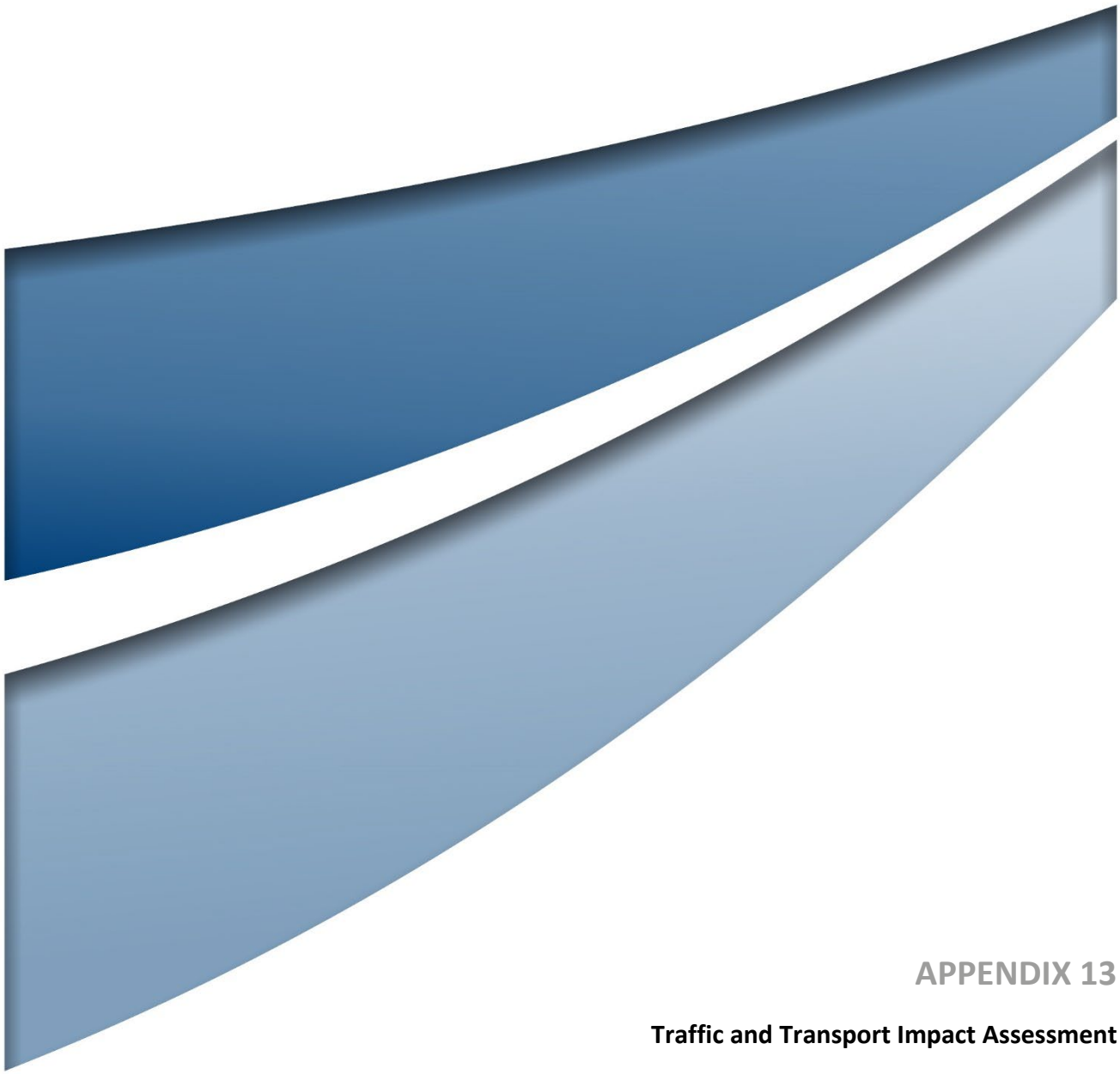

APPENDIX 13

Traffic and Transport Impact Assessment

This report has been prepared for Richmond Valley Solar & BESS Pty Ltd (ABN 43 672 993 869) a wholly owned special purpose vehicle of Ark Energy Projects Pty Ltd and the Proponent of the Project. Richmond Valley Solar & BESS Pty Ltd will herein be referred to as Ark Energy or Ark Energy Projects.

ACCESS TRAFFIC
CONSULTING

Richmond Valley Solar Farm

EIS Traffic and Transport Assessment

May 2024

Prepared for Umwelt (Australia) Pty Ltd

Quality Information

Document	EIS Traffic Impact Assessment
Client	Umwelt (Australia) Pty Ltd
Reference	UMW0123-007
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Prepared By	Andrew Barrie

Revision History

Rev	Revision Date	Details	Authorised	
			Name / Position	Signature
0	05/02/2024	Draft for Client Comment	Andrew Barrie Principal Traffic Engineer	Original Signed
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A	18/03/2024	Final	Andrew Barrie Principal Traffic Engineer	Original Signed
B	13/05/2024	Final – OSOM Route Revision	Andrew Barrie Principal Traffic Engineer	

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Key Terminology

Term	Definition
Against Gazettal (A-Gaz)	A direction of vehicular travel, against the gazettal direction of travel identified between two points.
Average Delay	The average delay in seconds, reflecting the time a vehicle must wait or be held at an intersection to undertake a specific movement.
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 as relevant to this Project, the maximum acceptable degree of saturation is noted to be 80% or 0.800.
Gazettal	A direction of vehicular travel, being the defined direction between two points. For the purpose of this assessment the gazettal directions of travel for the relevant external road links are defined as: - Summerland Way – South from Casino. - Main Camp Road – East from Summerland Way. - Avenue Roade – North-East from Main Camp Road.
Level of Service (LOS)	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. Refer to **Table 7** in **Section 2.6.2.1** for further details of the RTA NSW criteria for LOS.
OSOM	Over size, over mass vehicle; vehicle configuration which requires a permit from the National Heavy Vehicle Regulator.
Project	The Richmond Valley Solar Farm described in **Section 3.0** of this assessment.
Road Link	A section of external road between two defined points, i.e. Summerland Way between Casino and Main Camp Road
Site Access	Location on external network where Project traffic are expected to leave road and enter adjacent Project Area.
Vehicle Queue (95%)	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.
vpd	Vehicles per day
vph	Vehicles per hour

Executive Summary

Access Traffic Consulting was commissioned by Umwelt Australia Pty Ltd (Umwelt) on behalf of Ark Energy Projects Pty Ltd (Ark Energy) to undertake a traffic and transport impact assessment (TTIA) as part of the Environmental Impact Statement (EIS) for the proposed Richmond Valley Solar Farm (the Project), located at 420 Avenue Road, Myrtle Creek NSW.

The Project involves the construction, operation and decommissioning of up to 500 megawatts (MW) of solar DC PV generation, Battery Energy Storage System (BESS) with a power capacity of 275 megawatts and an energy storage capacity of up to 2,200-megawatt hour (MWh) over eight hours and approximately 2 km of transmission line to connect the Project from the switching substation to the National Electrical Market (NEM). The Project will also include various associated facilities and infrastructure including, temporary construction facilities, O&M facility, internal roads, civil works, fencing and other required electrical infrastructure.

Based on the outcomes of this assessment and the increase in traffic numbers anticipated as a result of the construction, operations and decommissioning phases of the Project, it is anticipated that the impact of the Project on the traffic operation of the surrounding road network can be managed by the provision of the following mitigation treatments:

- Construction of the proposed upgrade works to the Summerland Way / Main Camp Road intersection to provide a rural basic left (BAL) treatment on the northern approach and a rural short channelised right (CHRs) standard treatment on the southern approach, as per Figure 8.2 of Part 4A and Figure A7 of Part 4 of Austroads Guide to Road Design.
- Provision of sight line vegetation clearing on the south-east corner of the Summerland Way / Main Camp Road intersection to enable the provision of compliant safe intersection sight distance to/from the southern approach to the intersection.
- Provision of additional widening areas on the northbound and southbound departures of the Summerland Way / Main Camp Road intersection to provide bus layby / set down areas, enabling school bus pickup and drop off movements to be completed clear of the adjacent vehicle movements at the intersection.
- Provision of upgrade works to the relevant sections of Main Camp Road (Summerland Way to Avenue Road – approx. 0.515 km) and Avenue Road (Main Camp Road to proposed Site Access 3 – approx. 4.443 km) to provide a cross section providing a 6m sealed pavement on a 7m formation, as agreed with Richmond Valley Council.

  Furthermore, it is noted that as part of the upgrade works to Avenue Road, the existing road reserve boundary is to be realigned to enable the upgraded configuration of the link to be wholly contained within the new extents of the road reserve. Further details of the proposed revised alignment of the road reserve boundaries are proposed to be provided as part of the detailed design of the required road upgrade works to Avenue Road.
- Installation of advisory "truck turning" signage on the Summerland Way approaches to the intersection with the Main Camp Road, to highlight to motorists the presence of the Project access and the potential for turning heavy vehicles to/from the side road.
- Provision of suitable traffic management measures (traffic control / temporary traffic signals) at the Main Camp Road / Avenue Road intersection to enable the larger heavy vehicle movements associated with the Project to safely traverse the intersection clear of opposing traffic.
- Construction of the three identified access points to the Project Area on Avenue Road (SA1, SA2 and SA3) generally in accordance with the site access arrangement for articulated vehicles outlined in TfNSW's Typical Rural Property Access – Northern Region standard drawing (as per Figure 7.4 of Austroads Guide to Road Design Part 4: Intersections and Crossings – General).
- Completion of minor works along the identified OSOM transport routes to accommodate the swept paths of the OSOM transformer and switch room transport vehicles, including the relocation of signage infrastructure and construction of required temporary hardstand pavement areas as identified in the OSOM Route Assessment for the Project (refer **Appendix D**).

- Preparation of traffic management plan for Project outlining proposed management measures and processes to minimise the impact of the Project on the external road network.

Conditional to the provision of the identified mitigation measures, the potential impacts of the Project will have been appropriately managed, with minimal traffic impacts anticipated on the relevant sections of the local government and state-controlled road networks.

As such it can be concluded that this report, in combination with the Preliminary Route Assessment demonstrates the compliance of the Project with Schedule 8 of the Environmental and Planning Regulation (2021), as outlined in the traffic and transport items of the Secretary's Environmental Assessment Requirements (SEARs).

Access Traffic Consulting therefore recommends that the Project be approved from a traffic engineering and traffic impact viewpoint.

1.0 Introduction

1.1 Project Background

Ark Energy Projects Pty Ltd (Ark Energy) has proposed the construction of the Richmond Valley Solar Farm (the Project) at 420 Avenue Road, Myrtle Creek NSW.

The Project involves the construction, operation and decommissioning of up to 500 megawatts (MW) of solar DC photovoltaic (PV) generation, Battery Energy Storage System (BESS) with a power capacity of 275 megawatts and an energy storage capacity of up to 2,200-megawatt hour (MWh) over eight hours and approximately 2 km of transmission line to connect the Project from the switching substation to the national electricity market (NEM). The Project will include various associated facilities and infrastructure including, temporary construction facilities, O&M facility, internal roads, civil works, fencing and other required electrical infrastructure.

1.2 Scope

Access Traffic Consulting was commissioned by Umwelt Australia Pty Ltd (Umwelt) on behalf of Ark Energy to undertake a traffic and transport impact assessment (TTIA) as part of the Environmental Impact Statement (EIS) for the Project.

The Project Area is located within the Richmond Valley Council (RVC) local government area (LGA), approximately 26 km to the south and 64 km to the north of the regional centres of Casino and Grafton respectively. Vehicular access to the Project Area is proposed to be gained via access points from the local government controlled Avenue Road which runs east to west through the Project Area.

In addition, the Project traffic is expected to utilise the local government controlled Main Camp Road, as well as elements of the state-controlled road network including the adjacent Summerland Way and broader transport routes to the Port of Brisbane.

This TTIA was carried out to determine the level of potential impacts of the construction, operations and decommissioning phases of the Project on the operation of the surrounding road network. The outcomes of this assessment will be used in support of the EIS for the Project, with RVC and Transport for New South Wales (TfNSW) expected to be advice agencies.

Further to this, the purpose of this report is also to assess the Project's compliance with the requirements of Schedule 8 of the Environmental Planning and Assessment Regulation (2021), as outlined in the traffic and transport items of the Secretary's Environmental Assessment Requirements (SEARs) provided for the Project (refer **Table 1** of **Section 1.3** below), as well as respond to the specific traffic items raised in the SEARs advice from TfNSW, RVC and Crown Lands (refer **Table 2, Table 3** and **Table 4** of **Section 1.3**).

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

- Broadly identify the existing transport infrastructure which is of relevance to the Project.
- Review the current condition and operation of the existing road network. This was completed during a site inspection of the Project Area and the surrounding external road networks on 17-18 August 2023.
- Estimate traffic generation associated with the construction, operations and decommissioning phases of the Project and the distribution of this Project traffic on the identified road network, including the movement of materials, plant, equipment and turbine components in addition to the construction, operations and decommissioning phase workforces.
- Assess the potential impact of the Project on the surrounding transport infrastructure during the construction, operations and decommissioning phases.
- Identify potential mitigation and management strategies to be implemented during the construction, operations and decommissioning phases to offset the impact of the proposed Project (if required).

The adopted methodology centres on establishing a background, "without Project" traffic scenario for the identified transport routes and comparing this with a scenario including the additional Project-generated

traffic, i.e. the "with Project" scenarios, including the required cumulative assessment scenario considering the combined traffic conditions with adjacent State Significant development Applications (SSDA).

The process allows for the assessment of the traffic impacts of the Project in terms of road safety, access requirements, intersection operations, road link capacity, road pavements and other transport infrastructure. Following this, if required, potential mitigation and/or management measures would be formulated to address the potential traffic impacts of the Project.

1.3 Approval Agency Advice

1.3.1 State Environmental Assessment Requirements

The SEARs are a set of technical considerations that the EIS must address. Details of the SEARs for the Project were received on 21 September 2022, with a summary of the specific requirements relating to the traffic and transport assessment and details of the response to these items provided in **Table 1**. Further to the general SEARs for the Project, TfNSW, RVC and NSW Crown Lands have also provided further advice regarding the requirements for the traffic and transport assessment for the Project, with the specific items and corresponding responses for each summarised in **Table 2, Table 3** and **Table 4** respectively.

