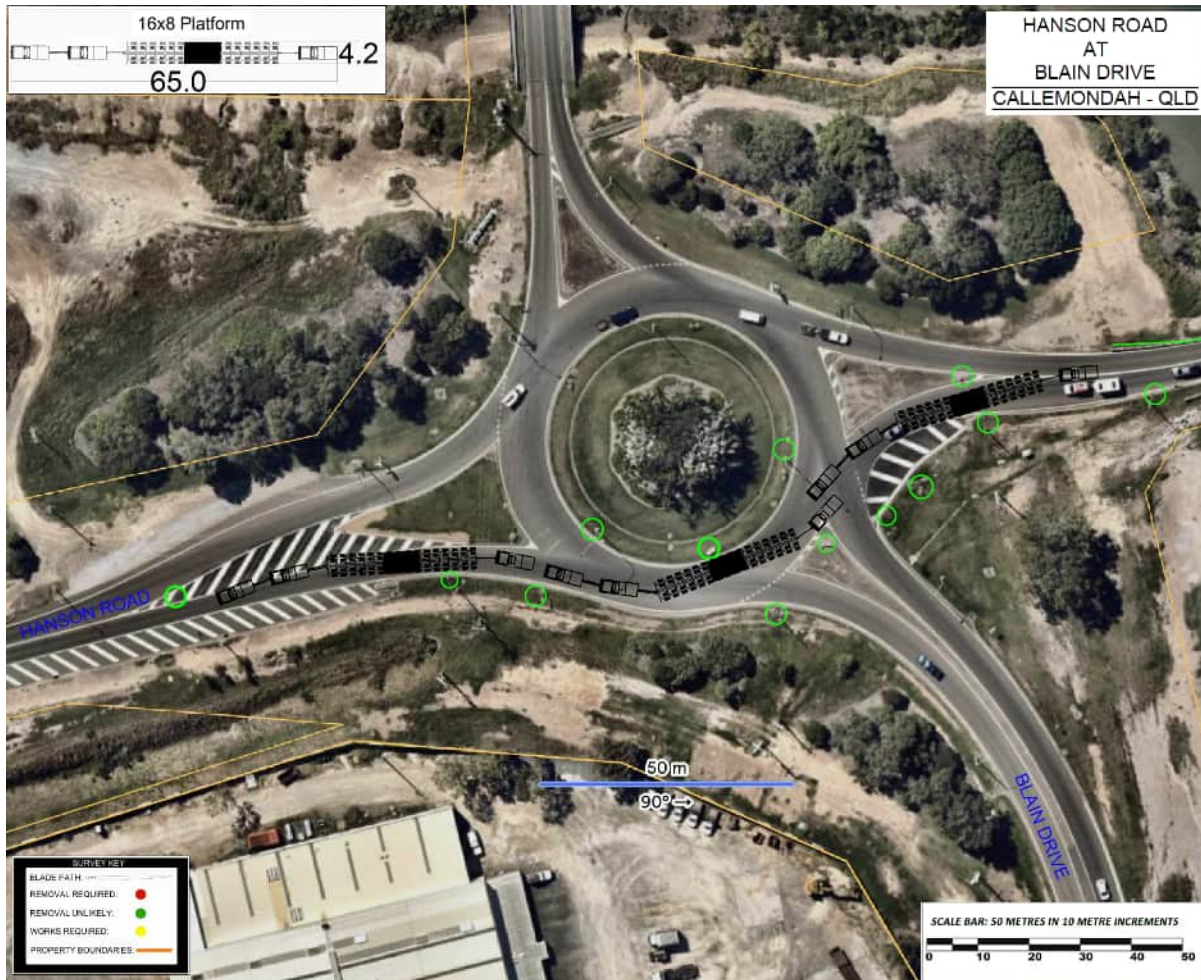


Figure 25 - Hanson Road through roundabout at the intersection of Blain Drive

GPS Link: <https://goo.gl/maps/6C49zBakJXZjckw9>

Procedure: Loads to travel through the roundabout on the correct side of the road at walking pace.

Modifications required: Nil.

3.8 Km's: Hanson Road Through Roundabout at the Intersection of Red Rover Road

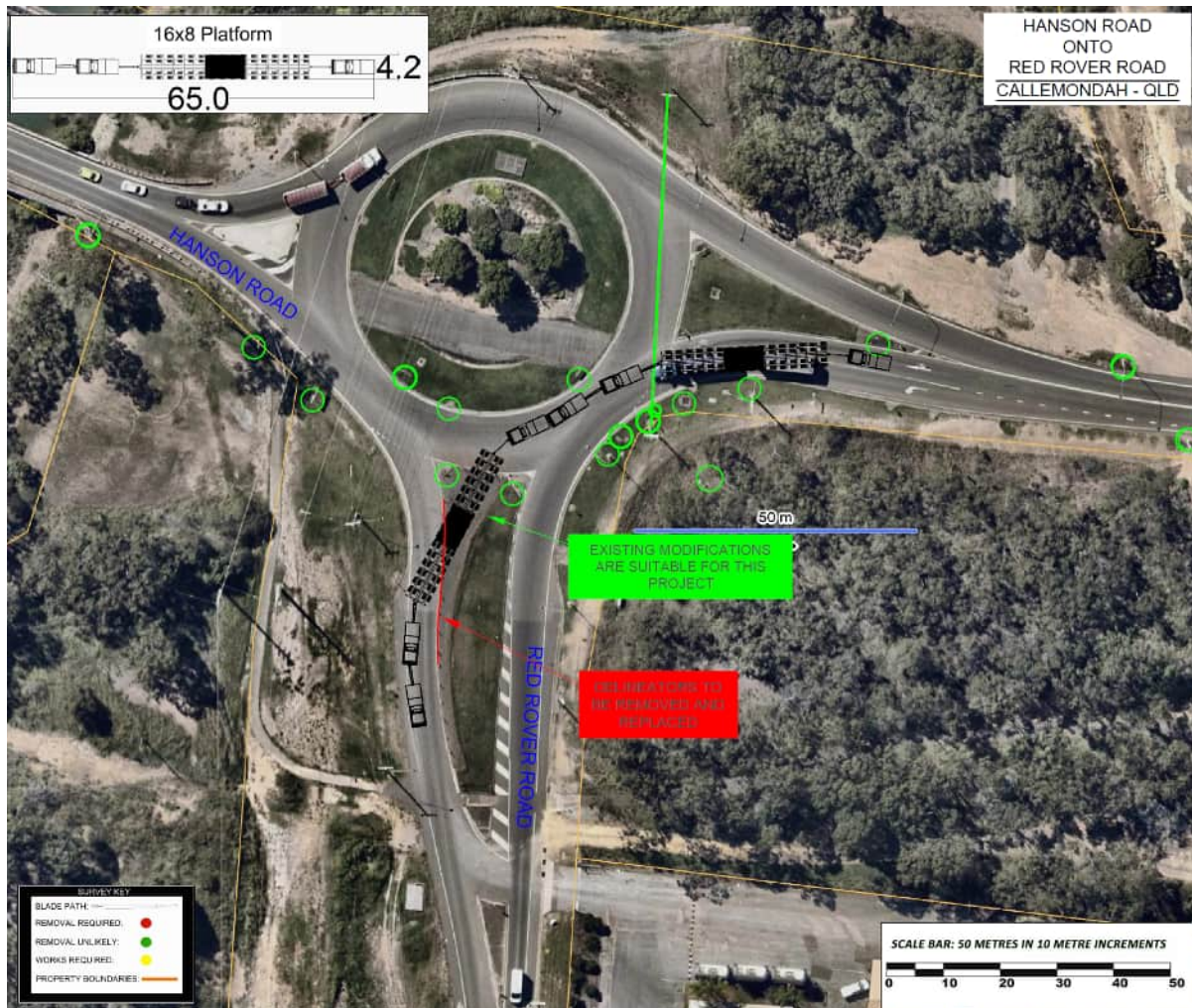


Figure 26 - Hanson Road through roundabout at the intersection of Red Rover Road

GPS Link: <https://goo.gl/maps/o2UqPC9cvomkR2nZ7>

Procedure: Loads to turn left at the roundabout onto incorrect side of road using modifications made on centre island.

Modifications required: Delineators to be removed and reinstalled.

9.4 Km's: Don Young Drive onto Dawson Highway

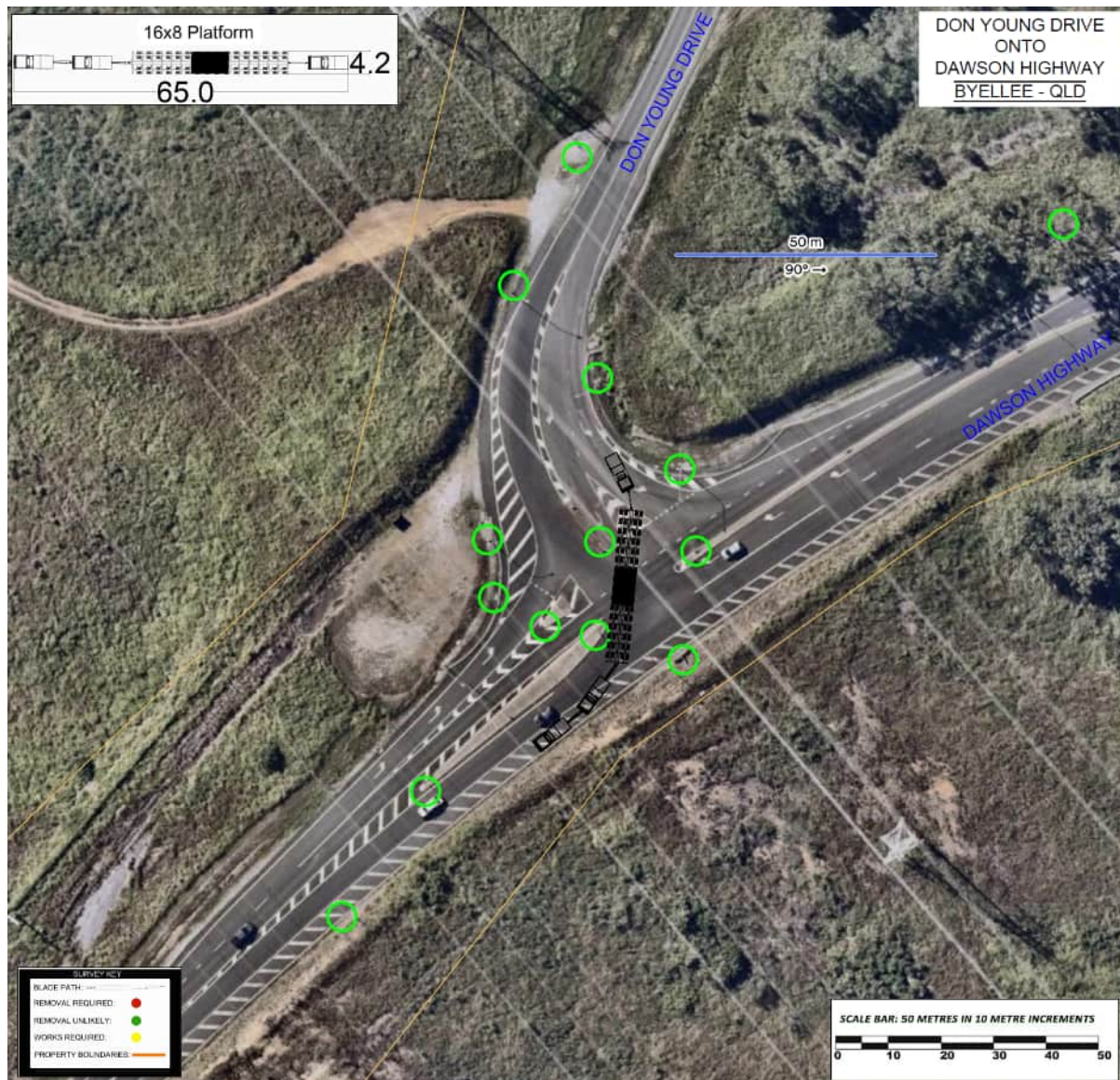


Figure 27 - Don Young Drive onto Dawson Highway

GPS Link: <https://goo.gl/maps/zn6AY8WmiG7YXpcC9>

Procedure: Right hand turn

Modifications required: Nil.