Table 1 Transport SEARs Items (21/09/2022)

SEARS Items		Reference / Response
Transport		
i)	The EIS must address the following specific matters: • An assessment of the peak and average traffic generation, including over-dimensional vehicles and construction worker transportation.	Refer **Section 4.0** of this report which identifies the expected Project traffic volumes from the construction, operations and decommissioning phases of the Project.
ii)	• An assessment of the likely transport impacts to the site access route(s), site access point(s), any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance.	Refer to **Section 5.0** of this report which summarises the traffic impact assessment of the Project, including route, site access, road link and intersection capacity and road safety assessments.
iii)	• A cumulative impact assessment of traffic from nearby developments.	Refer to **Section 4.5**, **Section 5.3** and **Section 5.4** of this report which includes details of the nearby projects considered and the results of the cumulative impact assessment undertaken.
iv)	• Provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authorities.	Refer to **Section 5.0** of this report which identifies the assessments undertaken to identify the recommended mitigation measures to cater for the increase in traffic volumes on the network as a result of the Project. A summary of the proposed mitigation measures is also provided in **Section 6.1.** Further details of these upgrade works, including the preliminary civil design, are provided in the concept design for the proposed roadworks by Turnbull Engineering Pty Ltd, provided for reference in **Appendix H.**

Table 2 TfNSW SEARs Advice Items (27/07/2022)

SEARS Items		Reference / Response
Transport		
i)	TfNSW requests that a Traffic Impact Assessment (TIA) be prepared by a suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and Roads and Maritime Guide to Traffic Generating Developments. The TIA should be tailored to the scope of the proposed development and include but not be limited to, the following: • A map of the surrounding road network identifying the site access, nearby accesses, intersections, relevant traffic route/s and connections to the classified (State) road network.	Details of the surrounding road network are included in **Section 2.4**, with mapping of the relevant sections of the network shown in **Figure 5**. Further details of the Project including the site layout and proposed access arrangements are outlined in **Section 3.1** and **Section 3.3** of this report.
ii)	• Assessment of all relevant vehicular traffic routes and intersections to / from the subject properties.	Refer **Section 2.3** of this report which clearly identifies the proposed transport routes for the Project, **Section 2.4** which provides further details of the relevant road links and intersections and **Section 5.0** which outlines the relevant assessment of the impacts of the Project on the relevant sections of the identified routes.
iii)	• Current traffic counts for all relevant traffic routes and relevant intersections, including connections to the classified (State) road network.	Refer **Section 2.5** of this report which identifies the current traffic counts for road link and intersection volumes utilised for the traffic assessment of the Project.
iv)	• The anticipated additional vehicular traffic generated from construction, operational and decommissioning stages of the project.	Refer **Section 4.1** to **Section 4.3** of this report which identifies the expected Project traffic volumes generation from the construction, operations and decommissioning phase of the Project. Specific Project volumes for the relevant road links are provided in **Table 11** in **Section 4.4.1**, and intersection volumes are shown in **Figure 31** to **Figure 36** in **Section 4.4.2**.
v)	• The distribution on the road network of the trips generated by the proposed development. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation.	Refer **Section 4.0** of this report which identifies the expected distribution of the calculated Project traffic volumes from the construction, operations and decommissioning phase of the Project, with specific diagrams showing the expected volumes at the key Summerland Way / Main Camp Road intersection provided in **Figure 31** to **Figure 36** in **Section 4.4.2**.
vi)	• Detailed assessment of all vehicular transport routes, relevant intersections and connections to the classified (State) road network for access to / from the proposed development site/s (including ancillary sites).	Refer Section 2.3 of this report which identifies the expected transport routes for the Project, as well as **Section 5.3** and **Section 5.4** of this report which summarises the assessment completed in regard to impact of the Project on the relevant road links and intersections along the identified Project transport routes.
vii)	• Assessment of Over Size Over Mass (OSOM) and heavy vehicle routes for all components associated with the construction of the solar farm and BESS, including swept path analysis for the largest design vehicle/s accessing the site and turning at relevant intersections along the classified (State) road network.	Please refer to the **Section 3.3** of this report which identifies the proposed transport routes for the Project. Also refer to the route survey undertaken for the Project by EMM Consulting Pty Ltd (refer **Appendix D**), which identifies the proposed transport routes for the OSOM transformer and switch room movements, including relevant swept path analysis.
viii)	• Consideration of the traffic impacts on existing and proposed intersections, including access to the site, and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the	Please refer to **Section 5.2** and **Section 5.3** of this report which covers the access and intersection assessment works completed, which includes turn warrant assessments for the critical intersections identified for the Project.

SEARS Items		Reference / Response
Transport		
	proposed development during construction, operational and decommissioning stages. Vehicle types to be considered: ▪ Commuter (employee and contractor) light vehicles and pool vehicles. ▪ Heavy (haulage) vehicles. ▪ Over size and over mass (OSOM) vehicles.	Also refer to **Section 3.6**, which identifies the expected route mitigation works along the identified OSOM transport routes.
ix)	• Consideration of cumulative impacts to identify and assess the implications of any projects that will potentially be occurring simultaneously with the scheduling of the OSOM movements along the proposed OSOM routes, including but not limited to the scenario where the Myrtle Creek Solar Farm and/or Summerville Solar Farm and/or Clarence Valley Solar Farm were to have coinciding construction timeframes. The assessment should consider the following: ▪ The cumulative impacts from traffic generated from the construction workforces in terms of the routes, access, AM/PM peaks where there is overlap with other projects. ▪ The cumulative impacts of heavy vehicle movements in terms of AM/PM peaks and routes where there is an overlap with other projects. ▪ Cumulative impacts and consideration in relation to the timing of movements of OSOMs where other projects will be utilising the same routes as proposed for this development. ▪ Any potential for future expansion of the subject development and the potential impacts any such expansion would have on the development, the broader road network and the AM/PM peaks. It should be noted, any future expansion beyond the scope of the subject application, will require additional applications and approvals. ▪ Strategies to manage the risk of damage to public road assets where accelerated deterioration of the road pavement occurs during construction.	Refer to **Table 12** in **Section 4.5** which summarises the review of the relevant major projects in the vicinity of the Project and identifies which Projects need to be considered as part of a cumulative impact assessment. Further to this, the analysis included in **Section 5.3** (refer **Table 19**) and **Section 5.4** (refer **Table 21**) which assesses the impact of the cumulative traffic associated with the Project and adjacent SSD Projects on the key intersections and road links of the external road network respectively.
x)	• An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for each relevant intersection along the identified transport route/s, including connections to the classified (State) road network.	Please refer to **Section 5.3** of this report which covers the intersection assessment works completed, which includes turn warrant assessments for the critical intersections identified for the Project.
xi)	• Identify the necessary road network infrastructure upgrades that are required to cater for, and mitigate, the impact of project related traffic on both the local and classified road network for the development (for instance, road widening and/or intersection treatments). Strategic (2D) design drawings for any proposed road upgrades and the site access should be prepared to support the TIA and demonstrate the scope, estimated cost and constructability of	The proposed road network infrastructure upgrades for the Project are summarised in **Section 6.1** of this report. Further details of the proposed works at the key state-controlled intersection of Summerland Way / Main Camp Road are provided in **Section 5.3.1,** with a strategic (2D) concept level design of the proposed upgrade works included for reference as **Appendix D**.

SEARS Items		Reference / Response
Transport		
	works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. All proposed works must be: ▪ Designed in accordance with Austroads Guidelines, Australian Standards and TfNSW Supplements. ▪ Appropriately designed for the existing posted speed limit. ▪ To the satisfaction of TfNSW and/or Council in accordance with relevant Roads Act functions. ▪ Submitted with the EIS and TIA.	
xii)	• Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model, including: ▪ Current traffic counts and 10-year traffic growth projections. ▪ With and without development scenarios. ▪ 95th percentile back of queue lengths. ▪ Delays and level of service on all legs for the relevant intersections. ▪ Electronic data for TfNSW review.	The traffic analysis for major intersections is outlined in **Section 5.3** of this report. This includes a summary of the outcomes of the completed SIDRA analysis for the key Summerland Way / Main Camp Road intersection for the forecast peak construction, cumulative construction, operations and decommissioning phases of the Project. This is provided in **Table 19**. Further to this, all electronic SIDROA files have been included for review by TfNSW.
xiii)	• Relevant swept paths analysis for the largest design vehicle accessing the site.	Please refer to the route survey undertaken for the Project by EMM Consulting Pty Ltd (refer **Appendix D**), which identifies the proposed transport routes for the OSOM transformer and switch room movements, including relevant swept path analysis.
xiv)	• Impacts on public transport (public and school bus routes) and consideration for alternative transport modes such as walking and cycling or carpooling and shuttle buses during construction.	Refer to **Section 5.6** of this report which assesses the impact of the Project on public and active transport infrastructure.
xv)	• Details of any Traffic Management Plan (TMP) proposed to address the construction, operation and decommissioning phases of the proposed development. The TMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017. It is recommended that any TMP include, but not necessarily limited to, the following; ▪ A map of the primary transport route/s highlighting critical locations. ▪ An induction process for vehicle operators and regular toolbox meetings. ▪ Procedures for travel through residential areas, school zones and/or bus route/s. ▪ Any proposed temporary measures such a Traffic Guidance Scheme (TGS) ▪ A Driver Code of Conduct for heavy vehicle operators. ▪ A complaint resolution and disciplinary procedure. ▪ Community consultation measures proposed for peak periods.	No TMP is proposed to be prepared as part of this TTIA. A Project specific TMP will be prepared by the contractor prior to the commencement of construction works for the Project. The production of the TMP at this later stage is considered more appropriate as the contractor will have more up to date and detailed information regarding their proposed construction methodologies, expected vehicle numbers and required traffic management measures and procedures. The Project specific TMP will include at minimum the requirements as outlined by TfNSW.

SEARS Items		Reference / Response
Transport		
	▪ Work, health and safety requirements under the Work Health and Safety Regulation 2017.	
xvi)	• Details of any additional construction and / or infrastructure works associated with connecting the proposed development to the existing Transmission Lines / Grid. In particular, clearly identifying the distance between the connection points of the Solar Farm & existing Transmission Line, the construction method and extent of works required.	Based on information provided by Ark Energy it is understood that all construction works associated with the transmission line for the Project will be able to be accessed via the SA2 site area (refer **Figure 22**) on the northern side of Avenue Road. As such the traffic volumes associated with the transmission line works have been considered within the assessment of the broader project provided.
xvii)	• Where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines.	Please refer to **Section 5.5** of this report which summarises the road safety assessment undertaken for the Project. This assessment highlighted that with the provision of the proposed mitigation measures on the external road network, no specific road safety concerns were identified as part of the Project.

Table 3 RVC SEARs Advice Items (12/09/2022)

SEARS Items		Reference / Response
Cumulative Impacts		
2	It is noted that a Scoping Report (Report No. 22104/REP, dated 23 December 2020), for a solar farm, also prepared by Premise on behalf Terrain Solar, was previously forwarded for Council comments (SSD-12360774). The proposal was described as Myrtle Creek Solar Farm with a capacity of approximately 100megawatts on part of the land holdings at 420 Avenue Road, Myrtle Creek. It is unclear how these two solar farms on the same sites will function operationally. Additionally, a third solar farm described as Summerville Solar Farm, is proposed in the same locality, within a 5-10-kilometre radius, to the western side of Summerland Way. All three Scoping Reports have been prepared in isolation of the remaining solar farms with respect to assessment of the potential impacts. The EIS must have regard for the cumulative impacts associated with multiple solar farms adjacent/in close proximity to each other in the region. In this regard, potential cumulative impacts on rural land uses, sensitive receivers, biodiversity, visual, transport/traffic generation, road capacity, and other similar matters must be considered. All supporting reports must assess and address the cumulative impacts. Consideration must be given to stage the construction of various solar farms in the area, particularly in relation to transport, traffic, and noise.	Refer to **Table 12** in **Section 4.5** which summarises the review of the relevant major projects in the vicinity of the Project and identifies which Projects need to be considered as part of a cumulative impact assessment. Further to this, the analysis included in **Section 5.3** (refer **Table 19**) and **Section 5.4** (refer **Table 21**) which assesses the impact of the cumulative traffic associated with the Project and adjacent SSD Projects on the key intersections and road links of the external road network respectively.
Engineering Comments		
7.	Council's Engineering Section notes that all supporting documents reports should include Myrtle Creek and Richmond Valley Solar Farms, the following matters are noted:	It is noted that based on survey checks undertaken, no realignment works are required to the existing Main Camp Road road reserve.

	• The realignment of the road reserve of Main Camp Road should be undertaken so that it is directly over the constructed road, this would minimise any potential issue regarding the physical road in the future. It is noted there is a small section that would need to be realigned that is outside of this development and adjacent to Tea Tree farm. The developer should liaise with appropriate landowner(s) to realign the entire section of road reserve that is not currently over the physical road for consistency and connectivity. Given the previous discussions around potential subdivision/consolidation of lots to confine the development on a single lot, the realignment may be undertaken at the same time as the subdivision/consolidation that may be required. As the location of the road reserve would be changing, Council's approval as a landowner will be needed.	Notwithstanding this, as identified in **Section 3.3.2**, as part of the proposed upgrade works to Avenue Road it has been identified that the existing road reserve boundary will need to be realigned at a number of locations to enable the current road alignment to be fully contained in the road reserve. Further details of these locations on Avenue Road and the revised extents of the road reserve proposed are provided in the preliminary design plans for the Avenue Road works included for reference in **Appendix H**.
	• The access to this development is required to meet the typical rural property access standard within Council's Vehicular Accessway specification. As such that location of access to the lot and design should be provided for assessment along with the vehicle class of the vehicles frequenting the site. A Driveway Application and bond payment is required to be made to Council prior to the construction of the driveway. The design and location of the driveway would need to be confined in the driveway application along with any required (if any) Traffic Control Plans (TCPs/TMP) and the certificate of currency for Public Liability of the contractor undertaking the driveway construction so that Council is aware that the contractor is adequately insured to undertake works.	As outlined in **Section 3.3.4**, the site access locations on Avenue Road are proposed to be provided in accordance with TfNSW Typical Rural Property Access Standard Drawing for articulated vehicles (in line with Figure 7.4 Austroads Guide to Road Design Part 4), as per the requirements of Council's Specification for the Construction of Vehicular Accessways. It is noted that all requirements for the design and construction of the access points are proposed to be completed as per this specification as part of subsequent phases of the Project
	• It is assumed that the proposal will be low traffic generating given the nature of the development, however, proposed traffic movements should be provided for comment. Given the size of the development, a full Traffic Impact Assessment (TIA) should be submitted. Transport for NSW is likely to require an impact assessment of the intersection of Summerland Way and Avenue Road so consideration to the subject intersection should also be made within the TIA.	This report forms the requested TTIA for the Project. Further to this, please refer to **Section 4.4.1** and **Figure 4.4.2** below, in particular **Table 11** and **Figure 31** to **Figure 36** which identifies the expected Project traffic volumes on both the relevant external road links (including Council's Main Camp Road and Avenue Road), as well as intersection volumes at the Summerland Way / Main Camp Road.

Table 4 Crown Lands SEARs Advice Items (21/09/2022)

SEARS Items		Reference / Response
Crown Lands		
1.	The Department of Planning and Environment – Crown Lands (the Department) has reviewed the proposal and notes that there are several Crown public roads contained within the development site. The Environmental Impact Statement must clearly acknowledge the occurrence of the Crown roads, and ensure the proposal does not include any use or development of the road which is inconsistent with the right of members of the public to pass along a public road, as set out under the Roads Act 1993.	Based on the information provided it is understood that identified Crown roads / paper roads are located within the Project Area and are proposed to be closed as part of the proposed Project works. Further details of the proposed closure of these roads are to be provided as part of the main EIS document for the Project.

	The proponent should consult with the Department regarding any proposed use of the Crown roads so that the relevant processes in relation to consent for works on roads, transfer to an appropriate Roads Authority or for roads to be closed and acquired, can be progressed. Any Crown Road required for access to the development/proposal, will need to be transferred to Council, or application made to close and purchase the roads. As authority to access or use Crown roads is required prior to the commencement of any works or access, and to avoid any delays for the proposal, a tenure may be required in the interim	

This TTIA has therefore been prepared in response to the items identified above and aims to provide additional information and clarification to the traffic assessment undertaken, in particular regarding the expected traffic and transport impacts of the Project on the state and local government-controlled road networks relevant to the Project.

2.0 Existing Conditions

2.1 Project Details

The Project Area is located at 420 Avenue Road, Myrtle Creek NSW situated entirely within the Richmond Valley Shire Council (RCSC) local government area (LGA). The Project is located approximately 26 km to the south and 64 km to the north of the regional centres of Casino and Grafton respectively (see **Figure 1** below). The Project Area spans approximately 1,475 ha, within which a maximum Development Footprint of approximately 803 ha and the Development Footprint for the road upgrade occupies approximately 11 ha. The overall Project Area comprises (wholly or partly) 10 cadastral lots owned by two associated receivers to the Project. Vehicular access to the Project Area is proposed to be gained via three access points from the local government-controlled Avenue Road which runs east to west through the Project Area.

As shown in **Figure 1** below, the Project is located on the eastern side of Summerland Way and is positioned on both sides of the local government link of Avenue Road.

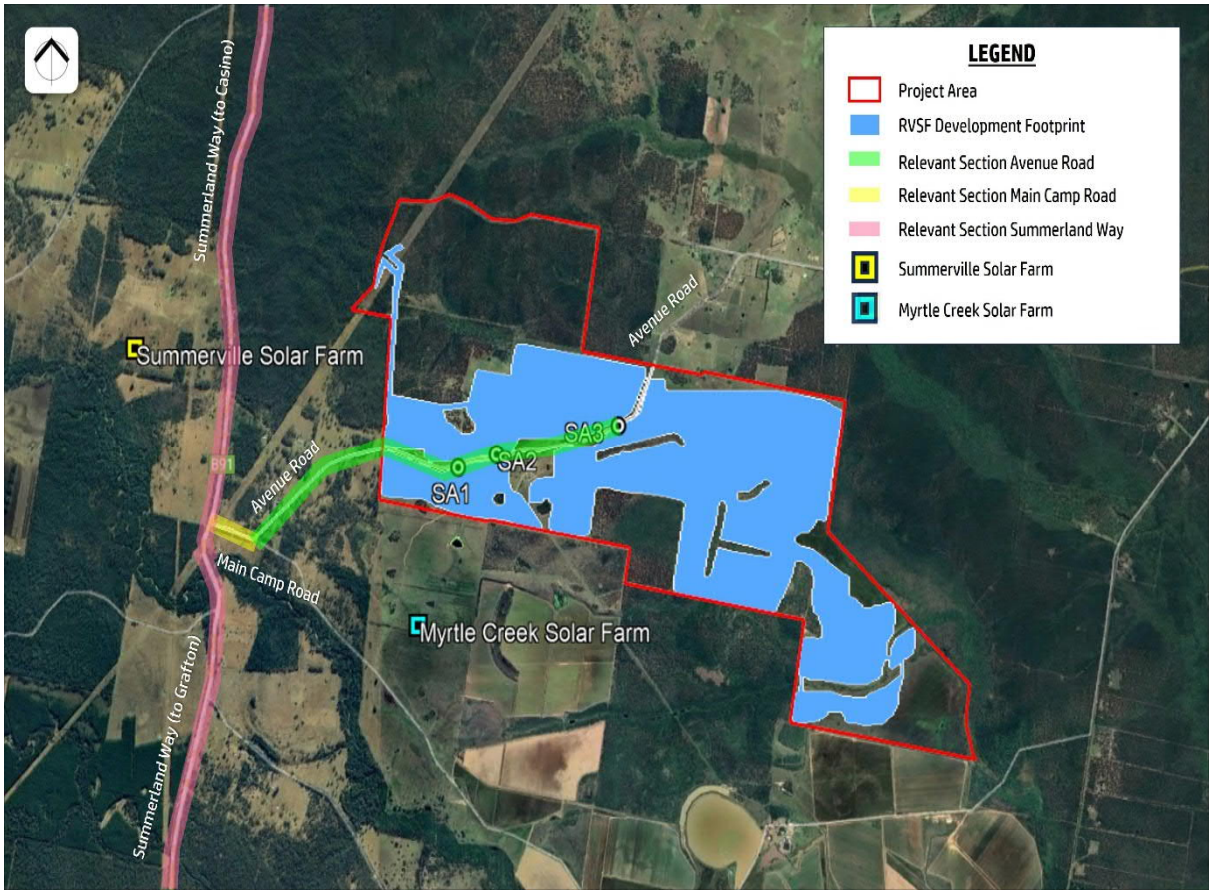

Figure 1 Project Area – Richmond Valley Solar Farm **[Source: Ark Energy & Google Earth Pro]**

2.2 Land Use and Zoning

The Project Area is zoned as 'RU1 Primary Production' under the Richmond Valley Local Environmental Plan (LEP) 2012 and bordered by land zoned as 'RU3 Forestry"', with the Ellangowan State Forest to the north-west and Bungwalbin State Forest in the east, as shown in **Figure 2**.

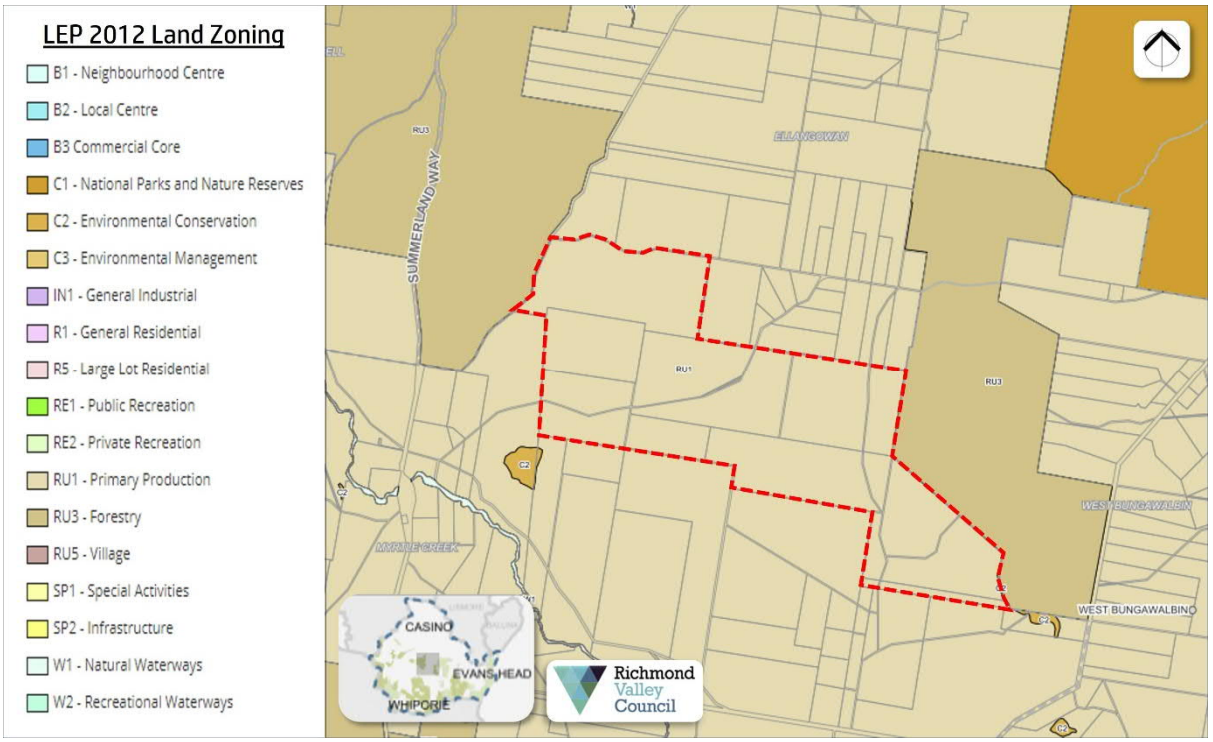

Figure 2 Current Land Zoning **[Source: NSW Planning Portal ePlanning Spatial Viewer]**

Existing land uses within the Project Area include livestock grazing, private native plantation, forestry and areas of environmental conservation as well as rural residential purposes.

2.2.1 Adjacent Land Use / Approvals

As shown in **Figure 2** above, the adjacent land parcels to the north, south and south-west of the Project Area are currently zoned as "RU1 – Primary Production", while the land to the east and north-west are north is zoned as "RU3 Forestry".

As part of the SEARs for the Project and the Cumulative Impact Assessment Guidelines for State Significant Projects 2022 [1] further assessment has been requested regarding the potential cumulative impacts of current State Significant Development Applications (SSDA) in the vicinity of the Project Area. Further detail regarding the cumulative impact assessment undertaken is provided in **Section 4.5** of this report, noting the consideration of the following proposed SSDAs:

- Summerville Solar Farm.
- Myrtle Creek Solar Farm.
- Clarence Valley Solar Farm.

2.3 Surrounding Road Network Details

Based on the anticipated Project transport routes identified (refer **Section 3.3** below), the relevant sections of the surrounding external road network were identified, with further details of their existing condition and operation of the key road links and intersections provided below.

2.3.1 Road Links

Based on the transport routes identified for the construction, operations and decommissioning phases of the Project, the critical road links were determined to be Summerland Way, Main Camp Road and Avenue Road as shown in **Figure 3**, which are expected to accommodate the majority of the staff and heavy vehicle movements generated by the Project.

[1] https://www.planning.nsw.gov.au/sites/default/files/2023-03/cumulative-impact-assessment-guidelines-for-ssp.pdf

All of the other road links identified, are noted to only be utilised by the transport vehicle movements for the solar and BESS components, and the OSOM movements for the larger electrical infrastructure (transformer and electrical switchroom). Furthermore, the remaining roads also currently cater for higher traffic volumes (particularly the motorway sections) and as such the minor addition of truck movements for the Project is not anticipated to have a significant impact on their operation.

Further details of the relevant sections of the Summerland Way, Main Camp Road and Avenue Road links are provided in the following sections.

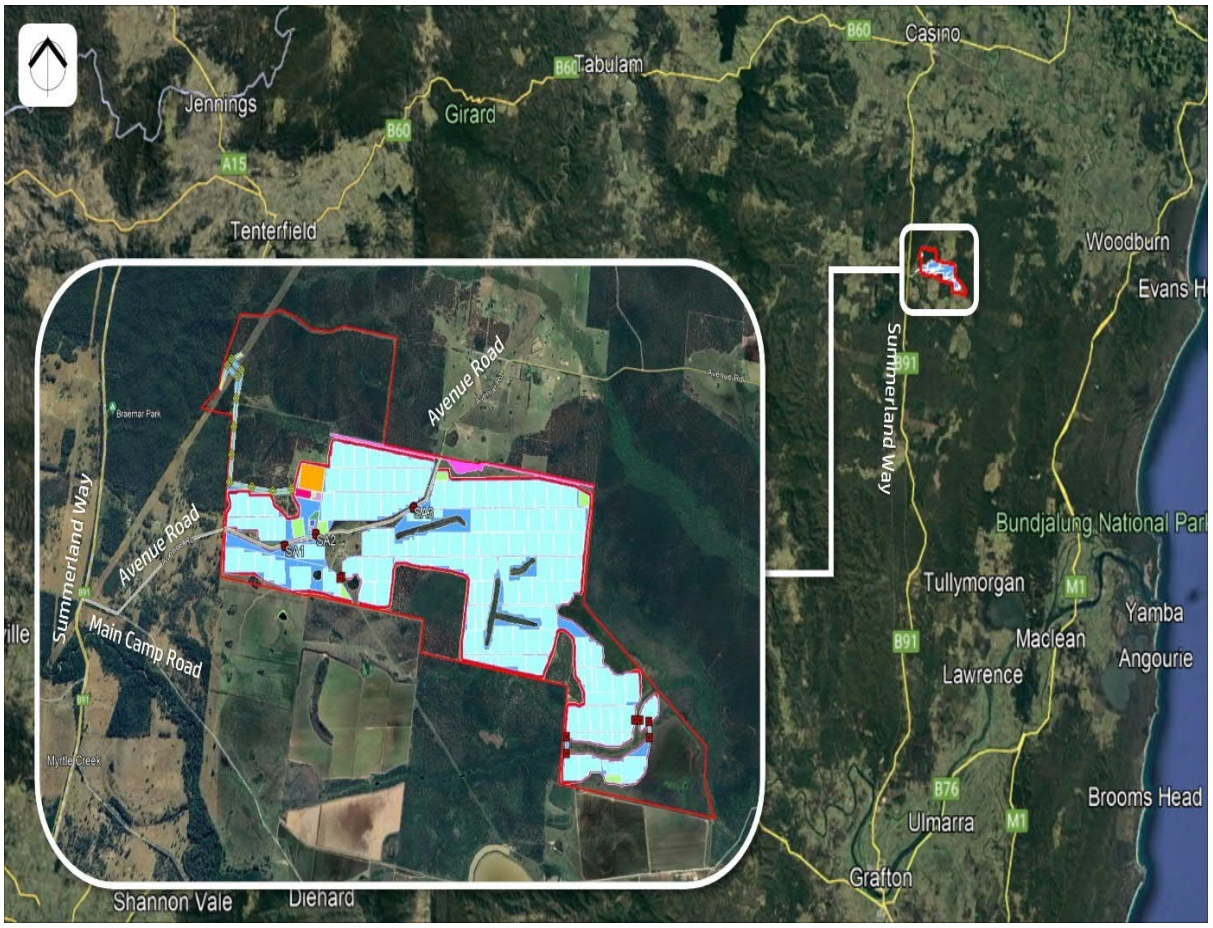

Figure 3 Critical External Road Links **[Source: Ark Energy & Google Earth Pro]**

2.3.1.1 Summerland Way

Summerland Way is a state-controlled route that runs north-south parallel to the Pacific Highway, connecting the Queensland border to Grafton in the south. Classified as an arterial road, the link also forms part of the TfNSW B-Double and OSOM Load Carrying Vehicle Network approved routes. The section of the link relevant to the Project is the 100km section between Casino and Grafton that is expected to be utilised by Project traffic travelling between these two regional centres and the Project Area.

In the vicinity of the Project Area, Summerland Way is generally configured as a two lane, two-way undivided rural highway cross section, as shown in **Figure 4**, where the road is constructed as a 9.5 m wide sealed pavement (including shoulders) and operates under a posted speed limit of 100km/hr. This section of Summerland Way was observed to be relatively flat, but with a number of horizontal curves on the approaches to the Main Camp Road, with grassed verges (including table drains) and a relatively dense roadside vegetation on both sides of the road.