21.3 Km's: Dawson Highway onto Bruce Highway

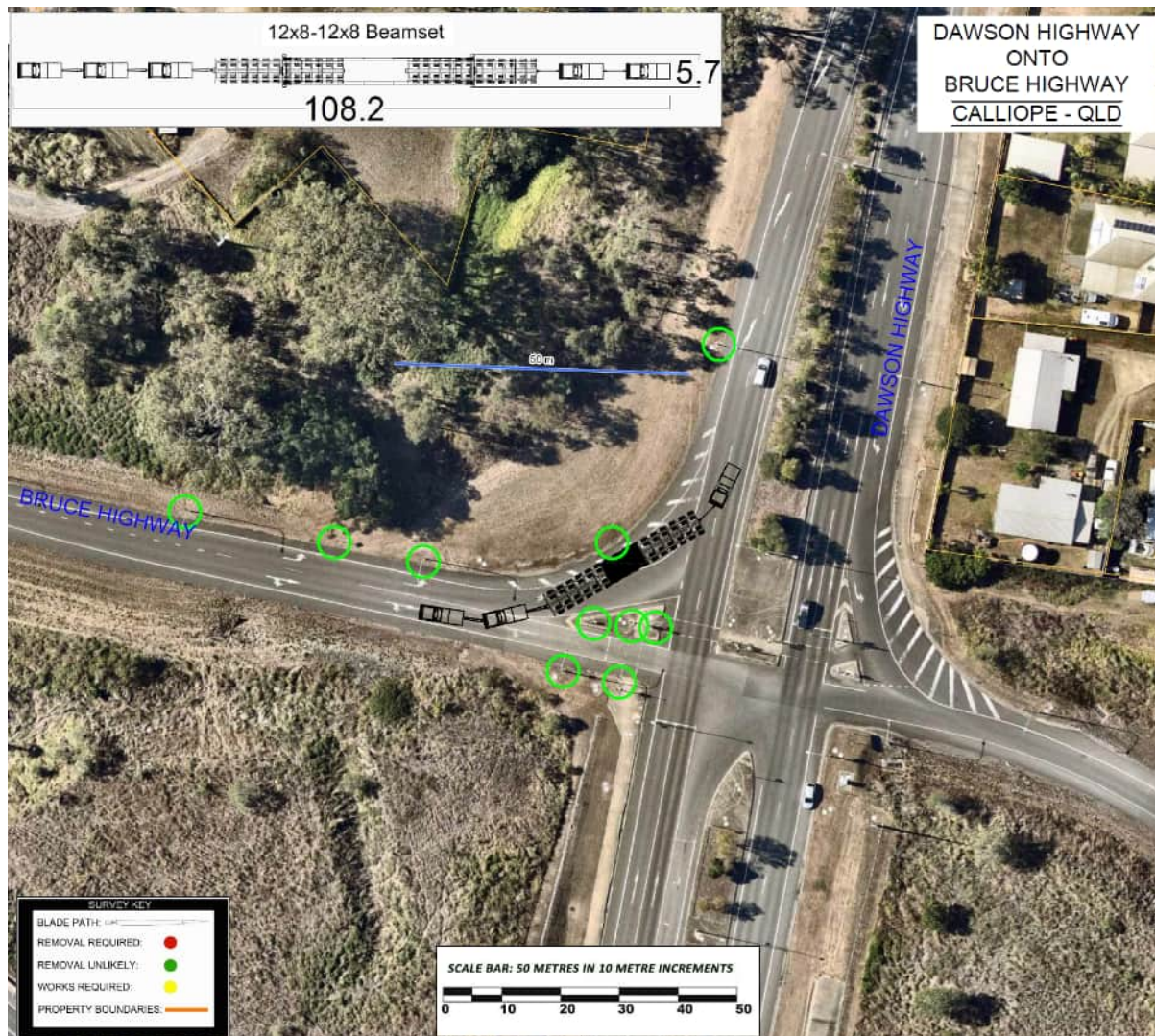


Figure 28 - Dawson Highway onto Bruce Highway

GPS Link: <https://maps.app.goo.gl/Xrevwd2DDFCakVAp7>

Procedure: Loads to cross to incorrect side of Dawson Hwy then enter Bruce Hwy via the off ramp.

Modifications required: Nil.

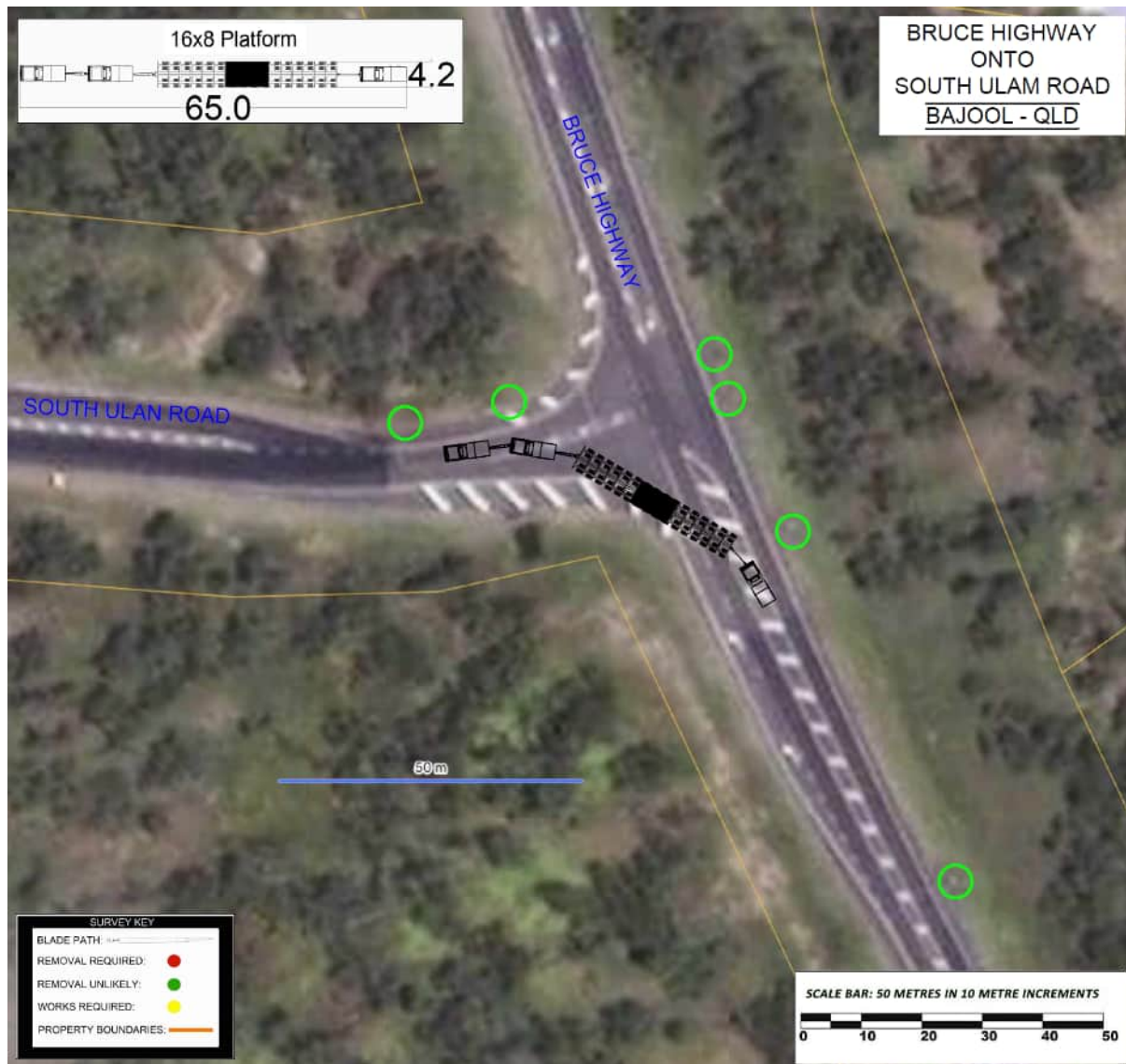
96.4 Km's: Bruce Highway onto South Ulam Road

Figure 29 - Bruce Highway onto South Ulam Road

GPS Link: <https://maps.app.goo.gl/Jrr9qAe45W9hFx2d8>**Procedure:** Left hand turn**Modifications required:** Nil.

113.0 Km's: South Ulam Road into Proposed Site Entry



Figure 30 - South Ulam Road into Proposed Site Entry

GPS Link: <https://maps.app.goo.gl/LwmzM1FYZd1fSo9j7>

Procedure: Right hand turn

Modifications required: Suitable site entry and site access roads to be constructed. Site entries and all site roads to constructed to appropriate standards to accommodate the height, weight, swept path and vertical curves of all proposed loads. Unsealed roads to be maintained for the duration of deliveries and may become un trafficable during periods of wet weather.

11.0 Route 2 - Conclusion

PORT PRECINCT

- Vegetation trimming required on foreshore.
- Approvals required to access the closed section of Flinders Parade.
- Security required to get loads back through the port and Foreshore.

DIMENSION-WEIGHT:

- There is an internal bridge that is inside the port secure zone. Similar sized loads have crossed this structure in the past, but the loads listed in this report will need to be assessed by Gladstone Port corporation.
- All bridges structures will need to be assessed for capacity of the loads that will use this route.

DIMENSION-LENGTH:

- Road modifications are required for the length of some of the proposed components. The modifications are listed in the route reports.

DIMENSION-WIDTH:

- Up to 6.5 metres wide.

DIMENSION-HEIGHT UNDER STRUCTURES

- There is a gantry/conveyer inside the port secure zone that is adequate for a loaded height of up to 6.4 metres.

OVERHEAD UTILITIES:

- The route will need to be pre-lifted to allow a maximum loaded height of 6.2 metres.

PAVEMENT:

- The road pavement is of Highway quality up to the site entry.
- Unsealed roads will need to be upgraded to an all-weather material, with a suitable road width and maintained for the duration of the project.

VEGETATION

- Vegetation to be trimmed in several locations.

TRAVEL RESTRICTIONS:

- All routes are listed as daytime travel only. No travel restrictions are in place on these routes except for Statewide public holidays and the Easter and Christmas curfew periods. More data is available through the QLD Main Roads website: <https://www.service.transport.qld.gov.au/ExcessMassExternal/PublicConditionReport.jsp>
- Night travel is possible on this route, but will need to be applied for through a TMP and specific trip permits.

SITE ENTRANCES AND SITE ROADS

- All site access roads are to be constructed to appropriate standards to accommodate the swept path, vertical curve and weight requirements of all proposed loads. Roads are to be maintained during the life of the project.

SOUTH ULAM ROAD

- South Ulam Road has only been assessed by desktop study. Should the project proceed a detailed study is required to ensure the route can accommodate the height, weight, swept path and vertical curves of all proposed loads.

12.0 Evaluation

Assessment of the proposed routes was conducted by Rex J Andrews Engineered Transportation based on a desktop survey as well as utilising observations and previous experience on sections of the identified routes transporting equipment similar to the proposed equipment on various other projects.

The assessment was conducted utilising the knowledge, experience and intellectual property of Rex J Andrews Engineered Transportation on purpose-built equipment and is not intended for use by other parties.

The assessment considered the key constraints encountered on the routes and an estimation of the amount of work required to make the route viable based on previous experience. Table 1 shows the evaluation of each route and provides an overall ranking to give guidance on the most suitable route for the development from a transport perspective.

The assessment was based on operational factors and equipment capability and does not consider external factors such as regulatory, landholder, environmental, cultural or any other external factors beyond the knowledge or control of Rex J Andrews Engineered Transportation.

Should the project proceed a detailed transport study will be required to confirm the route is suitable and quantify the modifications required, in particular the suitability of South Ulam Road.

1	No Work								
2	Some Work								
3	Moderate Amount of Work								
4	Large Amount of Work								
		Harbour	Road Modification	Road Furnishings	Vegetation	Site Entrance	Bridge Calculations	Overhead Utilities	Overall Work Required
Route 1	Transformer in Beamset & Switch Room on Platform Trailer	1	1	2	2	4	3	2	2.0
Route 2A	Transformer on 16x8 Platform Trailer	1	1	1	2	NA	2	2	1.5
Route 2B	Transformer on 16x8 Platform Trailer	NA	1	2	2	4	3	3	2.5

Table 1 - Route Evaluation

13.0 References

Rex J Andrews Route Study 528 REV01
Rex J Andrews P/L Drawings
NEOEN
Google Earth/Maps
Nearmaps
NHVR (OSOM)
NHVAS Maintenance Management (NHVAS21193)
NHVAS Basic Fatigue Management (NHVAS21193)
Australian Load Restraint Guide

Disclaimer: This route study is a guide only, government approvals would be required before these routes could be deemed suitable for transporting the components over the listed routes.

Any and all parties using the information contained in this submission do so at their own risk.

RJA accepts no responsibility for the use of all information contained within this report.

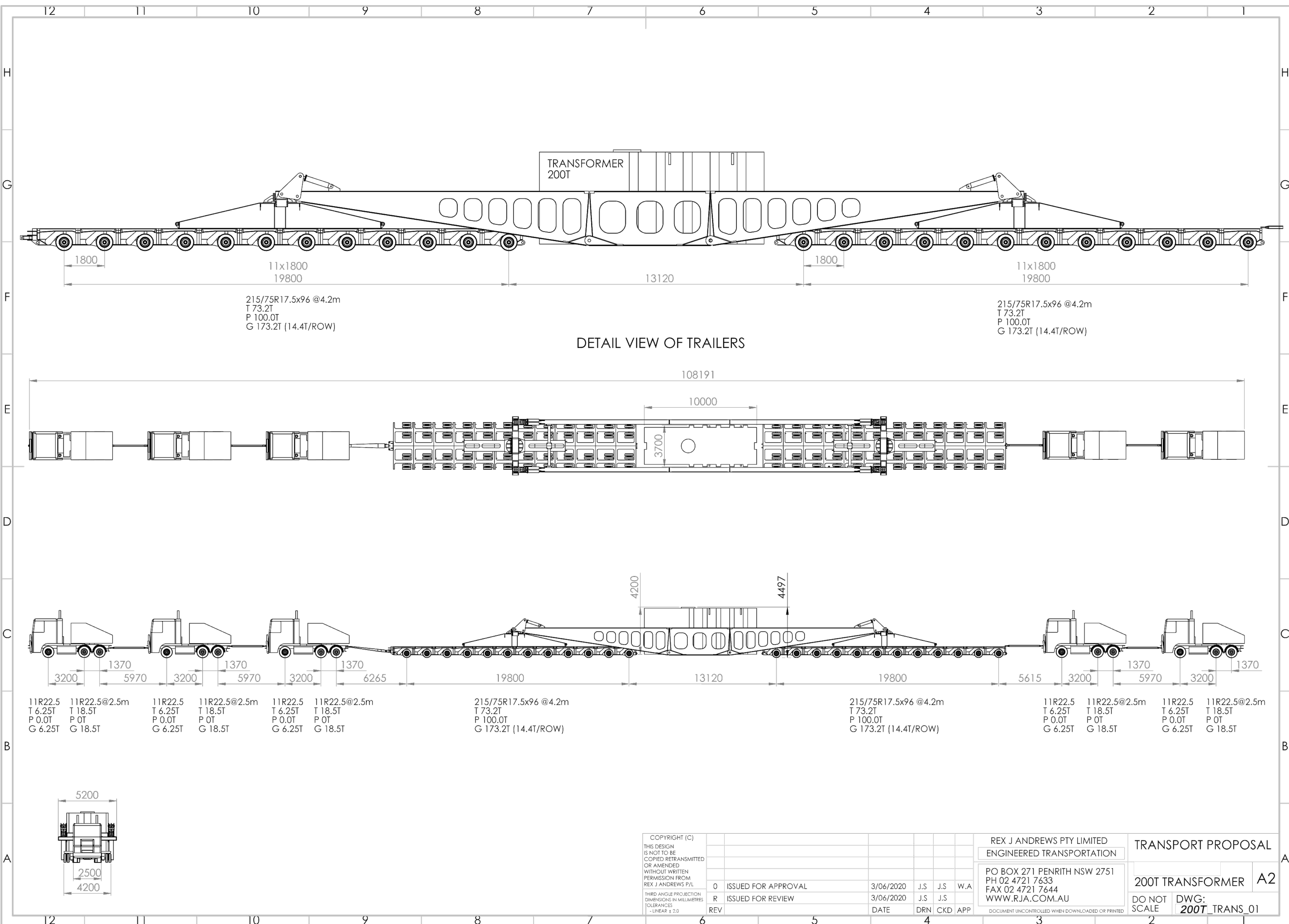
Actual approved routes may differ from those surveyed.

Proposed routes may change subject to approvals from authorities.

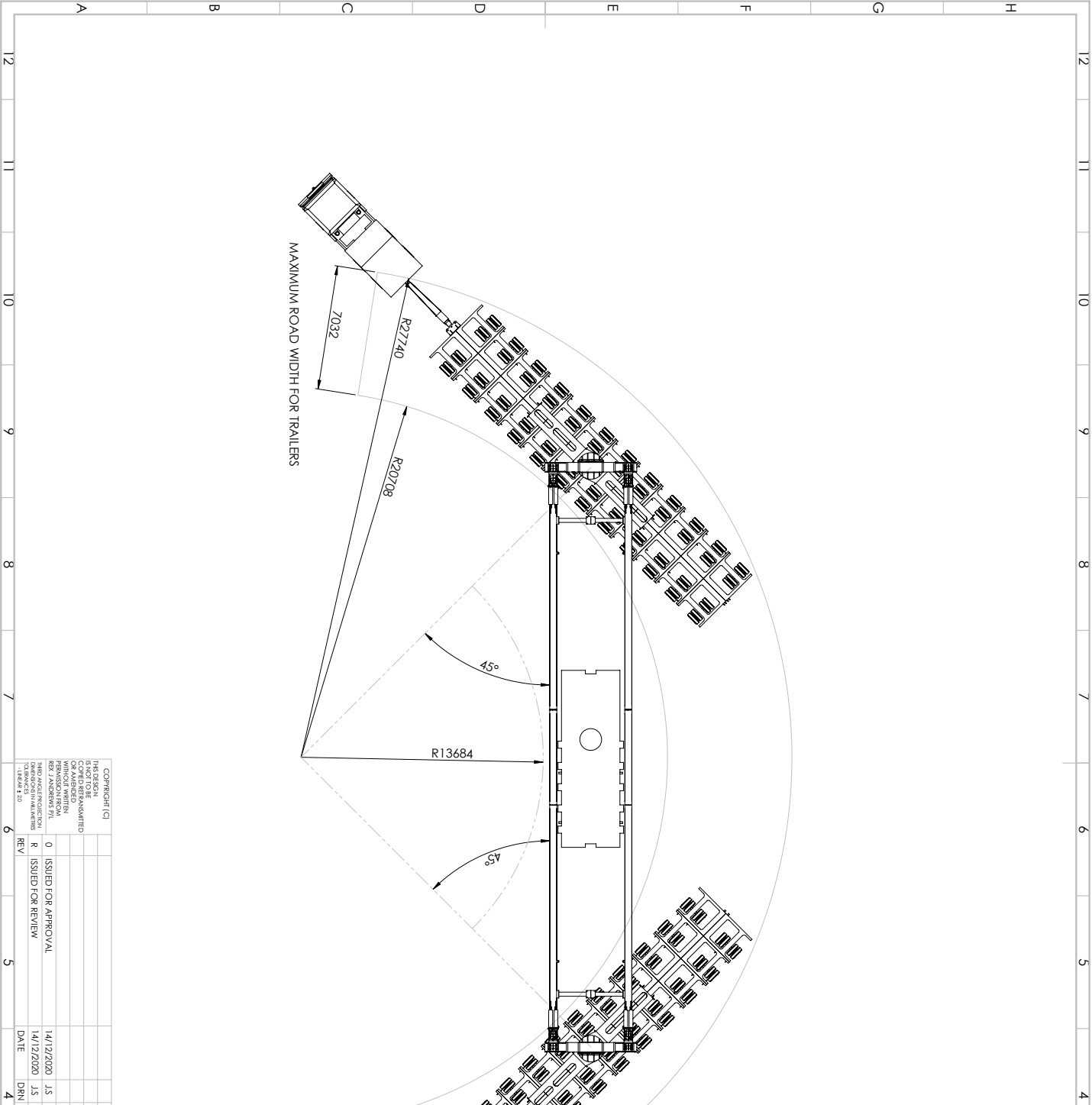
This study was undertaken using data supplied by Rex J Andrews P/L. Equipment and swept paths might vary if using transport methodology other than the data supplied by Rex J Andrews.

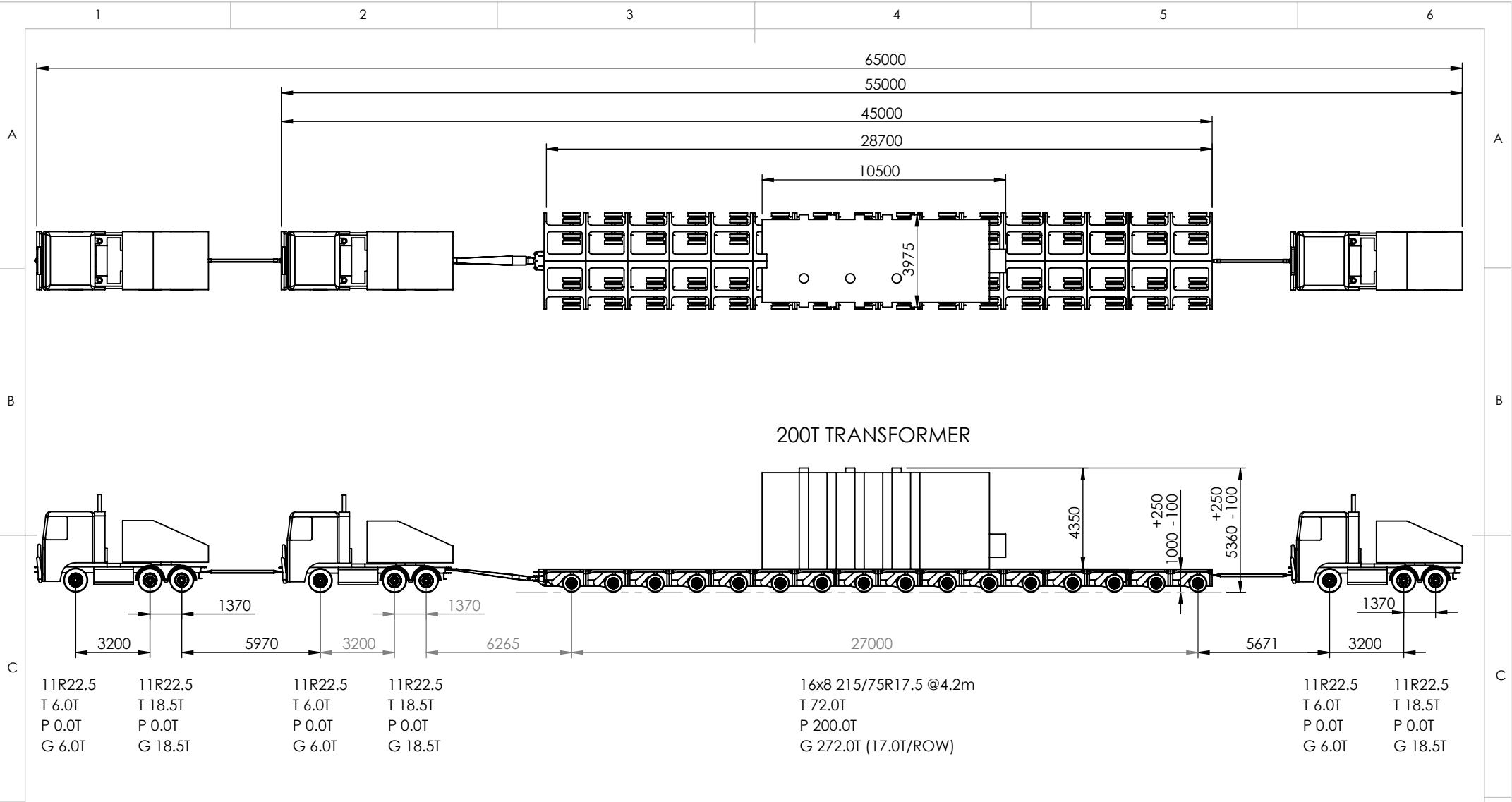
14.0 Appendix 1 – Transport Drawings (Examples)

\\SERVER\Volume_1\Projects\Blade transporters\Goldwind Transformers\CCWF_TRANS_01



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REV				DATE				DWG: 200T_TRANS_01	
O				ISSUED FOR APPROVAL				DO NOT SCALE	
R				ISSUED FOR REVIEW				A2	
				3/06/2020					
				J.S. J.S. W.A.					
				3/06/2020					
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TRUCKS	1	2	3
TARE	96.5T	121T	145.5T
GVM	296.5T	321T	345.5T

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	R	ISSUED FOR REVIEW	26/06/2025	J.S	W.A	
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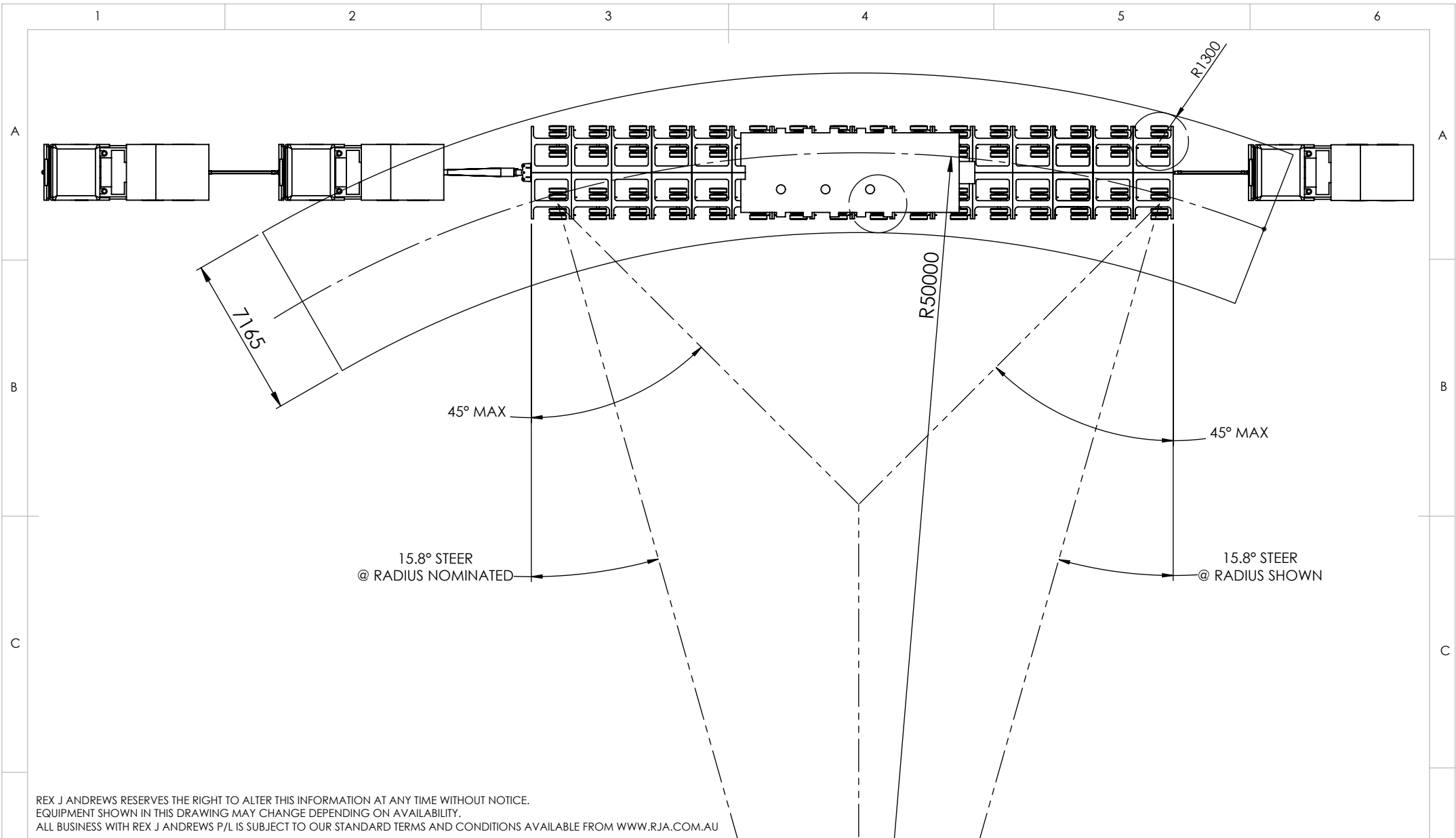
TRANSPORT PROPOSAL