Figure 4 Summerland Way looking north (towards Main Camp Road) **[Source: Access Traffic Consulting]**

In 2016, TfNSW released the Summerland Way Draft Corridor Strategy, which outlines key objectives and visions for the Grafton to Queensland border corridor. This document provides data into the traffic characteristics of Summerland Way such as existing traffic volumes and expected growth on the road network.

Figure 5 provides an extract of this document which identifies historic daily traffic volumes at various points along the link. Based on these volumes, it is noted that in the vicinity of the Project Area Summerland Way carried in the order of 1,122 vehicles per day (2015), including 255 heavy vehicles.

2.3.1.1 Main Camp Road

Main Camp Road is a rural access road under the jurisdiction of RVC that runs east from Summerland Way and provides access to a number of rural properties along its length. The section of the link relevant to the Project is a 515 m section between Summerland Way and Avenue Road that is expected to be utilised by all Project traffic travelling to/from the Project Area.

Currently this section of Main Camp Road provides a two-way, two-lane undivided carriageway with an unsealed road width of approximately 6 m as shown in **Figure 6.** This section of the link is also noted to be relatively straight in its alignment, with grassed verges (including table drains) and a current overhead powerline (and posts) located along the northern side of the road. No specific speed limit is posted for the relevant section of Main Camp Road is currently provided and as such a default 100 km/hr speed limit would apply, noting that warning signage is provided to alert drivers to the recommendation to drive to road conditions.

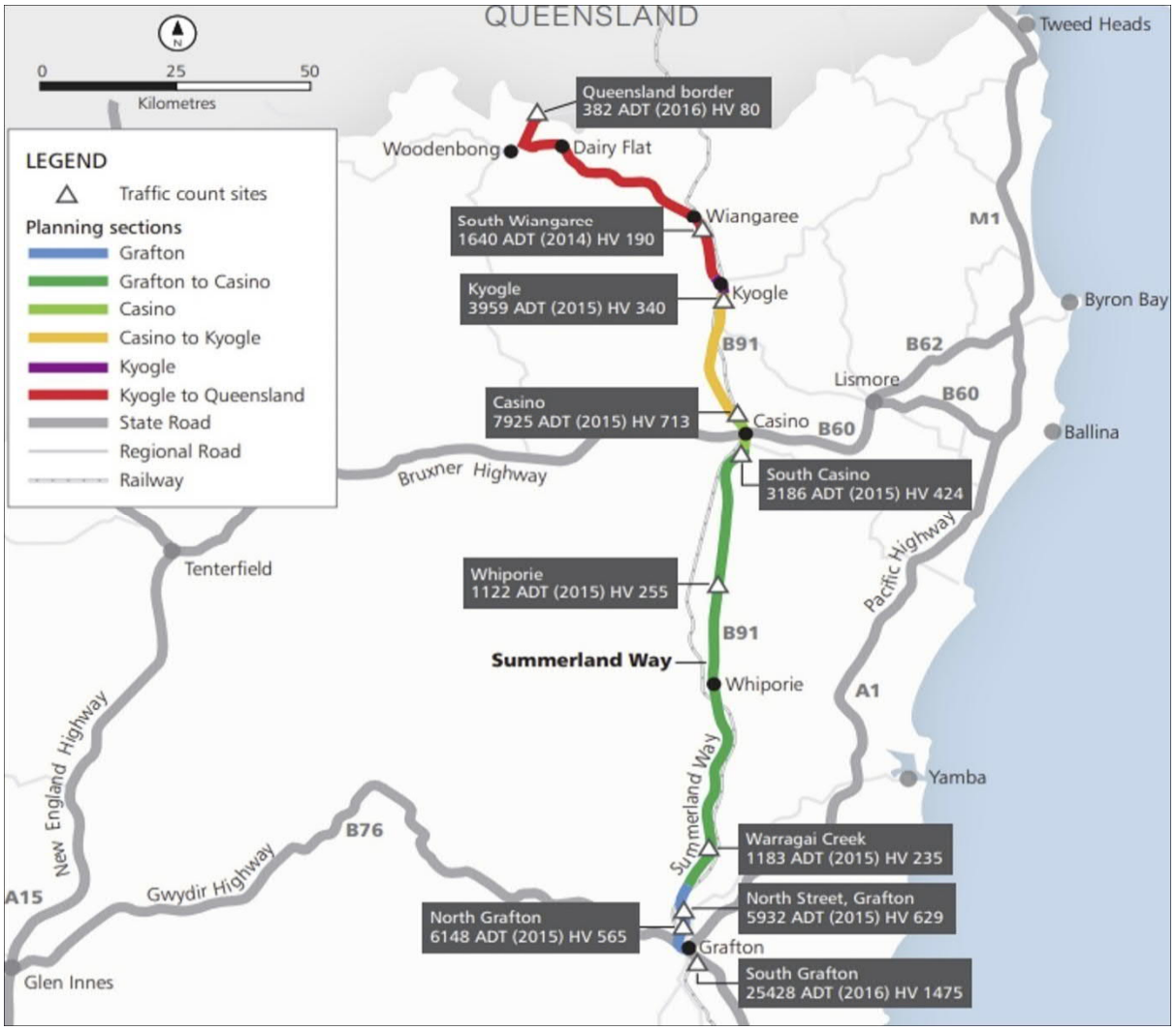

Figure 5 Daily Traffic & HV Volumes on Summerland Way [Source: TfNSW Summerland Way Draft Corridor Strategy]

Figure 6 Looking West on Main Camp Road towards Summerland Way [Source: Access Traffic Consulting]

2.3.1.1 Avenue Road

Avenue Road is also a rural access class road under the jurisdiction of RVC, that runs north-north east from Main Camp Road and provides access to a number of rural properties along its length. The section of Avenue Road considered relevant to the Project is a 4.443 m section between Main Camp Road and the proposed westernmost access point to the Project Area, which will be utilised by all Project traffic travelling to/from the Project Area. Currently this section of Avenue Road provides a two-way, two-lane undivided carriageway with a varying unsealed width of 4.0-5.0 m as shown in **Figure 7** and **Figure 8** below.

Figure 7 Looking South on Avenue Road [Source: Access Traffic Consulting]

Figure 8 Looking West on Avenue Road at Access SA2 [Source: Access Traffic Consulting]

This section of Avenue Road is relatively flat and includes a number of horizontal curves and minor rural property accesses, with grassed verges (including table drains) and some roadside vegetation present along its length. Again as an unsealed road, no posted speed limit is applied, with the default 100 km/hr speed limit applying, noting that drivers are recommended to drive to road conditions.

2.3.2 Intersections

2.3.2.1 Summerland Way / Main Camp Road intersection

This state-controlled road intersection will be the main access point from the broader road network to the Project Area and will be utilised for all material / equipment / solar component delivery movements (heavy vehicles and OSOM) and staff movements (light vehicles and shuttle buses).

The current configuration of the intersection is a three-way priority intersection (give way) with the northern and southern legs of Summerland Way having priority over the eastern, minor side road approach of Main Camp Road. One lane in each direction of traffic is provided on each approach to the intersection, with no left turn treatment and an auxiliary right (AUR) turn lane treatment provided on the northern and southern Summerland Way approaches respectively, as shown in **Figure 9**.

It is noted that the existing auxiliary right turn (AUR) treatment at the intersection (the provision of the short length of additional northbound through lane at the intersection) is an outdated treatment based on a previous design standard, with a short channelised right turn (CHRs) lane treatment (refer Figure A6 of Part 4 of Austroads Guide to Road Design) now the current, recommended standard, based on the latest intersection turn warrants as per Figure 3.25a of Part 6 of Austroads Guide to Traffic Management.

As such, further consideration should be given to updating the right turn treatment to a CHRs standard (generally retrofit into existing pavement extents with amended linemarking) as part of any required upgrade works at the intersection.

Figure 9 Existing Summerland Way / Main Camp Road intersection **[Source: Google Earth Pro]**

An assessment of the currently available sight distances at the intersection were undertaken based on the requirements of Part 4A of Austroads Guide to Road Design, which specifies the requirement for the following sight distance lengths to be available at intersection, based on an adopted design speed of 110 km/hr (posted speed + 10k m/hr) as per standard requirements, with a summary of this assessment provided in **Table 5** overpage.

Table 5 Intersection Sight Distance Requirements

Sight Distance Type	Adopted Parameters	Required Sight Distance (m)	
		Light Vehicles (Car)	Trucks
Approach Sight Distance (ASD)	Cars R_T = 2.5 sec / d = 0.36 Trucks R_T = 2.5 sec / d = 0.22	209 m	241 m
Safe Intersection Sight Distance (SISD)	Cars R_T = 2.5 sec / d = 0.36 / a = 0% Trucks R_T = 2.5 sec / d = 0.24 / V = 100km/h / a = 0%	**300 m**	**317 m**
Minimum Gap Sight Distance (MGSD)	Critical Acceptance Gap - Right Turn from Three Lane / Two Way - t_a = 6.5 sec	198.5 m	

A site inspection was also undertaken to establish the currently available sight distances to/from the intersection on all approaches. Based on this inspection, it was observed that suitable approach site distance (>241m – Truck ASD) was available along Main Camp Road to the intersection, while the currently available sight distances to/from the intersection to the north (towards Casino – refer **Figure 10**) exceeded the requirements for safe intersection sight distance (SISD >300m light vehicles / >317m heavy vehicles). Notwithstanding this, it was noted that the existing sight lines to/from the intersection to the south (towards Grafton – refer **Figure 11**) were slightly restricted due to the existing vegetation on the south-east corner of the intersection.

It was noted however that once the restricting vegetation is cleared (permanently to the ground), adequate SISD sight distance (SISD >300m light vehicles / >317m heavy vehicles) will be available to/from the southern approach, as identified in the sight distance assessment outline in **Figure 12** overpage, which is also included for reference as Drawing UMW0123-007_SK002 in **Appendix D**.

Figure 10 Looking North along Summerland Way from Main Camp Road Intersection [Source: Access Traffic Consulting]

Figure 11 Looking South along Summerland Way from Main Camp Road Intersection [Source: Access Traffic Consulting]

During the site inspection, it was also observed that the intersection is currently being utilised as an informal bus set down area for the school bus movements along Summerland Way, with the northbound bus movements in the AM stopping on the road shoulder on the western side of the Summerland Way at the intersection, while the southbound bus movements stopping across the Main Camp Road leg of the intersection on the eastern side of the road in the PM period.

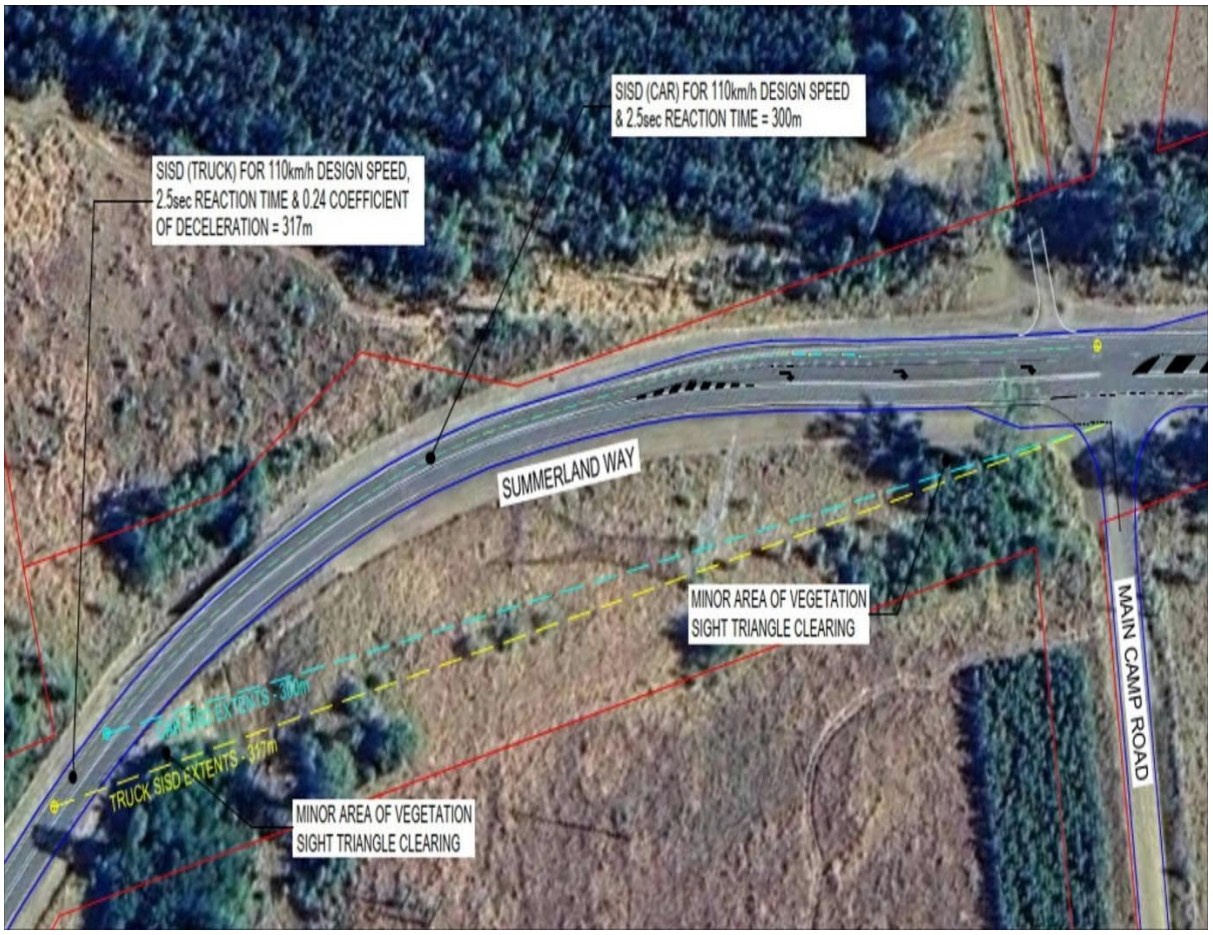

Figure 12 Safe Intersection Sight Distance Requirements to/from the South [Source: Access Traffic Consulting]

2.3.2.2 Main Camp Road / Avenue Road Intersection

The current configuration of the Main Camp Road / Avenue Road intersection is a three-way priority intersection (give way) with the western and eastern legs of Main Camp Road having priority over the minor side road approach of Avenue Road. One lane in each direction of traffic is provided on each approach to the intersection, with no turn treatments provided at the intersection.

Figure 13 Existing Main Camp Road / Avenue Road intersection [Source: Google Earth Pro]

As shown in **Figure 13**, this intersection currently has a relatively minor footprint, with heavy vehicles observed to utilise the full width of the approach and departure of the intersection to travel between Main Camp Road and Avenue Road, while adequate sight distances (in excess of those identified in **Table 5** above) were noted in both directions to/from Avenue Road at the intersection as shown in **Figure 14** and **Figure 15**.