TRANSFORMER
200T 16x8

A4

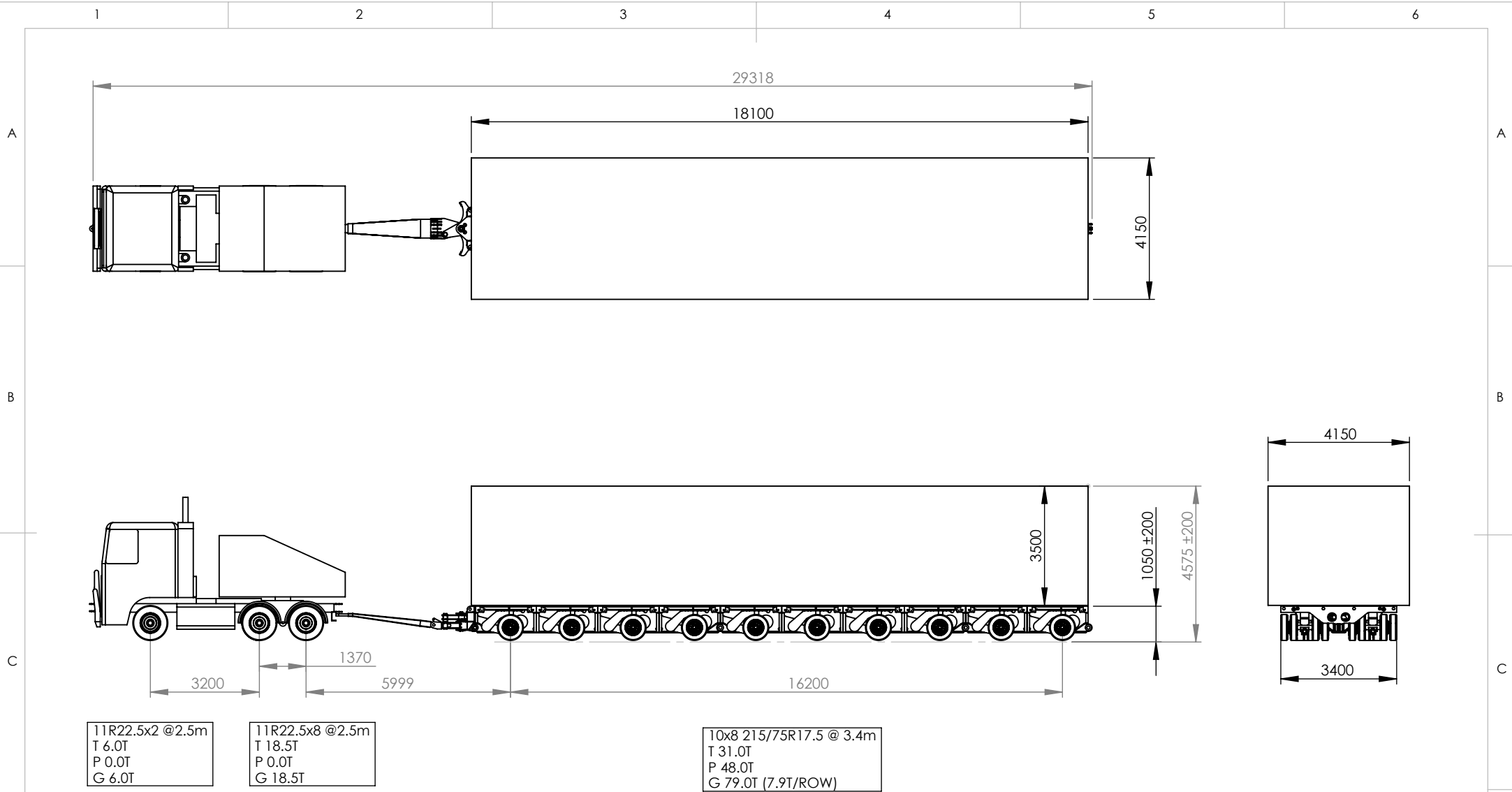
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THIRD ANGLE PROJECTION DIMENSIONS IN MILLIMETRES TOLERANCES - LINEAR ± 2.0							PO BOX 271 PENRITH NSW 2751 PH 02 4721 7633 FAX 02 4721 7644 WWW.RJA.COM.AU		A4	
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R ISSUED FOR REVIEW							26/06/2025		J.S W.A	
DATE							DRN		CKD APP	
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TARE	55.5T
GVM	103.5T

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							PO BOX 271 PENRITH NSW 2751 PH 02 4721 7633 FAX 02 4721 7644 WWW.RJA.COM.AU		SWITCHROOM 48T 10x8		
	0	ISSUED FOR APPROVAL	07/08/2025	J.S	H.A	R.A	DOCUMENT UNCONTROLLED WHEN DOWNLOADED OR PRINTED		DO NOT SCALE	DRG NO: SWITCH_ 18.1m_48T_10x8	A4
	R	ISSUED FOR REVIEW	07/08/2025	J.S	H.A						
THIRD ANGLE PROJECTION DIMENSIONS IN MILLIMETRES TOLERANCES - LINEAR ± 5.0	REV		DATE	DRN	CKD	APP					



Appendix B – Bruce Highway / South Ulam Road Intersection Count



Appendix C – Intersection Volume Forecast Calculations



Appendix D – SIDRA Results – Bruce Highway / South Ulam Road Intersection

MOVEMENT SUMMARY

▼ Site: 1 [EXISTING 2025 AM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	[Dist]				km/h
South: Bruce Highway															
1	L2	All MCs	1	0.0	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	52.9
2	T1	All MCs	200	20.5	200	20.5	0.115	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			201	20.4	201	20.4	0.115	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Bruce Highway															
8	T1	All MCs	226	24.2	226	24.2	0.133	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	3	33.3	3	33.3	0.003	7.1	LOS A	0.0	0.1	0.34	0.54	0.34	50.6
Approach			229	24.3	229	24.3	0.133	0.1	NA	0.0	0.1	0.00	0.01	0.00	59.8
West: South Ulam Road															
10	L2	All MCs	4	50.0	4	50.0	0.007	7.5	LOS A	0.0	0.2	0.37	0.56	0.37	49.6
12	R2	All MCs	1	0.0	1	0.0	0.007	9.2	LOS A	0.0	0.2	0.37	0.56	0.37	51.7
Approach			5	40.0	5	40.0	0.007	7.8	LOS A	0.0	0.2	0.37	0.56	0.37	50.0
All Vehicles			436	22.7	436	22.7	0.133	0.2	NA	0.0	0.2	0.01	0.01	0.01	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

▼ Site: 1 [EXISTING 2025 PM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	[Dist]				km/h
South: Bruce Highway															
1	L2	All MCs	5 60.0		5 60.0		0.004	6.2	LOS A	0.0	0.0	0.00	0.57	0.00	50.5
2	T1	All MCs	239 18.5		239 18.5		0.136	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			244 19.4		244 19.4		0.136	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7
North: Bruce Highway															
8	T1	All MCs	242 28.7		242 28.7		0.146	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	1 0.0		1 0.0		0.001	6.5	LOS A	0.0	0.0	0.34	0.52	0.34	51.8
Approach			243 28.6		243 28.6		0.146	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
West: South Ulam Road															
10	L2	All MCs	3 0.0		3 0.0		0.012	6.5	LOS A	0.0	0.4	0.53	0.61	0.53	48.8
12	R2	All MCs	2 100.0		2 100.0		0.012	18.7	LOS B	0.0	0.4	0.53	0.61	0.53	45.8
Approach			5 40.0		5 40.0		0.012	11.4	LOS A	0.0	0.4	0.53	0.61	0.53	47.5
All Vehicles			493 24.1		493 24.1		0.146	0.2	NA	0.0	0.4	0.01	0.01	0.01	59.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

▼ Site: 1 [PRE DEV 2027 AM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh.]	Dist]				
			veh/h		veh/h		v/c	sec		veh	m				km/h
South: Bruce Highway															
1	L2	All MCs	1	0.0	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	52.9
2	T1	All MCs	204	20.6	204	20.6	0.118	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			205	20.5	205	20.5	0.118	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Bruce Highway															
8	T1	All MCs	231	24.2	231	24.2	0.135	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	3	33.3	3	33.3	0.003	7.1	LOS A	0.0	0.1	0.34	0.54	0.34	50.6
Approach			234	24.3	234	24.3	0.135	0.1	NA	0.0	0.1	0.00	0.01	0.00	59.8
West: South Ulam Road															
10	L2	All MCs	4	50.0	4	50.0	0.007	7.5	LOS A	0.0	0.2	0.37	0.56	0.37	49.6
12	R2	All MCs	1	0.0	1	0.0	0.007	9.3	LOS A	0.0	0.2	0.37	0.56	0.37	51.7
Approach			5	40.0	5	40.0	0.007	7.9	LOS A	0.0	0.2	0.37	0.56	0.37	50.0
All Vehicles			444	22.7	444	22.7	0.135	0.2	NA	0.0	0.2	0.01	0.01	0.01	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

▼ Site: 1 [PRE DEV 2027 PM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	[Dist]				km/h
South: Bruce Highway															
1	L2	All MCs	5	60.0	5	60.0	0.004	6.2	LOS A	0.0	0.0	0.00	0.57	0.00	50.5
2	T1	All MCs	244	18.5	244	18.5	0.139	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			249	19.4	249	19.4	0.139	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7
North: Bruce Highway															
8	T1	All MCs	246	28.6	246	28.6	0.148	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	1	0.0	1	0.0	0.001	6.6	LOS A	0.0	0.0	0.35	0.52	0.35	51.8
Approach			247	28.5	247	28.5	0.148	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
West: South Ulam Road															
10	L2	All MCs	3	0.0	3	0.0	0.012	6.6	LOS A	0.0	0.4	0.54	0.62	0.54	48.7
12	R2	All MCs	2	100.0	2	100.0	0.012	19.1	LOS B	0.0	0.4	0.54	0.62	0.54	45.7
Approach			5	40.0	5	40.0	0.012	11.6	LOS A	0.0	0.4	0.54	0.62	0.54	47.4
All Vehicles			502	24.1	502	24.1	0.148	0.2	NA	0.0	0.4	0.01	0.01	0.01	59.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

▼ Site: 1 [STG 1 PEAK CONST 2027 AM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	[Dist]				km/h
South:															
1	L2	All MCs	2	50.0	2	50.0	0.002	6.1	LOS A	0.0	0.0	0.00	0.57	0.00	50.9
2	T1	All MCs	204	20.6	204	20.6	0.118	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			206	20.9	206	20.9	0.118	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
North: Bruce Highway															
8	T1	All MCs	231	24.2	231	24.2	0.135	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	48	4.3	48	4.3	0.043	6.6	LOS A	0.2	1.2	0.33	0.58	0.33	51.7
Approach			279	20.8	279	20.8	0.135	1.2	NA	0.2	1.2	0.06	0.10	0.06	58.3
West: South Ulam Road															
10	L2	All MCs	5	60.0	5	60.0	0.013	7.8	LOS A	0.0	0.5	0.44	0.59	0.44	48.2
12	R2	All MCs	2	50.0	2	50.0	0.013	14.1	LOS A	0.0	0.5	0.44	0.59	0.44	48.9
Approach			7	57.1	7	57.1	0.013	9.6	LOS A	0.0	0.5	0.44	0.59	0.44	48.4
All Vehicles			493	21.4	493	21.4	0.135	0.8	NA	0.2	1.2	0.04	0.07	0.04	58.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

▼ Site: 1 [STG 1 PEAK CONST 2027 PM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh]	[Dist]				km/h
South: Bruce Highway															
1	L2	All MCs	6	66.7	6	66.7	0.005	6.3	LOS A	0.0	0.0	0.00	0.57	0.00	50.2
2	T1	All MCs	244	18.5	244	18.5	0.139	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			251	19.7	251	19.7	0.139	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
North: Bruce Highway															
8	T1	All MCs	246	28.6	246	28.6	0.148	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	1	100.0	1	100.0	0.002	9.2	LOS A	0.0	0.1	0.43	0.54	0.43	46.8
Approach			247	28.9	247	28.9	0.148	0.1	NA	0.0	0.1	0.00	0.00	0.00	59.8
West: South Ulam Road															
10	L2	All MCs	48	2.2	48	2.2	0.061	6.7	LOS A	0.2	1.6	0.39	0.61	0.39	51.3
12	R2	All MCs	3	100.0	3	100.0	0.061	20.3	LOS B	0.2	1.6	0.39	0.61	0.39	48.1
Approach			52	8.2	52	8.2	0.061	7.5	LOS A	0.2	1.6	0.39	0.61	0.39	51.1
All Vehicles			549	22.8	549	22.8	0.148	0.8	NA	0.2	1.6	0.04	0.07	0.04	58.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

▼ Site: 1 [PRE DEV 2029 AM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh.]	Dist]				
			veh/h		veh/h		v/c	sec		veh	m				km/h
South: Bruce Highway															
1	L2	All MCs	1	0.0	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	52.9
2	T1	All MCs	209	20.6	209	20.6	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			211	20.5	211	20.5	0.121	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
North: Bruce Highway															
8	T1	All MCs	235	24.2	235	24.2	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	3	33.3	3	33.3	0.003	7.2	LOS A	0.0	0.1	0.35	0.54	0.35	50.5
Approach			238	24.3	238	24.3	0.138	0.1	NA	0.0	0.1	0.00	0.01	0.00	59.8
West: South Ulam Road															
10	L2	All MCs	4	50.0	4	50.0	0.007	7.6	LOS A	0.0	0.2	0.38	0.57	0.38	49.5
12	R2	All MCs	1	0.0	1	0.0	0.007	9.4	LOS A	0.0	0.2	0.38	0.57	0.38	51.6
Approach			5	40.0	5	40.0	0.007	8.0	LOS A	0.0	0.2	0.38	0.57	0.38	50.0
All Vehicles			454	22.7	454	22.7	0.138	0.2	NA	0.0	0.2	0.01	0.01	0.01	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

▼ Site: 1 [PRE DEV 2029 PM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	[Dist]				km/h
South: Bruce Highway															
1	L2	All MCs	5 60.0		5 60.0		0.004	6.2	LOS A	0.0	0.0	0.00	0.57	0.00	50.5
2	T1	All MCs	249 18.6		249 18.6		0.142	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			255 19.4		255 19.4		0.142	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.7
North: Bruce Highway															
8	T1	All MCs	252 28.9		252 28.9		0.152	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	1 0.0		1 0.0		0.001	6.6	LOS A	0.0	0.0	0.35	0.52	0.35	51.8
Approach			253 28.8		253 28.8		0.152	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
West: South Ulam Road															
10	L2	All MCs	3 0.0		3 0.0		0.012	6.6	LOS A	0.0	0.4	0.55	0.62	0.55	48.5
12	R2	All MCs	2 100.0		2 100.0		0.012	19.6	LOS B	0.0	0.4	0.55	0.62	0.55	45.6
Approach			5 40.0		5 40.0		0.012	11.8	LOS A	0.0	0.4	0.55	0.62	0.55	47.3
All Vehicles			513 24.2		513 24.2		0.152	0.2	NA	0.0	0.4	0.01	0.01	0.01	59.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

▼ Site: 1 [STG 2 PEAK CONST 2029 AM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh.]	[Dist]				km/h
South:															
1	L2	All MCs	2	50.0	2	50.0	0.002	6.1	LOS A	0.0	0.0	0.00	0.57	0.00	50.9
2	T1	All MCs	209	20.6	209	20.6	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			212	20.9	212	20.9	0.121	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
North: Bruce Highway															
8	T1	All MCs	235	24.2	235	24.2	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	29	3.6	29	3.6	0.026	6.5	LOS A	0.1	0.7	0.33	0.57	0.33	51.8
Approach			264	21.9	264	21.9	0.138	0.8	NA	0.1	0.7	0.04	0.06	0.04	58.9
West: South Ulam Road															
10	L2	All MCs	4	50.0	4	50.0	0.011	7.6	LOS A	0.0	0.4	0.45	0.59	0.45	48.5
12	R2	All MCs	2	50.0	2	50.0	0.011	13.9	LOS A	0.0	0.4	0.45	0.59	0.45	48.8
Approach			6	50.0	6	50.0	0.011	9.7	LOS A	0.0	0.4	0.45	0.59	0.45	48.6
All Vehicles			482	21.8	482	21.8	0.138	0.6	NA	0.1	0.7	0.03	0.04	0.03	59.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

▼ Site: 1 [STG 2 PEAK CONST 2029 PM Peak (Site Folder: 1. Bruce Highway / South Ulam Road)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Bruce Highway / South Ulam Road
Existing Intersection Configuration
Site Category: NA
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Bruce Highway															
1	L2	All MCs	6	66.7	6	66.7	0.005	6.3	LOS A	0.0	0.0	0.00	0.57	0.00	50.2
2	T1	All MCs	249	18.6	249	18.6	0.142	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			256	19.8	256	19.8	0.142	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.6
North: Bruce Highway															
8	T1	All MCs	252	28.9	252	28.9	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
9	R2	All MCs	1	100.0	1	100.0	0.002	9.3	LOS A	0.0	0.1	0.44	0.54	0.44	46.7
Approach			253	29.2	253	29.2	0.152	0.1	NA	0.0	0.1	0.00	0.00	0.00	59.8
West: South Ulam Road															
10	L2	All MCs	29	0.0	29	0.0	0.043	6.7	LOS A	0.1	1.1	0.41	0.61	0.41	51.1
12	R2	All MCs	3	100.0	3	100.0	0.043	20.4	LOS B	0.1	1.1	0.41	0.61	0.41	47.8
Approach			33	9.7	33	9.7	0.043	8.0	LOS A	0.1	1.1	0.41	0.61	0.41	50.7
All Vehicles			541	23.5	541	23.5	0.152	0.6	NA	0.1	1.1	0.03	0.04	0.03	59.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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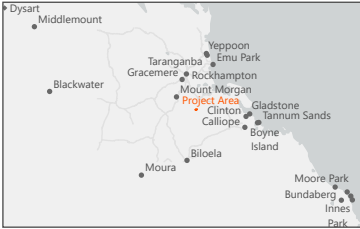


Appendix E – Plan of Development



FIGURE 1.2
Project Design

- Legend
- Study Area
 - Access road
 - BESS area
 - Overhead and underground line
 - Substation area
 - Switchyard area
 - Road



Scale 1:12,500 at A4
GDA2020 MGA Zone 56



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Appendix F – Project Traffic Volumes and Impact Calculations

UMW0125-001 | Mount Hopeful Battery Project
Site Properties
Site Components

Element	Qty	Unit
Length Access Track	1,800	m
Number of Substation Areas	1	ea
Number of BESS Areas	1	ea
Number of Switchyard Areas	1	ea
Staff Water Demand (L/Day)	30	L/day
Average Construction Staff (Stage 1)	90	staff
Overall Construction Period (Stage 1)	791	days
Dust Suppression Construction Period (Stage 1)	791	days
Average Construction Staff (Stage 1)	35	staff
Overall Construction Period (Stage 1)	426	days
Dust Suppression Construction Period (Stage 1)	426	days
% Site Area Dust Suppression per day	10%	
Dust Suppression Water Rate (KL/m2/day)	0.0015	KL/m2/day
% of Gravel Materials Sourced Onsite	0%	%
% of Gravel Materials Imported	100%	%
% of Water Sourced Onsite	0%	%
% of Water Imported	100%	%
% of Bedding Sand (Electrical) Sourced Onsite	0%	%
% of Bedding Sand (Electrical) Imported	100%	%

Site Areas (Each Area)

Element	Number Sites	Total Hardstand Area	Unit	% Gravel	Gravel Area	% Concrete	Concrete Area	Unit
Substation Area (Stage 1)	1	32,610	m2	95%	30,979	5%	1,630	m2
BESS Area (Stage 1)	1	80,270	m2	95%	76,257	5%	4,014	m2
Switchyard Area (Stage 1)	1	81,100	m2	95%	77,045	5%	4,055	m3
Substation Area (Stage 2)	1	12,890	m2	95%	12,246	5%	645	m2
BESS Area (Stage 2)	1	31,730	m2	95%	30,143	5%	1,586	m2

Material Assumptions

Element	Qty	Unit
Access Track Width	5.5	m
Access Track Pavement Depth	0.2	m
Substation Area Concrete Depth	0.2	m
Substation Area Gravel Depth	0.1	m
BESS Area Concrete Depth	0.2	m
BESS Area Gravel Depth	0.1	m
Switchyard Area Concrete Depth	0.2	m
Switchyard Area Gravel Depth	0.1	m

Movements
Site Component Vehicle Movements

Element	Task	Qty per Unit	Unit	Site Qty	Site Transport Qty	Vehicle Type	Vehicle Capacity	Movements
Mobilisation (Buildings / EW Plant) (Stage 1)	1A	-	each	40	40	Semi / Low Loader	1	40
BESS - Battery Components (Stage 1)	1D	-	each	466	466	Semi	1	466
BESS - Ancillary Components (Stage 1)	1D	-	each	50	50	Semi	1	50
BESS - Trench Bedding Sand Materials (Stage 1)	1D	-	each	10	10	Truck & Dog Trailer	1	10
BESS - Electrical Components (MV Transformers) (Stage 1)	1D	-	each	118	118	Semi	1	118
BESS - Battery Components (Stage 2)	2B	-	each	184	184	Semi	1	184
BESS - Ancillary Components (Stage 2)	2B	-	each	20	20	Semi	1	20
BESS - Trench Bedding Sand Materials (Stage 2)	2B	-	each	5	5	Truck & Dog Trailer	1	5
BESS - Electrical Components (MV Transformers) (Stage 2)	2B	-	each	46	46	Semi	1	46
Substation - Trench Bedding Sand Materials (Stage 1)	1E	-	each	10	10	Truck & Dog Trailer	1	10
Substation - Transformers (Stage 1)	1E	-	each	2	2	OSOM Special	1	2
Substation - Switch Room (Stage 1)	1E	-	each	3	3	OSOM Special	1	3
Substation - Trench Bedding Sand Materials (Stage 2)	2C	-	each	5	5	Truck & Dog Trailer	1	5
Switchyard - Electrical Components (Stage 1)	1F	-	each	100	100	Semi	1	100
Switchyard - Trench Bedding Sand Materials (Stage 1)	1F	-	each	10	10	Truck & Dog Trailer	1	10
Testing & Commissioning - Ancillary Components (Stage 1)	1G	-	each	50	50	Rigid Truck	1	50
Testing & Commissioning - Ancillary Components (Stage 2)	2D	-	each	25	25	Rigid Truck	1	25
							Total	1,119

Demobilisation

Element	Task	Qty per Unit	Unit	Site Qty	Site Transport Qty	Vehicle Type	Vehicle Capacity	Movements
BESS Area Decommissioning (Stage 1)	1H	-	each	20	20	Semi	1	20
Substation Area Decommissioning (Stage 1)	1H	-	each	20	20	Semi	1	20
Switchyard Area Decommissioning (Stage 1)	1H	-	each	20	20	Semi	1	20
General Demobilisation (Buildings / EW Plant) (Stage 1)	1H	-	each	40	40	Semi	1	40
BESS Area Decommissioning (Stage 2)	2E	-	each	10	10	Semi	1	10
Substation Area Decommissioning (Stage 2)	2E	-	each	10	10	Semi	1	10
General Demobilisation (Buildings / EW Plant) (Stage 2)	2E	-	each	15	15	Semi	1	15
							Total	135