Figure 14 Looking East along Main Camp Road from Avenue Road Intersection [Source: Access Traffic Consulting]

Figure 15 Looking West along Main Camp Road from Avenue Road Intersection [Source: Access Traffic Consulting]

2.4 Existing Traffic Volumes

2.4.1 Road Link Volumes

The road link volumes for the relevant sections of the Summerland Way have been estimated from the available historical count data from TfNSW, while an estimate of the daily volumes on Main Camp Road was established from the observed peak hour traffic volumes on the Main Camp Road leg of the Summerland Way / Main Camp Road intersection, with a factor (x5)[2] applied to the combined AM and PM network peak volumes on the leg.

Finally, the current daily volumes on Avenue Road have been conservatively estimated based on the application of a daily generation rate of 4 vehicles per day (vpd) for each of the 20 rural properties currently serviced by the link. This generation rate is based on the methodology of IPWEA's Lower Order Road Design Guidelines, with its application equating to approximately 40 vehicles per day (vpd) in each direction on Avenue Road.

A conservative background growth rate of 3% per annum (compound) was then applied to the identified baseline year volumes on Summerland Way and 1% on Main Camp Road and Avenue Road to establish forecasts of the current (2024) volumes on the link (refer **Table 6**), as well as the expected background volumes at future design horizons for the Project.

Table 6 Current (2024) AADT Traffic Volumes

Road ID	Road Segment		Base Data Year	Base Year AADT				10 Yr. GR %	Background AADT (2024)			
									Gaz		A-Gaz	
	Start (km)	End (km)		Gaz	A-Gaz	Gaz % HV	A-Gaz % HV		Total	HV	Total	HV
Summerland Way (Casino to Grafton)												
Casino to South Casino			2019	1,891	1,910	18.2%	17.6%	3.0%	2,192	400	2,214	390
South Casino to Main Camp Road			2008	632	648	18.8%	17.0%	3.0%	1,014	191	1,040	177
Main Camp Road to Whiporie			2008	632	648	18.8%	17.0%	3.0%	1,014	191	1,040	177
Whiporie to Warragai Creek			2007	1,201	1,263	18.8%	17.0%	3.0%	1,985	373	2,088	355
Warragai Creek to Grafton North			2011	3,196	3,209	7.6%	8.1%	3.0%	4,693	357	4,713	380
Grafton North to Grafton			2019	12,390	12,527	2.0%	2.1%	3.0%	14,363	282	14,522	300
Main Camp Road												
Summerland Way to Avenue Road	0.000	0.515	2023	80	80	12.5%	12.5%	1.0%	81	10	81	15
Avenue Road												
North of Main Camp Road	0.000	2.618	2023	40	40	10.0%	10.0%	1.0%	40	4	40	4
	2.618	3.051	2023	40	40	10.0%	10.0%	1.0%	40	4	40	4
	3.051	4.443	2023	40	40	10.0%	10.0%	1.0%	40	4	40	4

Gaz (Gazettal direction of travel or with chainage) / A-Gaz (Against Gazettal direction of travel or against chainage)
Main Camp Road chainage assumed to run east from Summerland Way / Avenue Road chainage assumed to north from Main Camp Road
Main Camp Road Ch. 0.515km – Avenue Road intersection / Avenue Road Ch. 2.618km - Site Access 1 / Avenue Road Ch. 3.501km - Site Access 2 / Avenue Road Ch. 4.443km - Site Access 3

[2] Standard practice is that peak hour volumes are approximately 10% of overall daily volumes. Hence combination of two peak hour periods (AM & PM) would be 20% of overall volumes (i.e. combined peak volumes x5 = daily volumes).

2.4.2 Intersection Volumes

Turning movement counts were undertaken at the Summerland Way / Main Camp Road intersection on Thursday 17th August 2023, with the counts undertaken for the period of 6-9 am and 3-6 pm respectively to record the traffic conditions at the intersection for both the expected Project peaks (6-7 am & 5-6 pm – being the peak periods of traffic generation from the Project during construction) as well as the peak periods of traffic volumes on the adjacent road network (i.e Summerland Way – 8-9 am & 3-4pm as identified in **Figure 16** below). The raw data for the completed intersection count is provided for reference in **Appendix A**.

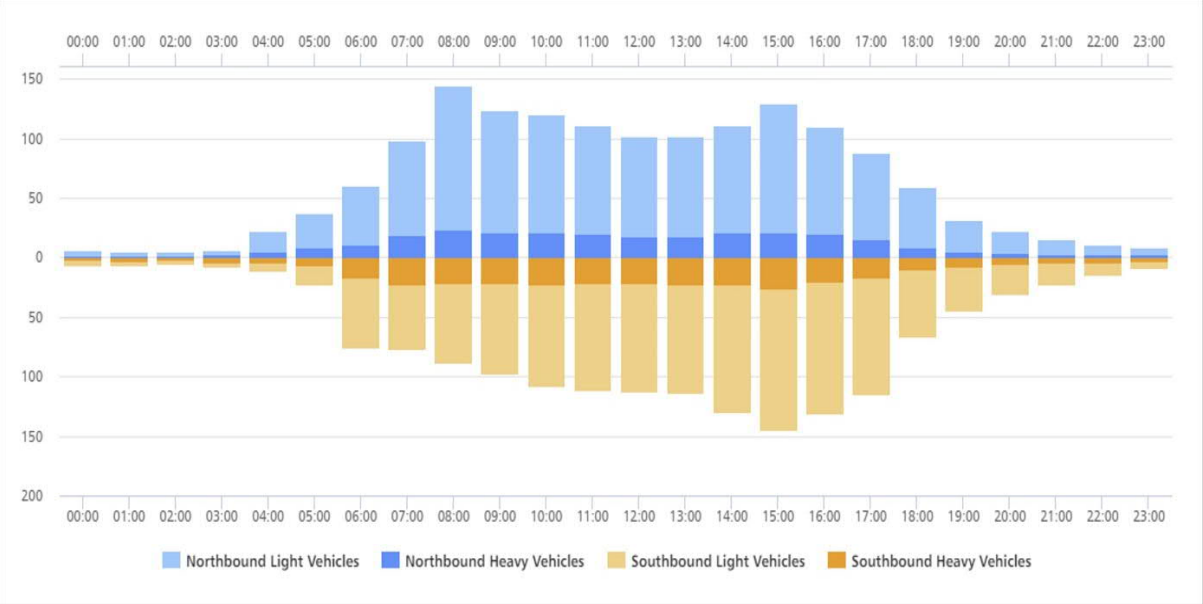

Figure 16 Summerland Way (Site T0260) Hourly Volume Profile (2021) [Source: TfNSW Traffic Volume Viewer]

A conservative 3% per annum (compound) growth rate has been applied to all movements through movements on Summerland Way, while a lower 1% growth rate has been applied to movements into / out of Main Camp Road to reflect the minimal growth on this local government controlled link. Using the recorded count data and the identified growth rates, a forecast of the current (2024) peak hour volumes at the intersection were established. A summary of the resultant 2024 AM and PM peak hour volumes for both the Project and network peak periods at the intersections are provided in **Figure 17** and **Figure 18.**

Finally, it is noted that no requirement to undertake a count was identified for the minor intersection of Main Camp Road and Avenue Road based on the extremely low volumes (<5vph) observed for all movements at this intersection.

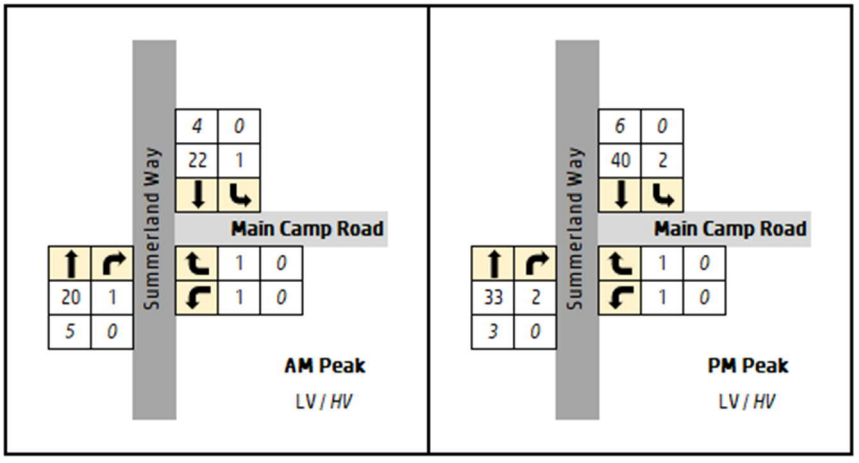

Figure 17 Existing (2024) AM Peak Hour Volumes (Project Traffic Peaks 6-7am & 5-6pm)

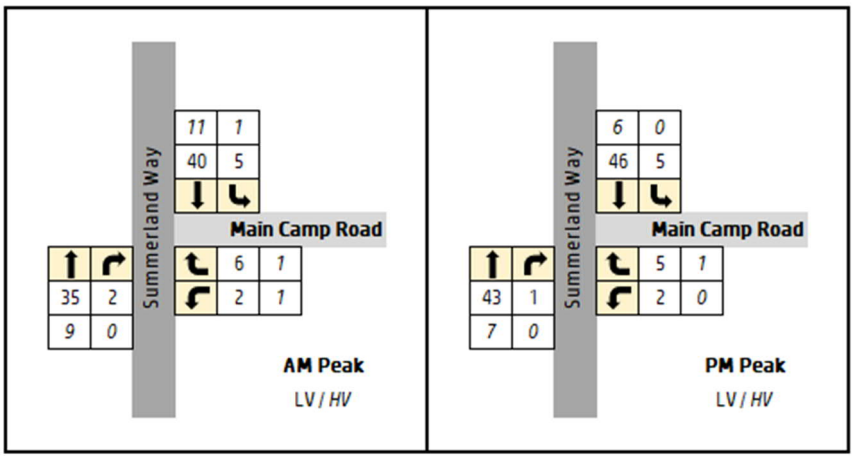

Figure 18 Existing (2024) AM Peak Hour Volumes (Network Traffic Peaks 8-9am & 3-4pm)

2.5 Existing Intersection and Network Performance

2.5.1 Road Links

Based on the road link volumes forecasts in **Table 6** above, it can be seen that the existing configurations of Summerland Way can be considered to have adequate capacity to cater for the current 2024 volumes on the link, in particular the rural two-lane arterial road configuration of the link in the vicinity of the Project Area (approx. 12,000vpd). Further to this, it is noted that the current unsealed configurations of Main Camp Road and Avenue Road are considered adequate to cater for the low volumes of traffic on each link.

2.5.2 Intersections

2.5.2.1 Performance Metrics

To understand the operational performance of the Summerland Way / Main Camp Road intersection, 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 a priority-controlled intersection such as the Summerland Way / Main Camp Road intersection 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 (RTA NSW criteria) are summarised in **Table 7** below:

Table 7 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 (95%ile) 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 Intersection Assessment

An assessment of the current operational performance of the key Summerland Way / Main Camp Road intersection has been undertaken utilising the Signalised Intersection Design and Research Aid (SIDRA) software package, based upon the forecast volumes for the current (2024) background AM peak and PM peak periods (both the expected Project peak and adjacent existing road network peak), as identified in **Figure 17** and **Figure 18** above. It is noted that the weekday AM and PM peaks identified for the assessment are considered to be the worst-case periods in terms of both the volume of traffic and therefore the operation of the intersection, with any weekend (Saturday) peak periods at the intersection noted to have lower traffic volumes and therefore better operational performance of the intersection.

The results of these analyses are summarised in **Table 8** below, with the detailed results provided for reference in **Appendix B**. These results revealed that the current configuration of the intersection is expected to operate satisfactorily for the forecast current (2024) background or pre Project traffic conditions, with all calculated values of Degree of Saturation (DOS), Level of Service (LOS), average delay and vehicle queue lengths for the intersection well within acceptable limits of operation for a priority-controlled intersection for all traffic scenarios assessed.

Table 8 SIDRA Results – Summerland Way / Main Camp Road Intersection (Existing Configuration)

Analysis Scenario	Intersection Degree of Saturation	Level of Service**	Intersection Average Delay (sec)	Maximum 95% Back of Queue Length (m)
Unsignalised / Priority Controlled Intersections				
Acceptable Limits of Operation	**< 0.800**	**LOS C**	**< 42.5**	**Varies ***
Summerland Way / Main Camp Road Intersection				
2024 AM Peak (Project Peak)	0.016	LOS A	0.4	0.0
2024 PM Peak (Project Peak)	0.029	LOS A	0.5	0.1
2024 AM Peak (Network Peak)	0.035	LOS A	1.0	0.3
2024 PM Peak (NE Hwy Peak)	0.034	LOS A	0.8	0.3

* Acceptable queue lengths are when all queues are contained within the existing lane lengths, with no traffic flows impeded.

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

2.6 Road Crash History Review

A review of the road crash history on the relevant sections of Summerland Way (Casino to Grafton), Main Camp Road (Summerland Way to Avenue Road) and Avenue Road (Main Camp Road to Site Access 3) in the vicinity of the Project Area was undertaken using the interactive crash statistic data available from the TfNSW Centre for Road Safety database for the period between 2018-2022.

The results of this search identified 0 recorded crashes on either relevant sections of Main Camp Road and Avenue Road, while in total 52 accidents were recorded on the rural section of Summerland Way (Casino to Grafton) between 2018-2022, including 16 and 36 crashes on the section to the north and south of Main Camp Road respectively. Further details of the recorded crash data on the rural sections of Summerland Way are provided in **Table 9**.