Construction Materials

Element	Task	Qty per Unit	Unit	Volume (m3)	Site Qty (tonnes)	Site Transport Qty	Vehicle Type	Vehicle Capacity (tonnes)	Movements
Substation Area Concrete (Stage 1)	1C	2.5	t/m3	326	815	815	Concrete Truck	14.4	57
Substation Area Gravel Material (Stage 1)	1C	1.8	t/m3	3,098	5,576	5,576	Truck & Dog Trailer	36	155
Substation Area Construction Water (Stage 1)	1C	1	t/m3	155	155	155	14KL Water Cart	14	12
BESS Area Concrete (Stage 1)	1C	2.5	t/m3	803	2,007	2,007	Concrete Truck	14.4	140
BESS Area Gravel Material (Stage 1)	1C	1.8	t/m3	7,626	13,726	13,726	Truck & Dog Trailer	36	382
BESS Area Construction Water (Stage 1)	1C	1	t/m3	381	381	381	14KL Water Cart	14	28
Switchyard Area Concrete (Stage 1)	1C	2.5	t/m3	811	2,028	2,028	Concrete Truck	14.4	141
Switchyard Area Gravel Material (Stage 1)	1C	1.8	t/m3	7,705	13,868	13,868	Truck & Dog Trailer	36	386
Switchyard Area Construction Water (Stage 1)	1C	1	t/m3	385	385	385	14KL Water Cart	14	28
Substation Area Concrete (Stage 2)	2A	2.5	t/m3	129	322	322	Concrete Truck	14.4	23
Substation Area Gravel Material (Stage 2)	2A	1.8	t/m3	1,225	2,204	2,204	Truck & Dog Trailer	36	62
Substation Area Construction Water (Stage 2)	2A	1	t/m3	61	61	61	14KL Water Cart	14	5
BESS Area Concrete (Stage 2)	2A	2.5	t/m3	317	793	793	Concrete Truck	14.4	56
BESS Area Gravel Material (Stage 2)	2A	1.8	t/m3	3,014	5,426	5,426	Truck & Dog Trailer	36	151
BESS Area Construction Water (Stage 2)	2A	1	t/m3	151	151	151	14KL Water Cart	14	11
Access Intersection Pavement Materials (Stage 1)	1B	1.8	t/m3	750	1,350	1,350	Truck & Dog Trailer	36	38
Access Intersection Construction Water (Stage 1)	1B	1	t/m3	38	38	38	14KL Water Cart	14	3
Access Track Pavement Materials (Stage 1)	1B	1.8	t/m3	1,980	3,564	3,564	Truck & Dog Trailer	36	99
Access Track Construction Water (Stage 1)	1B	1	t/m3	99	99	99	14KL Water Cart	14	8
Site Water - Staff Compound (Stage 1)	1W	1	t/m3	2,135	2,135	2,135	14KL Water Cart	14	153
Site Water - Dust Suppression (Stage 1)	1W	1	t/m3	1,175	1,175	1,175	14KL Water Cart	14	84
Site Water - Staff Compound (Stage 2)	2W	1	t/m3	447	447	447	14KL Water Cart	14	32
Site Water - Dust Suppression (Stage 2)	2W	1	t/m3	633	633	633	14KL Water Cart	14	46
Site Fuel - Overall	FU					160	Semi Tanker	1	161
Waste Collection - Overall	WC					160	Semi	1	161
								Total	2,422

UMW0125-001 | Mount Hopeful Battery Project

Site Vehicle Movement Summary - Stage 1

Assumed Work Days per Month 24 days

TASK 1A - MOBILISATION

Task Transport Duration 1 month

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Mobilisation (Buildings / EW Plant) (Stage 1)	40	Semi / Low Loader	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	40	40	2
South Ulam Road (Bruce Highway - Site Access)	40	40	2

TASK 1B - SITE ACCESS AND INTERNAL ACCESS ROAD

Task Transport Duration 2 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Access Intersection Pavement Materials (Stage 1)	38	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Access Intersection Construction Water (Stage 1)	3	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Access Track Pavement Materials (Stage 1)	99	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Access Track Construction Water (Stage 1)	8	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	137	69	3
Bruce Highway (South Ulam Road - Rockhampton)	11	6	1
South Ulam Road (Bruce Highway - Site Access)	148	74	4

TASK 1C - CIVIL WORKS

Task Transport Duration 6 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation Area Concrete (Stage 1)	57	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Gravel Material (Stage 1)	155	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation Area Construction Water (Stage 1)	12	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Concrete (Stage 1)	140	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Gravel Material (Stage 1)	382	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS Area Construction Water (Stage 1)	28	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Switchyard Area Concrete (Stage 1)	141	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Switchyard Area Gravel Material (Stage 1)	386	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Switchyard Area Construction Water (Stage 1)	28	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	923	154	7
Bruce Highway (South Ulam Road - Rockhampton)	406	68	3
South Ulam Road (Bruce Highway - Site Access)	1,329	222	10

TASK 1D - ELECTRICAL INSTALLATION (BESS)

Task Transport Duration (Delivery) 6 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS - Battery Components (Stage 1)	466	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Ancillary Components (Stage 1)	50	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS - Electrical Components (MV Transformers) (Stage 1)	118	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	634	106	5
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	634	106	5
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	634	106	5
Bruce Highway (Bills Road - South Ulam Road)	644	108	5
Bruce Highway (South Ulam Road - Rockhampton)	0	0	0
South Ulam Road (Bruce Highway - Site Access)	644	108	5

TASK 1E - SUBSTATION WORKS

Task Transport Duration (Delivery) 6 months A

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation - Transformers (Stage 1)	2	OSOM Special	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
Substation - Switch Room (Stage 1)	3	OSOM Special	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	5	1	1
Gladstone Mount Larcom Road (GPAR to Red Rover Road)	5	1	1
Gladstone Mount Larcom Road (Red Rover Road to Bruce Highway)	0	0	0
Red Rover Road (Gladstone Mount Larcom Road to Don Young Drive)	5	1	1
Don Young Drive (Red Rover Road to Dawson Highway)	5	1	1
Dawson Highway (Don Young Drive to Bruce Highway)	5	1	1
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	5	1	1
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	5	1	1
Bruce Highway (Bills Road - South Ulam Road)	15	3	1
Bruce Highway (South Ulam Road - Rockhampton)	0	0	0
South Ulam Road (Bruce Highway - Site Access)	15	3	1

TASK 1F - SWITCHYARD WORKS

Task Transport Duration (Delivery) 6 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Switchyard - Electrical Components (Stage 1)	100	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
Switchyard - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	100	17	1
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	100	17	1
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	100	17	1
Bruce Highway (Bills Road - South Ulam Road)	110	19	1
Bruce Highway (South Ulam Road - Rockhampton)	0	0	0
South Ulam Road (Bruce Highway - Site Access)	110	19	1

TASK 1G - TESTING AND COMMISSIONING

Task Transport Duration 9 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Testing & Commissioning - Ancillary Components (Stage 1)	50	Rigid Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	50	6	1
South Ulam Road (Bruce Highway - Site Access)	50	6	1

TASK 1H - FINALISATION / COMMISSIONING / DEMOBILISATION

Task Transport Duration 3 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Swithyard Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
General Demobilisation (Buildings / EW Plant) (Stage 1)	40	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	100	34	2
South Ulam Road (Bruce Highway - Site Access)	100	34	2

TASK 1W - SITE WATER

Task Transport Duration (Staff Water) 26 months

Task Transport Duration (Dust Suppression Water) 6 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Water - Staff Compound (Stage 1)	153	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Site Water - Dust Suppression (Stage 1)	84	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	237	20	1
South Ulam Road (Bruce Highway - Site Access)	237	20	1

TASK F - SITE FUEL

Task Transport Duration 37 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Fuel - Overall	161	Semi Tanker	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	161	5	1
South Ulam Road (Bruce Highway - Site Access)	161	5	1

TASK WC - SITE WASTE COLLECTION

Task Transport Duration 37 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Waste Collection - Overall	161	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	161	5	1
South Ulam Road (Bruce Highway - Site Access)	161	5	1

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Site Vehicle Movement Summary - Stage 2

Assumed Work Days per Month 24 days

TASK 2A - CIVIL WORKS

Task Transport Duration 3 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation Area Concrete (Stage 2)	23	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Gravel Material (Stage 2)	62	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation Area Construction Water (Stage 2)	5	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Concrete (Stage 2)	56	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Gravel Material (Stage 2)	151	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS Area Construction Water (Stage 2)	11	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	213	71	3
Bruce Highway (South Ulam Road - Rockhampton)	95	32	2
South Ulam Road (Bruce Highway - Site Access)	308	103	5

TASK 2B - ELECTRICAL INSTALLATION (BESS)

Task Transport Duration (Delivery) 4 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS - Battery Components (Stage 2)	184	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Ancillary Components (Stage 2)	20	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Trench Bedding Sand Materials (Stage 2)	5	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS - Electrical Components (MV Transformers) (Stage 2)	46	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	250	63	3
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	250	63	3
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	250	63	3
Bruce Highway (Bills Road - South Ulam Road)	255	64	3
Bruce Highway (South Ulam Road - Rockhampton)	0	0	0
South Ulam Road (Bruce Highway - Site Access)	255	64	3

TASK 2C - SUBSTATION WORKS

Task Transport Duration (Delivery) 1 months A

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation - Trench Bedding Sand Materials (Stage 2)	5	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Red Rover Road)	0	0	0
Gladstone Mount Larcom Road (Red Rover Road to Bruce Highway)	0	0	0
Red Rover Road (Gladstone Mount Larcom Road to Don Young Drive)	0	0	0
Don Young Drive (Red Rover Road to Dawson Highway)	0	0	0
Dawson Highway (Don Young Drive to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	5	5	1
Bruce Highway (South Ulam Road - Rockhampton)	0	0	0
South Ulam Road (Bruce Highway - Site Access)	5	5	1

TASK 2D - TESTING AND COMMISSIONING

Task Transport Duration 3 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Testing & Commissioning - Ancillary Components (Stage 2)	25	Rigid Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	25	9	1
South Ulam Road (Bruce Highway - Site Access)	25	9	1

TASK 2E - FINALISATION / COMMISSIONING / DEMOBILISATION

Task Transport Duration 2 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS Area Decommissioning (Stage 2)	10	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Decommissioning (Stage 2)	10	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
General Demobilisation (Buildings / EW Plant) (Stage 2)	15	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	35	18	1
South Ulam Road (Bruce Highway - Site Access)	35	18	1

TASK 2W - SITE WATER

Task Transport Duration (Staff Water) 17 months
Task Transport Duration (Dust Suppression Water) 3 months

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Water - Staff Compound (Stage 2)	32	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Site Water - Dust Suppression (Stage 2)	46	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Road Section	Total Trips	Trips / Month	Avg. Trips / Day
Gladstone Port Access Road	0	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0	0
Bruce Highway (South Ulam Road - Rockhampton)	78	18	1
South Ulam Road (Bruce Highway - Site Access)	78	18	1

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Project Staff Movements

Project Timeframe

Element	Qty	Unit
Hours per day	12	hrs
Working days per week	7	days
Working days per month	30	days

Construction Workforce

Element	Max Staff	Unit
Peak Workforce - Stage 1	150	staff
Peak Workforce - Stage 2	50	staff

Construction Workforce Distribution - Stage 1 (Peak)

Location	Distribution	Unit	Qty	Vehicle Type	% Vehicle	Staff No. per Vehicle Type	Average Vehicle Capacity	Movements Round Trip (per day)
Rockhampton	100%	%	150	LV	50%	75	2	38
				Bus	50%	75	20	4
							Total	42

Construction Workforce Distribution - Stage 2 (Peak)

Location	Distribution	Unit	Qty	Vehicle Type	% Vehicle	Staff No. per Vehicle Type	Average Vehicle Capacity	Movements Round Trip (per day)
Rockhampton	100%	%	50	LV	100%	50	2	25
Total								25

Operations

Element	Qty	Unit
Hours per day	12	hrs
Working days per week	6	days
Working days per month	24	days
Peak Workforce	10	each

Location	Distribution	Unit	Qty	Vehicle Type	Vehicle Capacity	Movements 2-way (per day)
Rockhampton	100%	%	10	LV	1	10
Total						10

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Stage 2 Project Traffic Impact % Calculations