Table 9 Summary of Road Crash Data **[Source: TfNSW Centre for Road Safety Database]**

Crash ID	Crash Year	Degree of Crash	RUM Code	RUM Description
Summerland Way (Casino to Main Camp Road) – Rural				
1169313	2018	Fatal	21	Right Through
1178003	2018	Non-Casualty (Towaway)	70	Off Road to Left
1181868	2018	Non-Casualty (Towaway)	80	Off Road Left (Right Turn Bend)
1181972	2018	Serious Injury	83	Off Road Right (Right Turn Bend) – Hit Object
1188426	2018	Non-Casualty (Towaway)	73	Off Road to Right - Hit Object
1189378	2018	Minor / Other Injury	81	Off Road Left (Right Turn Bend) – Hit Object
1192758	2019	Serious Injury	70	Off Road to Left
1209219	2019	Serious Injury	73	Off Road to Right - Hit Object
1212445	2019	Serious Injury	83	Off Road Right (Right Turn Bend) – Hit Object
1214065	2019	Serious Injury	67	Struck Animal
1221112	2019	Minor / Other Injury	71	Off Road to Left - Hit Object
1233478	2020	Moderate Injury	20	Head On
1249087	2020	Serious Injury	73	Off Road to Right - Hit Object
1258563	2021	Moderate Injury	67	Struck Animal
1277912	2021	Non-Casualty (Towaway)	70	Off Road to Left
1308514	2022	Non-Casualty (Towaway)	67	Struck Animal
Summerland Way (Main Camp Road to Grafton) – Rural (Richmond Valley LGA)				
1160752	2018	Fatal	87	Off Road Left (Left Turn Bend) – Hit Object
1181162	2018	Serious Injury	71	Off Road to Left - Hit Object
1187738	2018	Moderate Injury	87	Off Road Left (Left Turn Bend) – Hit Object
1201849	2019	Moderate Injury	71	Off Road to Left - Hit Object
1204134	2019	Serious Injury	82	Off Road Right (Right Turn Bend)
1218625	2019	Minor / Other Injury	13	Right Near
1229089	2020	Moderate Injury	67	Struck Animal
1258103	2021	Serious Injury	71	Off Road to Left - Hit Object
1260232	2021	Minor / Other Injury	71	Off Road to Left - Hit Object
1272551	2021	Serious Injury	83	Off Road Right (Right Turn Bend) – Hit Object
1277250	2021	Non-Casualty (Towaway)	73	Off Road to Right - Hit Object
1279515	2021	Minor / Other Injury	81	Off Road Left (Right Turn Bend) – Hit Object
1281195	2022	Moderate Injury	73	Off Road to Right - Hit Object
1282394	2022	Moderate Injury	70	Off Road to Left
1298790	2022	Minor / Other Injury	32	Right Rear
1303238	2022	Serious Injury	70	Off Road to Left
Summerland Way (Main Camp Road to Grafton) – Rural (Clarance Valley LGA)				
1160447	2018	Moderate Injury	47	Emerging From Driveway
1169375	2018	Non-Casualty (Towaway)	67	Struck Animal
1171459	2018	Moderate Injury	88	Out of Control on Bend
1182762	2018	Moderate Injury	67	Struck Animal
1187082	2018	Non-Casualty (Towaway)	88	Out of Control on Bend
1187885	2018	Moderate Injury	70	Off Road to Left
1191922	2018	Non-Casualty (Towaway)	88	Out of Control on Bend

Crash ID	Crash Year	Degree of Crash	RUM Code	RUM Description
1189658	2019	Fatal	20	Head On
1196568	2019	Serious Injury	81	Off Road Left (Right Turn Bend) – Hit Object
1202473	2019	Moderate Injury	73	Off Road to Right - Hit Object
1218444	2019	Non-Casualty (Towaway)	63	Vehicle Door
1218941	2019	Moderate Injury	71	Off Road to Left - Hit Object
1225407	2020	Fatal	20	Head On
1250906	2020	Moderate Injury	73	Off Road to Right - Hit Object
1253120	2020	Moderate Injury	71	Off Road to Left - Hit Object
1251189	2021	Moderate Injury	81	Off Road Left (Right Turn Bend) – Hit Object
1264558	2021	Fatal	73	Off Road to Right - Hit Object
1271461	2021	Moderate Injury	67	Struck Animal
1272433	2021	Serious Injury	71	Off Road to Left - Hit Object
1294933	2022	Moderate Injury	70	Off Road to Left

Based on further review of the recorded crash data above, it is noted that the majority of the accidents are single vehicle off path/road crashes which are typical for rural highway environments and generally relate to driver behaviour.

Furthermore, no crash clusters were identified which would suggest that there were not any particular existing road feature or design deficiency on the network (Summerland Way) which is likely to be contributing to vehicle accidents. Finally, it is noted that no recorded crashes were identified at the key intersection of Summerland Way / Main Camp Road.

2.7 Transport Infrastructure

2.7.1 Public Transport Infrastructure

Due to the rural nature of the Project Area, approximately 26 km to the south and 64 km to the north of the regional centres of Casino and Grafton respectively, there is currently no public transport infrastructure (i.e. public bus routes) along the key transport routes for the Project of Summerland Way, Main Camp Road or Avenue Road that could be utilised as part of the vehicle movements required for the Project.

Notwithstanding this, as mentioned above, the existing intersection of Summerland Way and Main Camp Road is currently utilised as an informal stop for school bus movements with the existing shoulder on the western side of the intersection observed for AM pickups of the northbound bus movements, and the Main Camp Road approach on the eastern side of the intersection used for PM drop-offs, with students being driven to/from these points from surrounding areas.

As such it may be a positive benefit to the community to provide additional widening works on the Summerland Way departures to the intersection in each direction of travel as part of any required intersection upgrade works for the Project to accommodate clear, formal set down areas for the school bus.

2.7.2 Active Transport Infrastructure

Again based on the isolated, rural nature of the Project Area there are no specific active transport facilities or infrastructure on the surrounding road network (i.e. bike lanes or pedestrian pathways) that could be utilised as part of required movements for the Project.

3.0 Project Details

3.1 Conceptual Project Layout

As shown in **Figure 19**, the overall Project Area is made up of three sub areas aligning with the Project's three access points including one to the north (SA2) and two to the south (SA1 and SA3) of Avenue Road, which runs through the centre of the Project Area (refer **Figure 19**). Each sub area is proposed to be serviced by a separate vehicular access point from Avenue Road, which in turn will be accessed from the broader external road network (i.e. the state-controlled Summerland Way) via Main Camp Road and the section of Avenue Road to the south-west of the Project Area. These road links and access points are expected to cater for all traffic from the construction, operations and decommissioning phases of the Project.

A copy of the conceptual layout for the Project has been included for reference in **Appendix C.**

3.2 Project Details

Information regarding the proposed construction activities, day to day operations and decommissioning of the Project has been provided by Ark Energy, with a summary of the key site elements of the Project provided in **Table 10**. These elements are shown in **Figure 22.**

Table 10 Key Elements of Richmond Valley Solar Farm

Element	Site Area 1	Site Area 2	Site Area 3
Site Access	SA1 South	SA2 North	SA3 South
External Road Upgrade Length	515 m Main Camp Road 2,618 m Avenue Road	433 m Avenue Road	1,392 m Avenue Road
Length of Internal Access Roads	6,278 m	13,567 m	32,215 m
Substations / Switching Stations	0	2	0
Battery Energy Storage System	0	1	0
Site Construction Compounds	0	1	0
Site Laydown Areas	1	2	3
Site Staff Carpark Areas	0	1	0
Site Operational & Maintenance Facility Areas	0	1	0
Length of Transmission Line	0	2 km	0

3.2.1 Construction Phase

The construction of the Project is anticipated to be completed over a 24-month period which is expected to commence in Q4 2025 (October 2025 - pending approvals). Based on this assumed 24-month overall construction it is expected that all construction works on site will be completed by the start of Q4 2027 (October 2027), with the peak period of construction expected to occur within Q1 and Q2 2026.

Construction activities are proposed to be limited to 7 am – 6 pm Monday to Friday and 8 am to 1 pm on Saturdays. No activities would occur on Sundays or public holidays unless unexpected risk to the Project and personnel are required to be resolved during these days.

Preliminary details of the proposed construction phase activities have been provided by Ark Energy, with a high-level program of the key construction tasks, including the likely order of completion and anticipated timeframes provided in the schedule included as **Figure 20.**

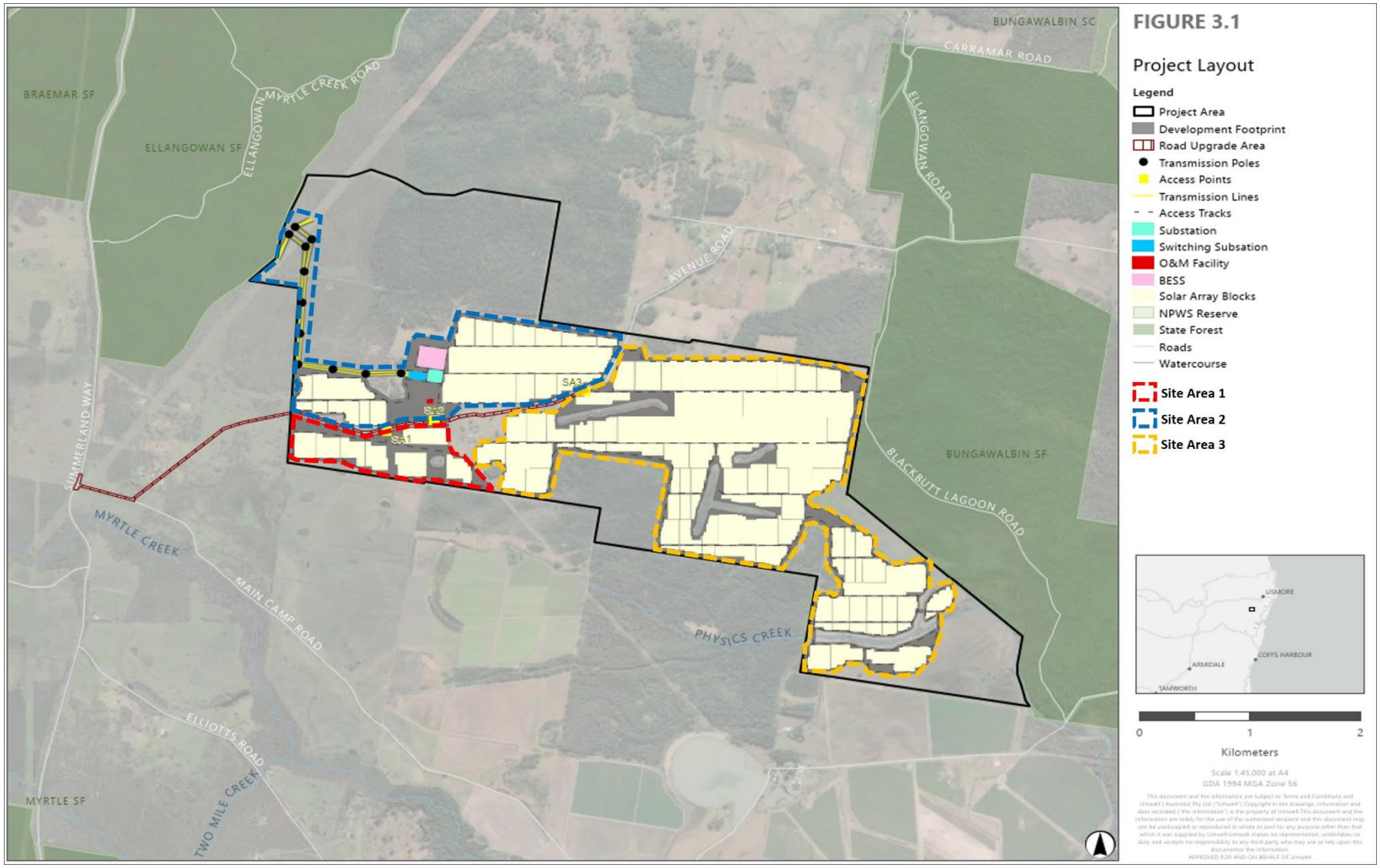

Figure 19 Richmond Valley Solar Farm – Conceptual Project Layout **[Source: Umwelt / Ark Energy]**

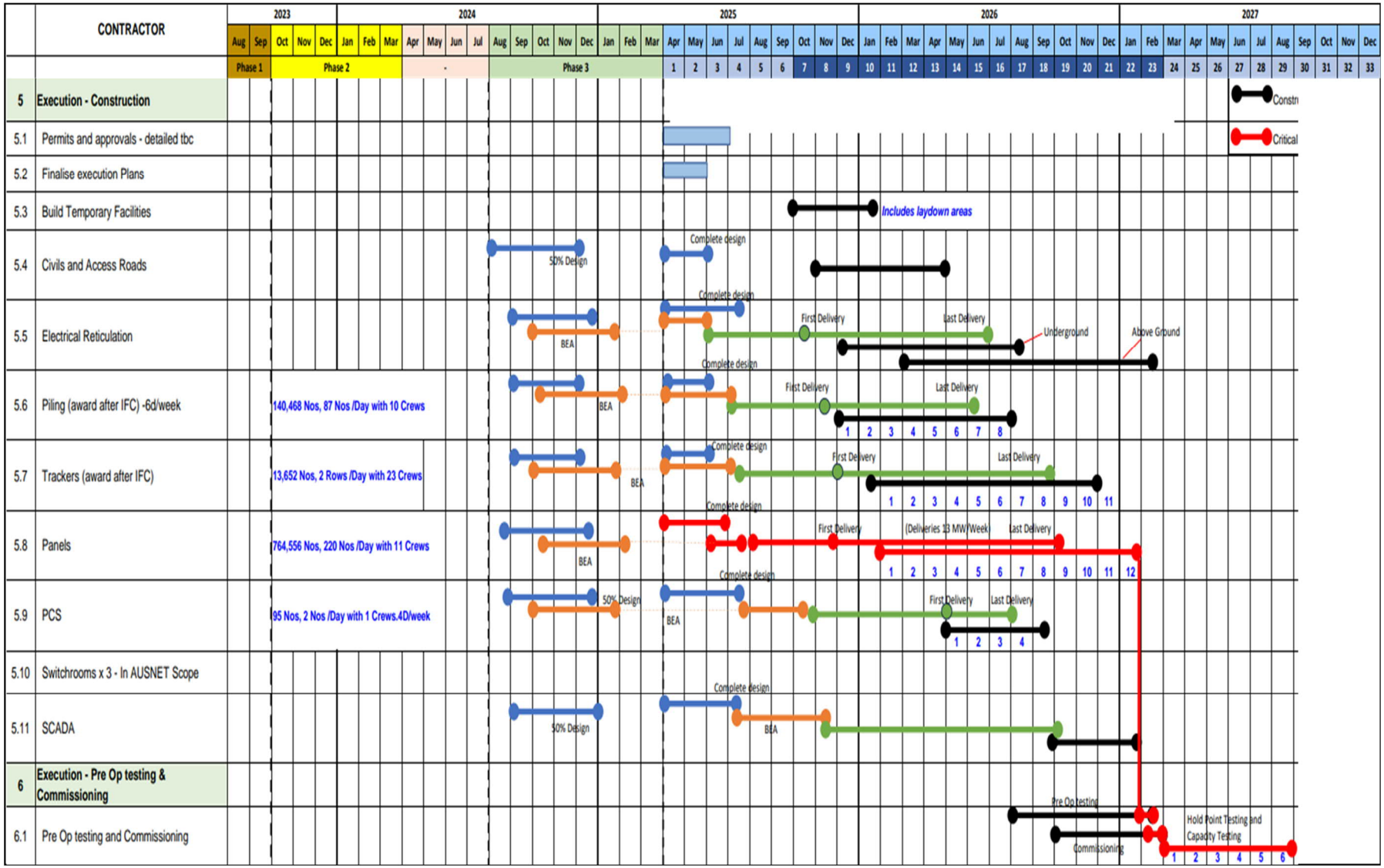

Figure 20 Proposed Construction Schedule – Richmond Valley Solar Farm **[Source: Ark Energy]**

3.2.2 Operations Phase

The operations phase of the Project will commence upon completion of the construction works, with the solar farm to be operated by a relatively small number of staff (approximately 10-15 staff). In addition, it is expected that limited numbers of heavy vehicles will access the Project Area during operations, with only periodic maintenance (monthly) and routine service/refuse collection vehicles (1 per week) anticipated to travel to/from the Project Area.