Road ID	Road Description	AADT Segment	AADT Segment		Base Data Year	Base Year AADT			Base Year HV%		Base Year HV		10 Yr GR%	2029 AADT			2029 HV	
			Start (km)	End (km)		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz
183	Gladstone Port Access Road	61605	0.000	0.858	2023	950	886	1,836	31.96%	42.33%	304	375	1.00%	1,008	941	1,949	322	398
181	Gladstone - Mount Larcom Road	160360	0.000	0.175	2023	5,650	5,948	11,598	8.85%	8.60%	500	512	1.00%	5,998	6,314	12,312	531	543
		160361	0.175	0.675	2023	5,316	6,043	11,359	14.61%	17.13%	777	1,035	1.00%	5,643	6,415	12,058	824	1,099
		60071	0.675	1.409	2023	3,900	3,574	7,474	13.77%	17.32%	537	619	1.00%	4,140	3,794	7,934	570	657
		60073	1.409	3.258	2023	3,737	3,657	7,394	15.09%	12.33%	564	451	1.00%	3,967	3,882	7,849	599	479
		61052	3.258	3.830	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	1.00%	4,444	5,460	9,904	707	1,080
			3.830	4.625	2023	4,186	5,144	9,330	15.92%	19.78%	666	1,017	1.00%	4,444	5,460	9,904	707	1,080
		60074	4.625	12.292	2023	3,207	3,230	6,437	19.17%	20.76%	615	671	1.00%	3,404	3,429	6,833	653	712
		60076	12.292	32.140	2023	1,754	1,758	3,512	23.74%	28.18%	416	495	1.00%	1,862	1,866	3,728	442	526
-	Red Rover Road	GRC	0.000	3.390	-	No Information Available												
-	Don Young Drive	GRC	0.000	2.280	-	No Information Available												
46A	Dawson Highway (Gladstone - Biloela)	60065	7.150	19.305	2023	3,835	3,659	7,494	17.32%	13.62%	664	498	1.00%	4,071	3,884	7,955	705	529
10E	Bruce Highway (Benaraby - Rockhampton)	60006	11.445	45.420	2023	2,174	2,111	4,285	26.01%	35.67%	565	753	1.00%	2,308	2,241	4,549	600	799
		60023	45.420	75.469	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,357	3,393	6,750	1,048	926
			75.469	85.308	2023	3,112	3,146	6,258	31.22%	27.30%	972	859	1.27%	3,357	3,393	6,750	1,048	926
		160954	85.308	86.183	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	1.00%	3,531	3,302	6,833	1,003	937
			86.183	87.080	2023	3,326	3,111	6,437	28.42%	28.37%	945	883	1.00%	3,531	3,302	6,833	1,003	937
		61551	87.080	108.938	2023	3,588	3,569	7,157	30.95%	26.82%	1,110	957	1.55%	3,935	3,914	7,849	1,218	1,050
		60130	108.938	114.388	2022	2,861	2,635	5,496	27.44%	33.99%	785	896	1.00%	3,067	2,825	5,892	842	960
		60024	114.388	116.961	2023	5,575	5,344	10,919	15.02%	17.15%	837	916	2.21%	6,356	6,093	12,449	955	1,045
-	South Ulam Road	RRC	0.000	16.773	2022	87	105	192	43.28%	35.80%	38	38	1.00%	93	113	206	40	40

STG 2 % INCREASE			
Gaz	%	A-Gaz %	Bi-Dir %
0.30%	0.32%	0.31%	
0.00%	0.00%	0.00%	
0.05%	0.05%	0.05%	
0.07%	0.08%	0.08%	
0.08%	0.08%	0.08%	
0.07%	0.05%	0.06%	
0.07%	0.05%	0.06%	
0.09%	0.09%	0.09%	
0.16%	0.16%	0.16%	
-	-	-	
-	-	-	
0.00%	0.00%	0.00%	
0.00%	0.00%	0.00%	
0.09%	0.09%	0.09%	

STG 2 PEAK CONST		
Gaz	A-Gaz	Bi-Dir
1,011	944	1,955
5,998	6,314	12,312
5,646	6,418	12,064
4,143	3,797	7,940
3,970	3,885	7,855
4,447	5,463	9,910
4,447	5,463	9,910
3,407	3,432	6,839
1,865	1,869	3,734
-	-	-
-	-	-
4,071	3,884	7,955
2,308	2,241	4,549
3,360	3,396	6,756
3,361	3,397	6,758
3,535	3,306	6,841
3,535	3,306	6,841
3,963	3,942	7,905
3,095	2,853	5,948
6,384	6,121	12,505
125	145	270



ACCESS TRAFFIC
CONSULTING

0.91%	0.99%	0.95%
0.44%	0.46%	0.45%
34.27%	28.34%	31.03%

Road ID	Road Description	AADT Segment	AADT Segment		Dev Traffic (Daily) - Construction																				
			Start (km)	End (km)	Gazettal									A-Gazettal									Bi-Dir		
					2A	2B	2C	2D	2E	2 Water	2 Staff	Fuel	Waste	Max	2A	2B	2C	2D	2E	2 Water	2 Staff	Fuel		Waste	Max
183	Gladstone Port Access Road	61605	0.000	0.858	0	3	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3	6
181	Gladstone - Mount Larcom Road	160360	0.000	0.175	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		160361	0.175	0.675	0	3	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3	6
		60071	0.675	1.409	0	3	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3	6
		60073	1.409	3.258	0	3	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3	6
		61052	3.258	3.830	0	3	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3	6
			3.830	4.625	0	3	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3	6
		60074	4.625	12.292	0	3	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3	6
		60076	12.292	32.140	0	3	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3	6
-	Red Rover Road	GRC	0.000	3.390	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
-	Don Young Drive	GRC	0.000	2.280	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
46A	Dawson Highway (Gladstone - Biloela)	60065	7.150	19.305	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10E	Bruce Highway (Benaraby - Rockhampton)	60006	11.445	45.420	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		60023	45.420	75.469	0	3	0	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3	6	
			75.469	85.308	3	3	1	0	0	0	0	0	0	4	3	3	1	0	0	0	0	0	4	8	
		160954	85.308	86.183	3	3	1	0	0	0	0	0	0	4	3	3	1	0	0	0	0	0	4	8	
			86.183	87.080	2	0	0	1	1	1	25	1	1	28	2	0	0	1	1	1	25	1	28	56	
		61551	87.080	108.938	2	0	0	1	1	1	25	1	1	28	2	0	0	1	1	1	25	1	28	56	
		60130	108.938	114.388	2	0	0	1	1	1	25	1	1	28	2	0	0	1	1	1	25	1	28	56	
-	South Ulam Road	RRC	0.000	16.773	5	3	1	1	1	1	25	1	1	32	5	3	1	1	1	25	1	32	64		



Appendix G – Turn Warrants Assessment

Turn Warrant Assessment

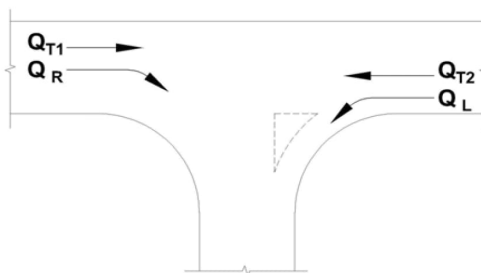
Intersection: **Bruce Highway / South Ulam Road**

Year / Peak: **2027 AM & PM**

Scenario: **Stage 1 Peak Construction**

Assessment based on Austroads Guide to Road Design, Part 4b. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	PM Peak
Q_{T1}	219	234
Q_R	46	1

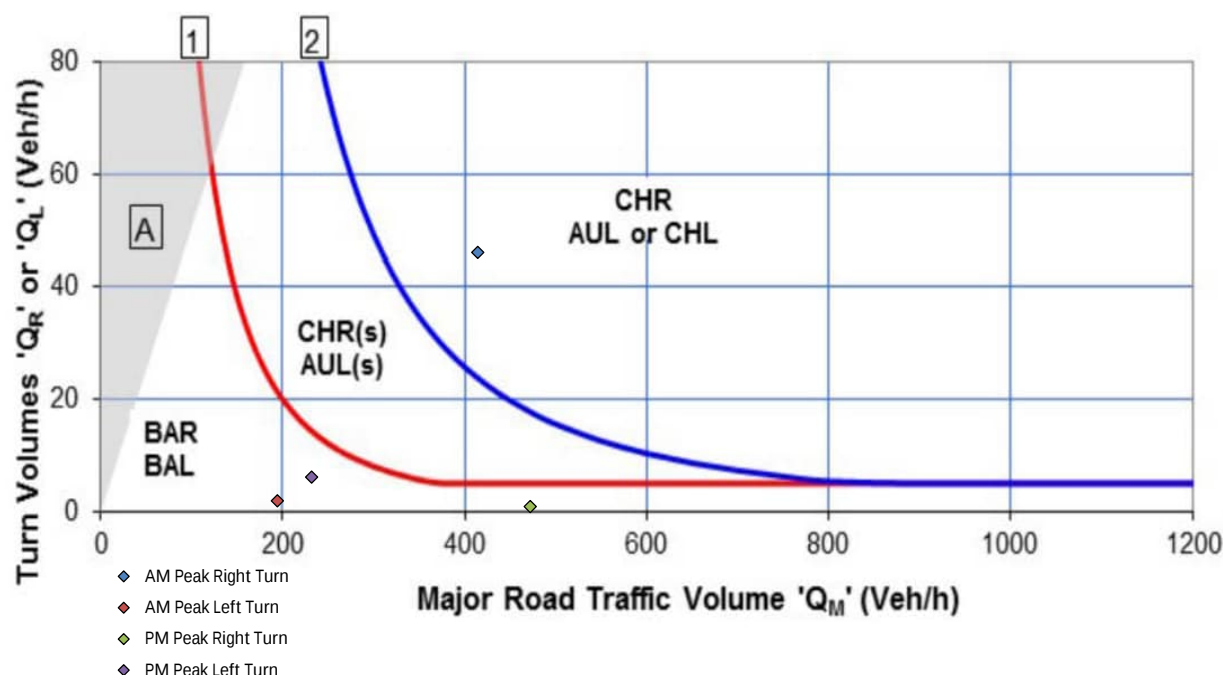


	AM Peak	PM Peak
Q_{T2}	194	232
Q_L	2	6

Splitter Island? **No**

Design speed (km/h) **110**

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	415	46
Left	194	2
PM Peak		
Right	473	1
Left	232	6



Recommended treatments:

Right Turn	CHR
Left Turn	BAL

Legend

BAR	Basic Right Turn	BAL	Basic Left Turn
CHR(S)	Channelised Right Turn (short)	AUL(S)	Auxiliary Left Turn (short)
CHR	Channelised Right Turn	AUL	Auxiliary Left Turn
		CHL	Channelised Left Turn

Comments:

Existing intersection configuration (CHR / AULs) is expected to be adequate to cater for expected Stage 1 project "in construction" traffic volumes.

Prepared by: A. Barrie

Reviewed by: A. Barrie

Date: 12/09/2025

Turn Warrant Assessment

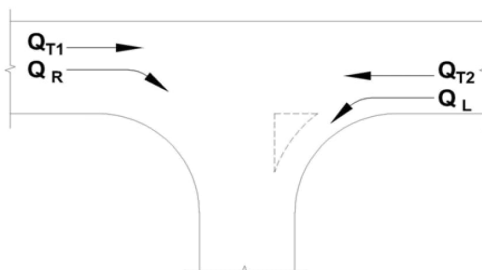
Intersection: **Bruce Highway / South Ulam Road**

Year / Peak: **2029 AM & PM**

Scenario: **Stage 2 Peak Construction**

Assessment based on Austroads Guide to Road Design, Part 4b. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	PM Peak
Q_{T1}	223	239
Q_R	28	0

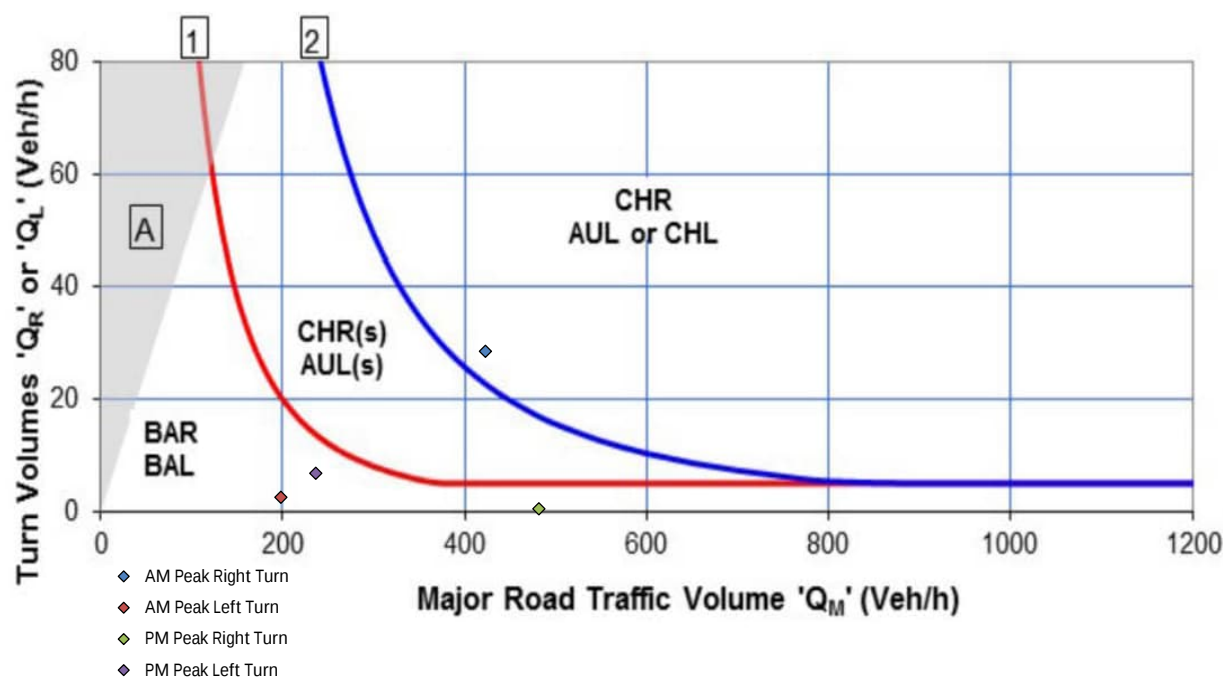


	AM Peak	PM Peak
Q_{T2}	198	237
Q_L	2	6

Splitter Island? **No**

Design speed (km/h) **110**

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	423	28
Left	198	2
PM Peak		
Right	482	0
Left	237	6



Recommended treatments:

Right Turn	CHR
Left Turn	BAL

Legend

BAR	Basic Right Turn	BAL	Basic Left Turn
CHR(S)	Channelised Right Turn (short)	AUL(S)	Auxiliary Left Turn (short)
CHR	Channelised Right Turn	AUL	Auxiliary Left Turn
		CHL	Channelised Left Turn

Comments:

Existing intersection configuration (CHR / AULs) is expected to be adequate to cater for expected Stage 2 project "in construction" traffic volumes.