The Project would operate continuously (24 hours a day / 7 days a week), with a mix of remote and onsite monitoring and maintenance. Associated work by onsite staff would be undertaken during the standard working hours of:

- Monday to Friday: 7am–6pm
- Saturday: 8am–1pm

No activities would occur on Sundays or public holidays, however, in cases of emergencies, major asset inspection or maintenance programs may be undertaken outside standard hours. RVC and surrounding landholders would be notified of any works outside standard work hours that may be expected to cause noise exceedance.

3.2.3 Decommissioning or Upgrading Phase

At the end of the operational life of the Project infrastructure (approx. 30 years) it is proposed that the solar farm would either be decommissioned, removing all infrastructure, and returning the site to the original condition or the Project will be upgraded (pending any additional approval requirements).

Decommissioning would involve the mobilisation of a workforce and additional temporary facilities, and the subsequent removal of equipment and infrastructure. All above ground infrastructure except the transmission lines and substation will be removed during decommissioning unless stated otherwise in the conditions of consent. At this time, it is expected that this would require significant movements of light vehicles and trucks for transporting waste would occur.

The decommissioning phase would be expected to last less than 24 months, with the peak traffic movements to/from the site during decommissioning conservatively estimated to be approximately 70% of the identified peak construction movements (both material/equipment delivery and peak staff movements).

3.3 Project Transport Routes

To assist in the identification of the sections of the external state and local government controlled road networks relevant to the Project, the transport routes anticipated to be utilised by Project traffic during the construction, operations and decommissioning phases of the Project were also identified, as outlined below and indicatively shown in **Figure 21** and **Figure 22**:

3.3.1 Construction Phase

Based on preliminary details provided by Ark Energy, the following transport routes have been identified for traffic associated with the Project.

<u>Light Vehicles</u>

- The construction workforce is assumed to commute daily to/from the Project Area from the nearby townships to the south (Grafton) and north (Casino and Ballina), utilising the road links of Summerland Way, Main Camp Road and Avenue Road (refer **Figure 22**)

<u>Heavy Vehicles</u>

- Major solar and BESS components are proposed to be delivered to the Port of Brisbane and then transported to the Project Area by road using a route consisting of the Port of Brisbane Motorway (M4), Gateway Motorway (M1), Pacific Motorway (M1), Myocum Road, Hinterland Way (B62), Lismore-Bangalow Road (B62), Bruxner Highway (B60), Summerland Way (B91), Main Camp Road and Avenue

Road to the 3 site access locations proposed, as indicatively shown in **Figure 21**. It is noted that all state-controlled road links along this route are approved TfNSW OSOM Load Carrying Vehicle Roads.

- Construction equipment (bulk earthworks plant, prefabricated buildings) and general construction materials (such as quarry materials, concrete, reinforcing steels, cable, site water, diesel fuel, waste removal etc) are proposed to also be sourced from the larger regional centres to both the south (i.e. Grafton) and north (i.e. Casino and Ballina) of the Project, and travel to/from the site via Summerland Way, Main Camp Road and Avenue Road (refer **Figure 22**).

OSOM Vehicles

- Larger electrical infrastructure components such as the transformers and switch rooms for the substation and switching substation are proposed to be transported by OSOM transport vehicles. Ark Energy have advised that the transformer deliveries should be assumed to come from/via the Port of Brisbane, while the switch rooms deliveries should be assumed to come from James Energies at 67 Noosa Street, Heathwood, Queensland.

  A route assessment for the required OSOM transport movements for the Project has been completed by EMM Consulting Pty Ltd (dated 3 May 2024 – refer **Appendix D**), which identified proposed OSOM transport routes for both the transformer and switch room components, with a summary of the proposed transport routes outline below and shown further in **Figure 23** (transformer) and **Figure 24** (switch rooms):

  Transformers (Approx. 287km)

  Port of Brisbane near berths 1–3 to Port Drive, Port of Brisbane Motorway (M4), Gateway Motorway (M1), Pacific Motorway (M1), Tugun Currumbin Road, Gold Coast Highway, Pacific Motorway (M1), Bruxner Highway (B60), Centre Street, Summerland Way (B91), Main Camp Road and Avenue Road to Site Access 2 (SA2).

  Switch Rooms (Approx. 289km)

  67 Noosa Street to Noosa Street, Stradbroke Street, Logan Motorway (M2), Centenary Highway (M5), Ipswich Motorway (M7), Granard Road, Riawena Road, Kessels Road, Logan Road, Pacific Motorway (M3 and M1), Tugun Currumbin Road, Gold Coast Highway, Pacific Motorway (M1), Bruxner Highway (B60), Centre Street, Summerland Way (B91), Main Camp Road and Avenue Road to Site Access 2 (SA2).

3.3.2 Operations Phase

The following transport routes relevant to the operations phase of the Project have been identified:

Light Vehicles

- The workforce during operation will consist of a small number of local workers (i.e. approx. 10-15 staff FTE) who are expected to reside locally to the Project Area.

Heavy Vehicle

- Heavy vehicle movements during the operations stage of the Project are anticipated to be extremely low, with only occasional movements to/from the Project Area (in the order of 1 vehicle per week) associated with maintenance activities, routine removal of waste and delivery of consumables to the Project operations facility. These heavy vehicle movements are expected to originate from the south or north and travel to the Project Area via Summerland Way, Main Camp Road and Avenue Road.

3.3.3 Decommissioning or Upgrading Phase

At the end of the operational life of the Project infrastructure (approx. 30 years) it is proposed that the solar farm would either be decommissioned, removing all infrastructure, and returning the site to the original condition or the Project will be upgraded (pending any additional approval requirements).

While the details regarding the expected vehicle movements during either upgrade or decommissioning works are difficult to confirm at this stage, it is likely that they will be similar to the construction phase in relation to the movements of staff and materials, equipment and site components. Based on this the

following assumptions have been made regarding the transport routes for the Project during site decommissioning:

Light Vehicles

- The workforce for either the decommissioning or upgrading works are assumed to commute daily to/from the Project Area from either the south (Grafton) or north (Casino & Ballina).

Heavy Vehicles

- Plant and equipment (bulk earthworks plant) and materials (such as gravels and soils for rehabilitation works) will primarily be sourced locally (as far as reasonably practical) from surrounding regional centres.
- If the Project is to be upgraded, the solar and BESS components are expected to be delivered to the Port of Brisbane and then transported to the Project Area by road, likely via the route identified for the construction phase of the Project utilising Port of Brisbane Motorway (M4), Gateway Motorway (M1), Pacific Motorway (M1), Myocum Road, Hinterland Way (B62), Lismore-Bangalow Road (B62), Bruxner Highway (B60), Summerland Way (B91), Main Camp Road and Avenue Road to the 3 site access locations (refer **Figure 3**).
- If the Project is to be decommissioned, the solar and BESS infrastructure is expected to be dismantled, removed and transported to nearby recycling facilities.

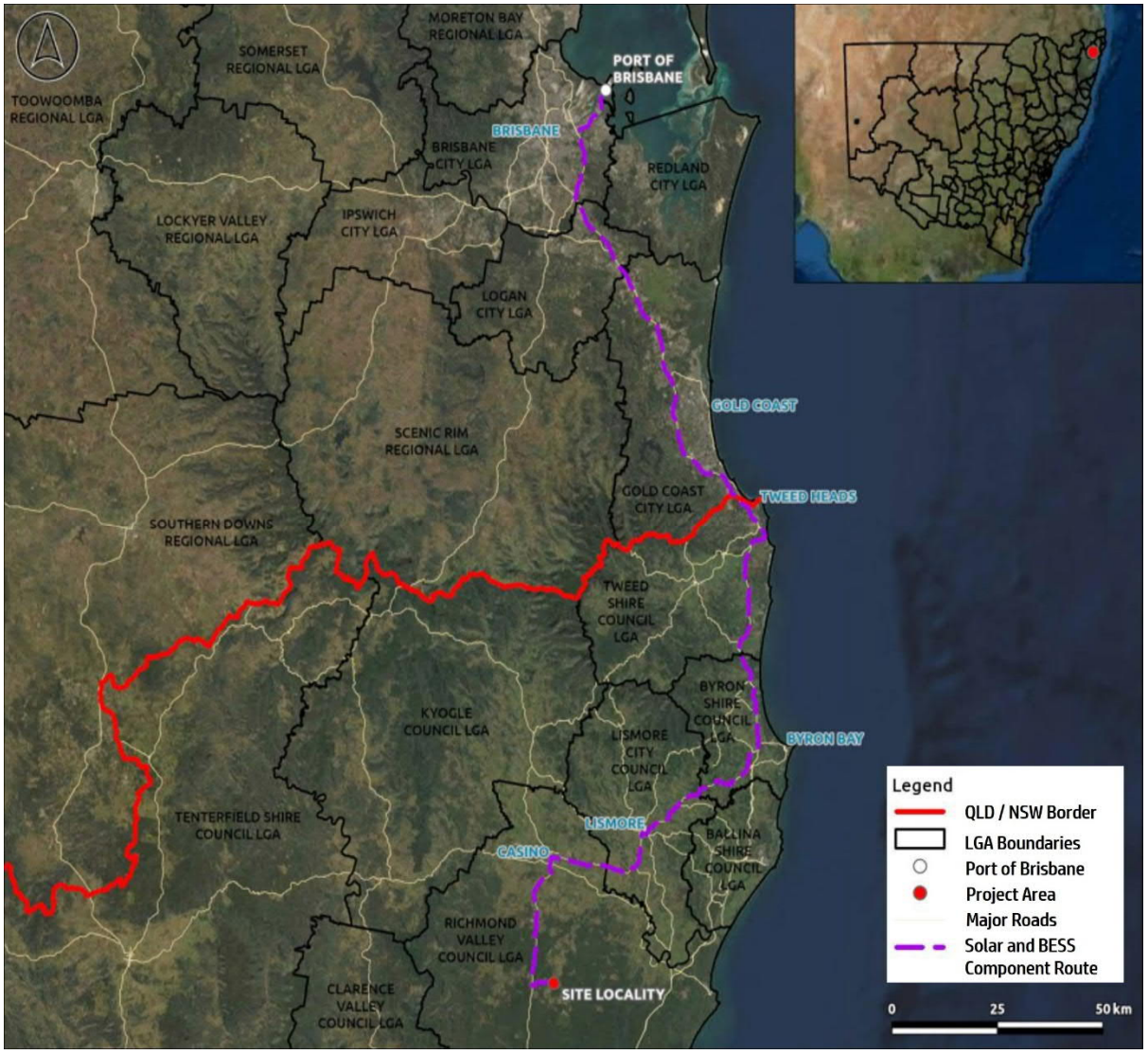

Figure 21 Project Construction – Main Solar and BESS Component Transport Route **[Source: Ark Energy]**

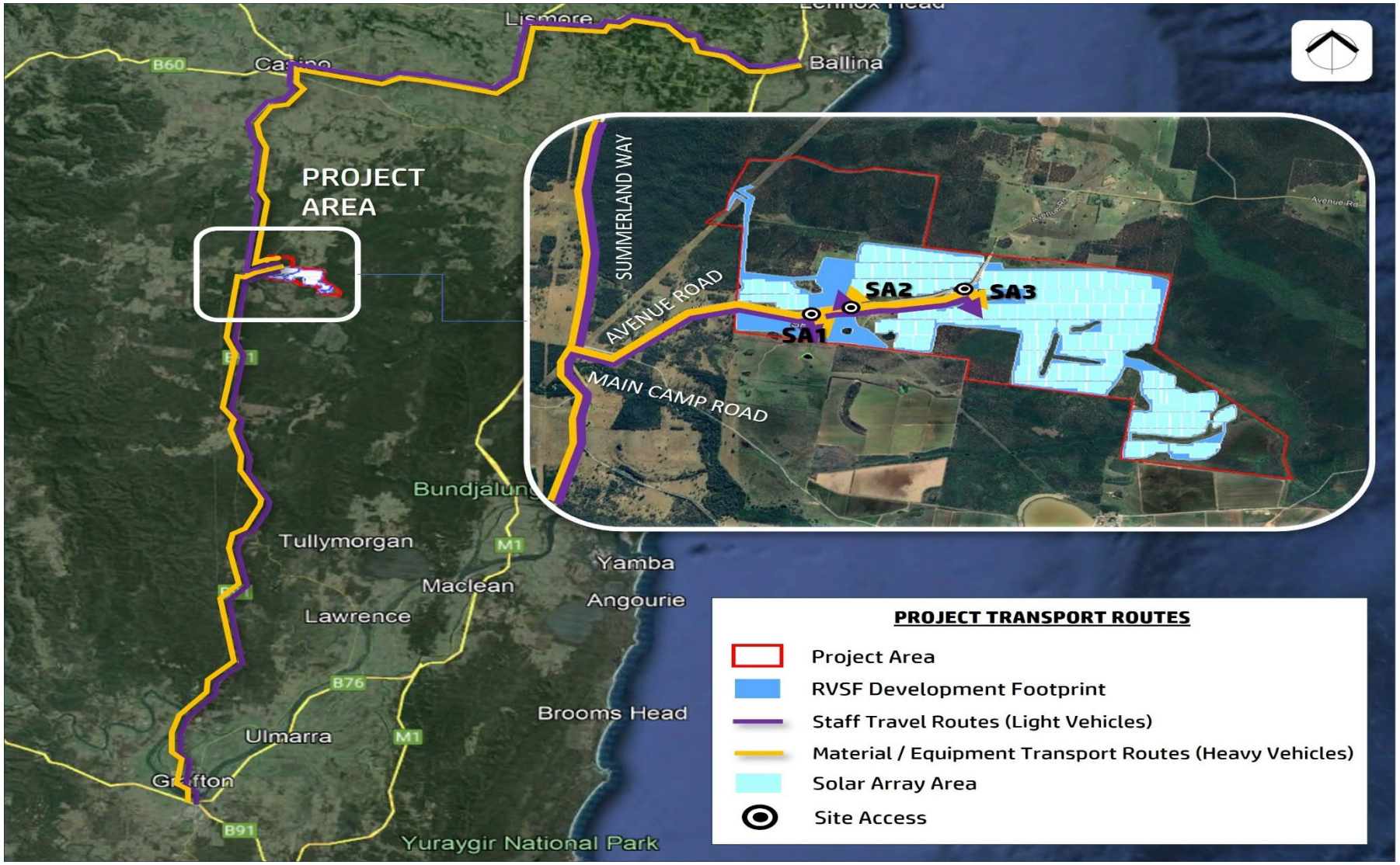

Figure 22 Project Construction – Material / Equipment / Staff Transport Routes [Source: Google Earth Pro & Ark Energy]