Prepared by: A. Barrie

Reviewed by: A. Barrie

Date: 12/09/2025



Appendix H – Project Pavement Loading and Impact Calculations

UMW0125-001 | Mount Hopeful Battery Project
Project Pavement Loading - Stage 1
TASK A - MOBILISATION

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Mobilisation (Buildings / EW Plant) (Stage 1)	40	Semi / Low Loader	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	67	222
South Ulam Road (Bruce Highway - Site Access)	222	67

TASK B - SITE ACCESS AND INTERNAL ACCESS ROAD

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Access Intersection Pavement Materials (Stage 1)	38	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Access Intersection Construction Water (Stage 1)	3	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Access Track Pavement Materials (Stage 1)	99	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Access Track Construction Water (Stage 1)	8	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs
14KL Water Cart (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
14KL Water Cart (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	843	225
Bruce Highway (South Ulam Road - Rockhampton)	4	45
South Ulam Road (Bruce Highway - Site Access)	888	229

TASK C - CIVIL WORKS

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation Area Concrete (Stage 1)	57	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Gravel Material (Stage 1)	155	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation Area Construction Water (Stage 1)	12	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Concrete (Stage 1)	140	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Gravel Material (Stage 1)	382	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS Area Construction Water (Stage 1)	28	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Switchyard Area Concrete (Stage 1)	141	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Switchyard Area Gravel Material (Stage 1)	386	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Switchyard Area Construction Water (Stage 1)	28	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Concrete Truck (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
Concrete Truck (4 Axle Rigid) Loaded (100%)	4.13	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs
14KL Water Cart (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
14KL Water Cart (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	5,676	1,514
Bruce Highway (South Ulam Road - Rockhampton)	146	1,677
South Ulam Road (Bruce Highway - Site Access)	7,353	1,660

**TASK D - ELECTRICAL INSTALLATION (BESS)**

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS - Battery Components (Stage 1)	466	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Ancillary Components (Stage 1)	50	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS - Electrical Components (MV Transformers) (Stage 1)	118	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	1,065	3,512
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	3,512	1,065
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	3,512	1,065
Bruce Highway (Bills Road - South Ulam Road)	3,512	1,065
Bruce Highway (South Ulam Road - Rockhampton)	0	0
South Ulam Road (Bruce Highway - Site Access)	3,512	1,065

TASK E - SUBSTATION WORKS

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation - Transformers (Stage 1)	2	OSOM Special	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
Substation - Switch Room (Stage 1)	3	OSOM Special	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs
OSOM Transformer Transport Unloaded (0%)	26.57	ESAs
OSOM Transformer Transport Loaded (100%)	70.21	ESAs
OSOM Switchroom Transport Unloaded (0%)	4.79	ESAs
OSOM Switchroom Transport Loaded (100%)	6.46	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	68	160
Gladstone Mount Larcom Road (GPAR to Red Rover Road)	160	68
Gladstone Mount Larcom Road (Red Rover Road to Bruce Highway)	0	0
Red Rover Road (Gladstone Mount Larcom Road to Don Young Drive)	160	68
Don Young Drive (Red Rover Road to Dawson Highway)	160	68
Dawson Highway (Don Young Drive to Bruce Highway)	160	68
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	160	68
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	160	68
Bruce Highway (Bills Road - South Ulam Road)	221	84
Bruce Highway (South Ulam Road - Rockhampton)	0	0
South Ulam Road (Bruce Highway - Site Access)	221	84

TASK F - SWITCHYARD WORKS

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Switchyard - Electrical Components (Stage 1)	100	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
Switchyard - Trench Bedding Sand Materials (Stage 1)	10	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	168	554
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	554	168
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	554	168
Bruce Highway (Bills Road - South Ulam Road)	616	184
Bruce Highway (South Ulam Road - Rockhampton)	0	0
South Ulam Road (Bruce Highway - Site Access)	616	184

**TASK G - TESTING AND COMMISSIONING**

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Testing & Commissioning - Ancillary Components (Stage 1)	50	Rigid Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Rigid Truck (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
Rigid Truck (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	18	207
South Ulam Road (Bruce Highway - Site Access)	207	18

TASK H - FINALISATION / COMMISSIONING / DEMOBILISATION

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Swithyard Area Decommissioning (Stage 1)	20	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
General Demobilisation (Buildings / EW Plant) (Stage 1)	40	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	554	168
South Ulam Road (Bruce Highway - Site Access)	168	554

TASK 1W - SITE WATER

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Water - Staff Compound (Stage 1)	153	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Site Water - Dust Suppression (Stage 1)	84	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

14KL Water Cart (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
14KL Water Cart (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	85	979
South Ulam Road (Bruce Highway - Site Access)	979	85

TASK F - SITE FUEL

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Fuel - Overall	161	Semi Tanker	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	270	892
South Ulam Road (Bruce Highway - Site Access)	892	270



TASK WC - SITE WASTE COLLECTION

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Waste Collection - Overall	161	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	270	892
South Ulam Road (Bruce Highway - Site Access)	892	270

**UMW0125-001 | Mount Hopeful Battery Project****Project Pavement Loading - Stage 2****TASK 2A - CIVIL WORKS**

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation Area Concrete (Stage 2)	23	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Gravel Material (Stage 2)	62	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
Substation Area Construction Water (Stage 2)	5	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Concrete (Stage 2)	56	Concrete Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
BESS Area Gravel Material (Stage 2)	151	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS Area Construction Water (Stage 2)	11	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Concrete Truck (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
Concrete Truck (4 Axle Rigid) Loaded (100%)	4.13	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs
14KL Water Cart (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
14KL Water Cart (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	1,310	349
Bruce Highway (South Ulam Road - Rockhampton)	34	392
South Ulam Road (Bruce Highway - Site Access)	1,702	384

TASK 2B - ELECTRICAL INSTALLATION (BESS)

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS - Battery Components (Stage 2)	184	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Ancillary Components (Stage 2)	20	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access
BESS - Trench Bedding Sand Materials (Stage 2)	5	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access
BESS - Electrical Components (MV Transformers) (Stage 2)	46	Semi	100%	Gladstone	GPAR - Gladstone Mount Larcom Road - Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs
Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	420	1,385
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	1,385	420
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	1,385	420
Bruce Highway (Bills Road - South Ulam Road)	1,385	420
Bruce Highway (South Ulam Road - Rockhampton)	0	0
South Ulam Road (Bruce Highway - Site Access)	1,385	420

TASK 2C - SUBSTATION WORKS

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Substation - Trench Bedding Sand Materials (Stage 2)	5	Truck & Dog Trailer	100%	Marmor Quarry	Bills Road - Bruce Highway - South Ulam Road - Site Access

Truck & 4 Axle Dog Trailer Unloaded (0%)	1.64	ESAs
Truck & 4 Axle Dog Trailer Loaded (100%)	6.15	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Red Rover Road)	0	0
Gladstone Mount Larcom Road (Red Rover Road to Bruce Highway)	0	0
Red Rover Road (Gladstone Mount Larcom Road to Don Young Drive)	0	0
Don Young Drive (Red Rover Road to Dawson Highway)	0	0
Dawson Highway (Don Young Drive to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	31	8
Bruce Highway (South Ulam Road - Rockhampton)	0	0
South Ulam Road (Bruce Highway - Site Access)	31	8

**TASK 2D - TESTING AND COMMISSIONING**

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Testing & Commissioning - Ancillary Components (Stage 2)	25	Rigid Truck	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Rigid Truck (4 Axle Rigid) Unloaded (0%)	0.36	ESAs			
Rigid Truck (4 Axle Rigid) Loaded (100%)	4.13	ESAs			

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	9	103
South Ulam Road (Bruce Highway - Site Access)	103	9

TASK 2E - FINALISATION / COMMISSIONING / DEMOBILISATION

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
BESS Area Decommissioning (Stage 2)	10	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Substation Area Decommissioning (Stage 2)	10	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
General Demobilisation (Buildings / EW Plant) (Stage 2)	15	Semi	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

Semi Unloaded (0%)	1.68	ESAs
Semi Loaded (100%)	5.54	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	194	59
South Ulam Road (Bruce Highway - Site Access)	59	194

TASK 1W - SITE WATER

Activity Description	Project Volume	Vehicle	Project Vol Distrib	Origin	Route
Site Water - Staff Compound (Stage 2)	32	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access
Site Water - Dust Suppression (Stage 2)	46	14KL Water Cart	100%	Rockhampton	Bruce Highway - South Ulam Road - Site Access

14KL Water Cart (4 Axle Rigid) Unloaded (0%)	0.36	ESAs
14KL Water Cart (4 Axle Rigid) Loaded (100%)	4.13	ESAs

Road Section	Gazettal	A-Gazettal
Gladstone Port Access Road	0	0
Gladstone Mount Larcom Road (GPAR to Bruce Highway)	0	0
Bruce Highway (Dawson Highway - Gladstone Mt Larcom Road)	0	0
Bruce Highway (Gladstone Mt Larcom Road - Bills Road)	0	0
Bruce Highway (Bills Road - South Ulam Road)	0	0
Bruce Highway (South Ulam Road - Rockhampton)	28	322
South Ulam Road (Bruce Highway - Site Access)	322	28

[illegible]



Appendix I – TIA RPEQ Certification and Authorisation



Certification of Traffic Impact Assessment Report

Registered Professional Engineer Queensland

for

Project Title:	Mount Hopeful Battery Project
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As a professional engineer registered by the Board of Professional Engineers of Queensland pursuant to the *Professional Engineers Act 2002* as competent in my areas of nominated expertise, I understand and recognise:

- the significant role of engineering as a profession, and that
- the community has a legitimate expectation that my certification affixed to this engineering work can be trusted, and that
- I am responsible for ensuring its preparation has satisfied all necessary standards, conduct and contemporary practice.

As the responsible RPEQ, I certify:

- I am satisfied that all submitted components comprising this traffic impact assessment, listed in the following table, have been completed in accordance with the *Guide to Traffic Impact Assessment* published by the Queensland Department of Transport and Main Roads and using sound engineering principles, and
- where specialised areas of work have not been under my direct supervision, I have reviewed the outcomes of the work and consider the work and its outcomes as suitable for the purposes of this traffic impact assessment, and that
- the outcomes of this traffic impact assessment are a true reflection of results of assessment, and that
- I believe the strategies recommended for mitigating impacts by this traffic impact assessment,
- embrace contemporary practice initiatives and will deliver the desired outcomes.

Name:	Andrew Barrie	RPEQ No:	12801
RPEQ Competencies:	Civil	Date:	19 September 2025
Signature:			
Postal Address:	PO Box 9864, Frenchville QLD 4701		
Email:	andrew.barrie@accesstraffic.com.au		



Traffic impact assessment components to which this certification applies	✓
1. Introduction	
Background	✓
Scope and study area	✓
Pre-lodgement meeting notes	✓
2. Existing Conditions	
Land use and zoning	✓
Adjacent land uses / approvals	✓
Surrounding road network details	✓
Traffic volumes	✓
Intersection and network performance	✓
Road safety issues	✓
Site access	N/A
Public transport (if applicable)	N/A
Active transport (if applicable)	N/A
Parking (if applicable)	N/A
Pavement (if applicable)	✓
Transport infrastructure (if applicable)	✓
3. Proposed Development Details	
Development site plan	✓
Operational details (including year of opening of each stage and any relevant catchment / market analysis)	✓
Proposed access and parking	✓
4. Development Traffic	
Traffic generation (by development stage if relevant and considering light and heavy vehicle trips)	✓
Trip distribution	✓
Development traffic volumes on the network	✓
5. Impact Assessment and Mitigation	
With and without development traffic volumes	✓
Construction traffic impact assessment and mitigation (if applicable)	✓
Road safety impact assessment and mitigation	✓
Access and frontage impact assessment and mitigation	✓
Intersection delay impact assessment and mitigation	✓
Road link capacity assessment and mitigation	✓
Pavement impact assessment and mitigation	✓
Transport infrastructure impact assessment and mitigation	✓
Other impacts assessment relevant to the specific development type / location (if applicable)	N/A
6. Conclusions and Recommendations	
Summary of impacts and mitigation measures proposed	✓
Certification statement and authorisation	✓



ACCESS TRAFFIC
CONSULTING

TRAFFIC IMPACT ASSESSMENTS | SITE FEASIBILITY STUDIES | INTERSECTION ANALYSIS
ROAD SAFETY AUDITS | ROAD SAFETY INVESTIGATIONS | PAVEMENT IMPACT ASSESSMENTS
TRANSPORT ROUTE ASSESSMENTS | TRANSPORT PLANNING | ACCESS MANAGEMENT STRATEGIES
PEER REVIEWS | PARKING FACILITY DESIGN | SERVICE FACILITY DESIGN