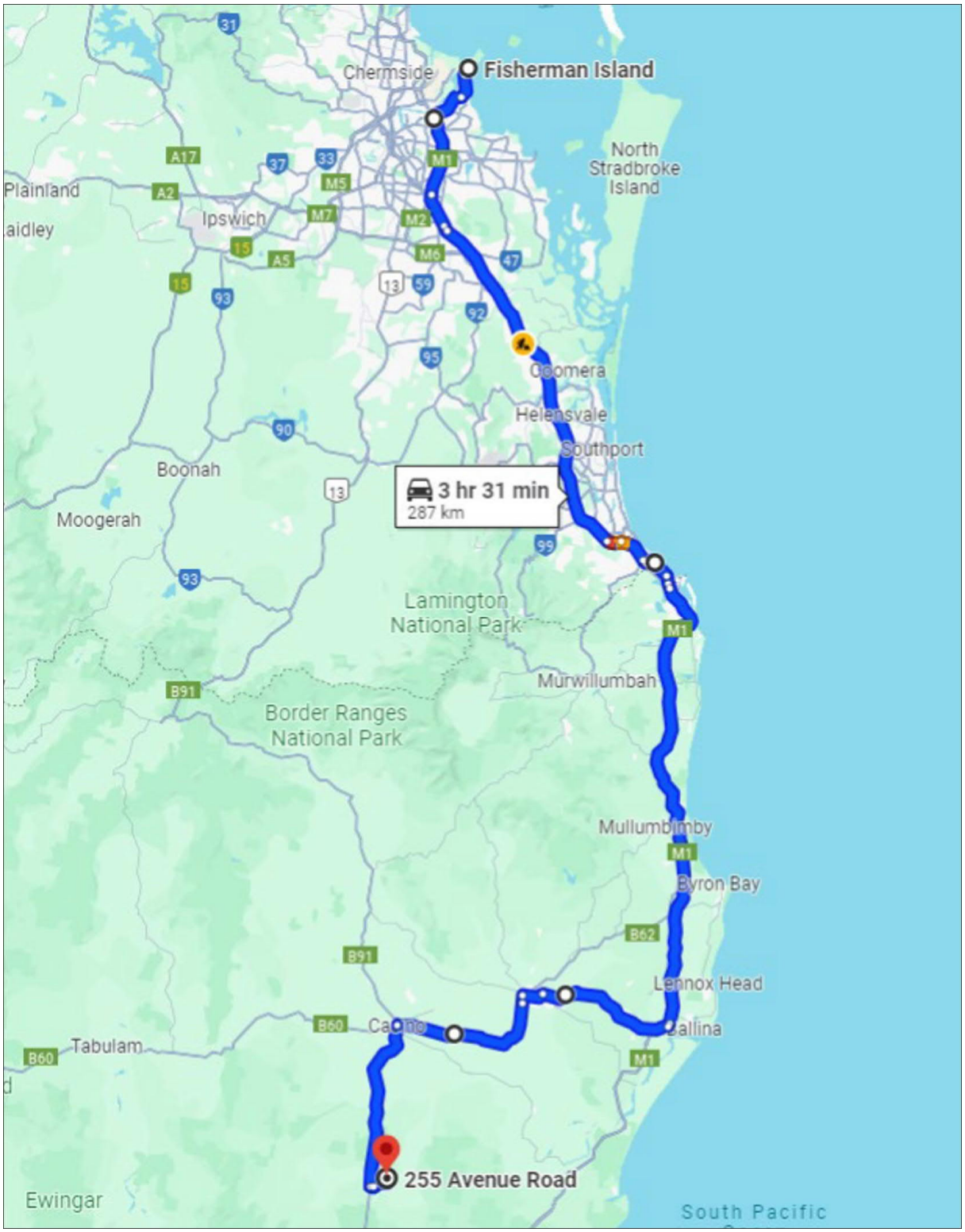

Figure 23 Project Construction – OSOM Transformer Transport Route **[Source: EMM Consulting Pty Ltd]**

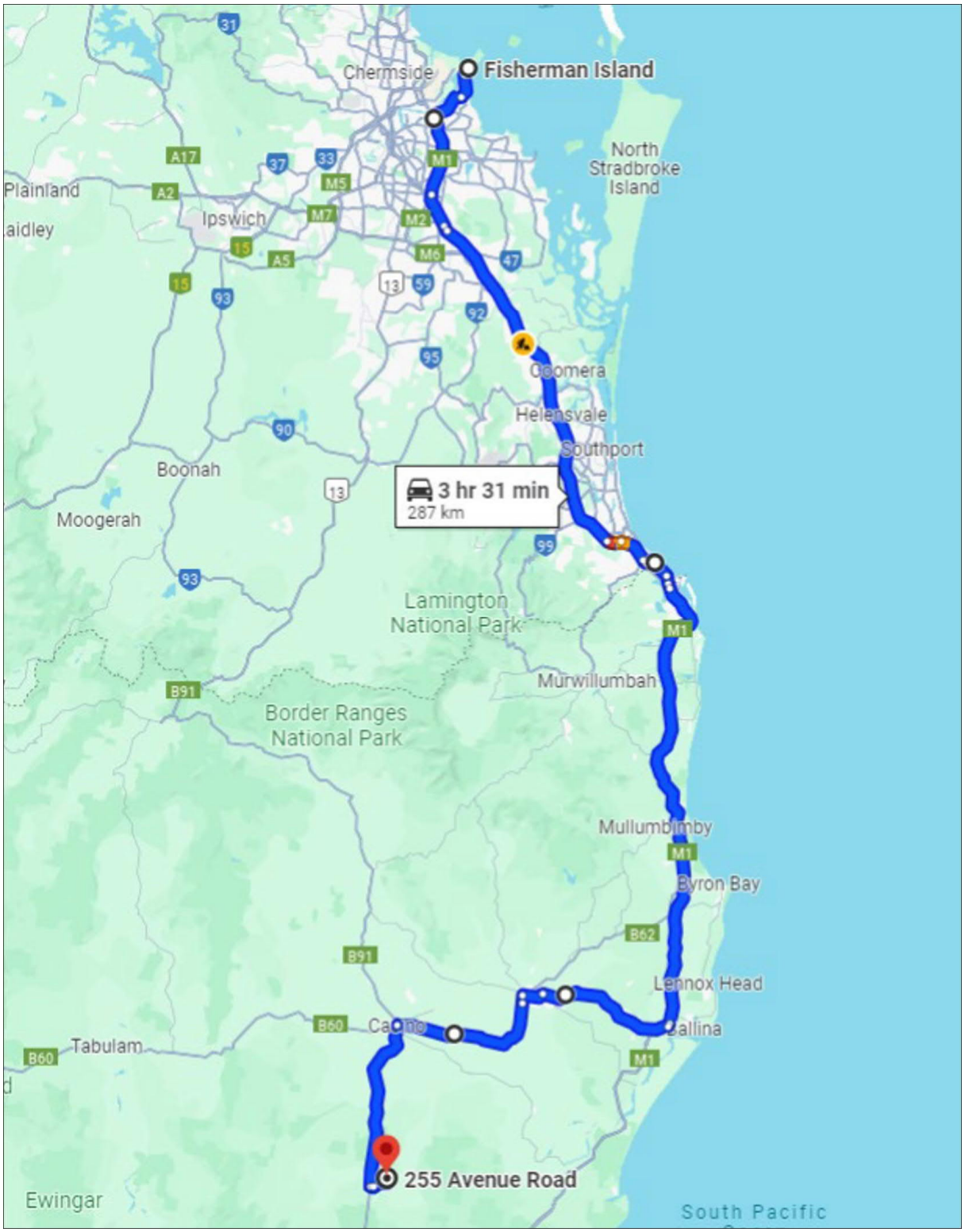

Figure 24 Project Construction – OSOM Switch Room Transport Route [Source: EMM Consulting Pty Ltd]

3.4 Site Access

3.4.1 Summerland Way / Main Camp Road Intersection

As shown in **Figure 16** above, the main access for Project traffic from the state-controlled road network (Summerland Way) will be via the existing Summerland Way / Main Camp Road intersection located approximately 70.5 km north of Grafton and 30.2km t south of Casino. As identified in **Section 2.4.2.1** above, it is expected that suitable safe intersection sight distances to/from the intersection are deemed to be achievable for Project traffic with the provision of minor vegetation clearing works on the south-eastern corner of the intersection, as shown in **Figure 13**.

In addition, the detailed analysis of the intersection undertaken (refer **Section 5.3** below) identified that the additional traffic anticipated from the peak construction phase of the Project will require the current intersection configuration (SL / AUR) to be upgraded to provide a basic left (BAL) turn treatment on the northern approach to the intersection, with the current, outdated AUR turn treatment also recommended to be upgraded to the current CHRs treatment.

The required upgrade works are to be provided generally in accordance with Figure 8.2 of Part 4A (rural BAL) and Figure A7 of Part 4 (rural CHRs) of Austroads Guide to Road Design, adopting a design speed of 110km/h. A concept layout plan of the proposed intersection upgrade works has been completed by Turnbull Engineering Pty Ltd, with a copy of the proposed configuration of the Summerland Way / Main Camp Road intersection shown further in Drawing 0426-CV-101 included for reference as **Appendix E**.

Further swept path analysis was also completed for the proposed OSOM transport vehicle movements at the intersection, with the resultant vehicle path shown in **Figure 25** below. Based on the swept path shown, it is noted that the OSOM transport vehicle will require the provision of additional temporary hardstand area on the north-eastern corner of the intersection to complete the turn into Main Camp Road, as well as the relocation of the existing mailboxes and upgrade to the road edge on the departure of the intersection.

Further to this, it is noted that the OSOM transport vehicle will require the use of the full width of the northern Summerland Road approach and Main Camp Road departure to the intersection, and as such all OSOM vehicle movements at the intersection will be required to be completed under escort, utilising traffic management measures to hold opposing traffic during manoeuvring.

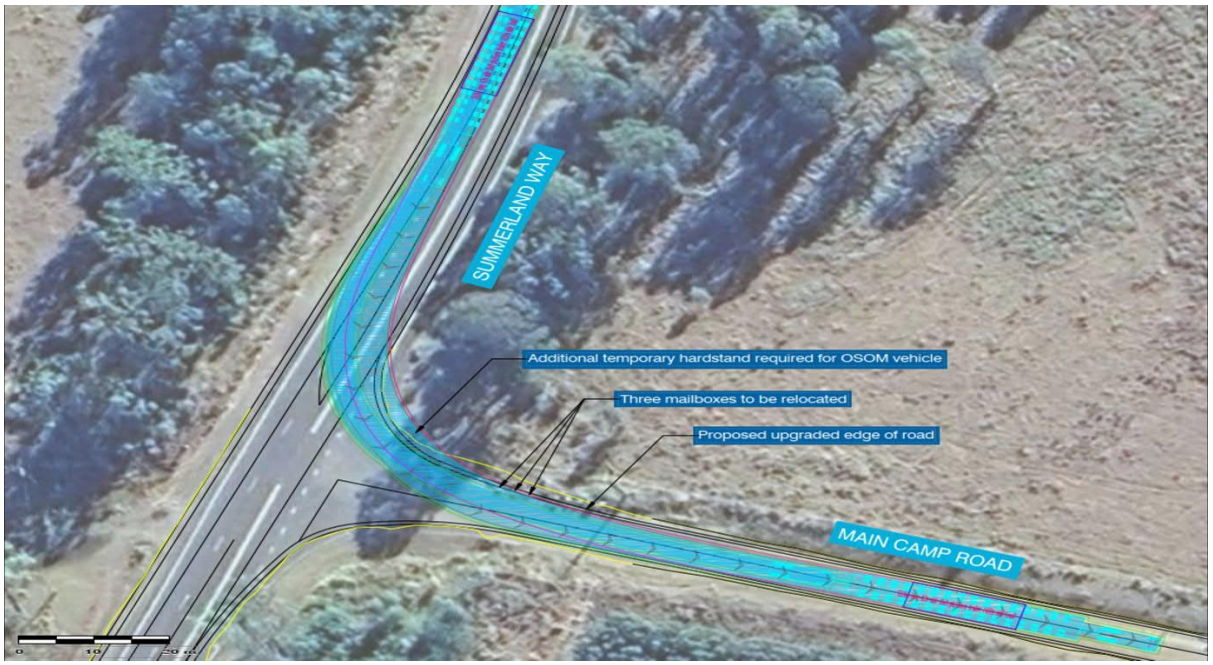

Figure 25 OSOM Vehicle Swept Paths – Summerland Way / Main Camp Road [Source: EMM Consulting Pty Ltd]

3.4.2 Main Camp Road

As part of the access route to/from the Project Area, Project traffic will also utilise the 0.515 km section of Main Camp Road between Summerland Way and Avenue Road. To accommodate the additional Project traffic volumes it is proposed that this section of Main Camp Road be upgraded from its current configuration (6.0m wide unsealed) to provide a 6m sealed pavement on a 7m formation, as agreed with Richmond Valley Council.

Further details of the proposed upgrade works to Main Camp Road are provided in the preliminary design completed by Turnbull Engineering Pty Ltd, which is shown further in Drawing 0426-CV-101 and Drawing 0426-CV-102, included for reference in **Appendix H**.

3.4.3 Main Camp Road / Avenue Road Intersection

The existing simple rural "T" or 3-way configuration of the Main Camp Road / Avenue Road intersection is proposed be retained, with only minor widening and sealing works to be completed as shown in Drawing 0426-CV-0103 (refer **Appendix H**).

The existing, simple configuration of the intersection is considered adequate to cater for both the current and expected traffic movements, based on the following:

- The low existing traffic volumes on both Main Camp Road and Avenue Road.
- The temporary nature (24 months) of the increase in traffic volumes at the intersection as a result fo the proposed construction phase of the Project.
- The low volume of ongoing additional traffic at the intersection associated with the operations phase of the Project.
- The use of traffic management during larger heavy vehicle movements at the intersection (19m Articulated Vehicle and larger).

This approach also aligns with Council's aim to avoid overengineering for temporary construction impacts, ensuring a balance between functionality, environmental impacts and cost-effectiveness.

As such, the provision of basic turn treatments (BAL / BAR) at the intersection, whilst desirable, were not seen as critical for the Project based on the traffic conditions identified in the points above, and the fact that the provision of such works would require significant relocation works to the existing electrical infrastructure as well as an encroachment into the adjacent private properties.

Based on the retention of the existing configuration of the intersection, temporary traffic management measures would be required to be implemented at the intersection (potentially traffic controllers / temporary traffic signals) to enable the larger heavy vehicle movements associated with the Project to safely traverse the intersection clear of opposing traffic, noting their requirement to utilise the full width of the Main Camp Road and Avenue Road legs of the intersection to complete the required turning movements.

The use of such traffic control measures at the intersection are considered acceptable based on; 1) the low volume of larger size heavy vehicles anticipated as part of the construction (noting that the solar and BESS components are proposed to be transported utilising rigid truck configurations), and 2) the temporary nature of increase in heavy vehicle movements at the intersection due to the Project construction works.

Finally, the swept paths completed as part of the OSOM route survey works for the proposed transformer transport vehicle movements, identified that additional route upgrade works, including the provision of hardstand area on the inside (northern) corner of the intersection, are required to accommodate the expected vehicle paths of the oversize transformer transport vehicles movements at the intersection, as shown in **Figure 26** below.

Figure 26 OSOM Transport Vehicle Swept Paths – Main Camp Road / Avenue Road [Source: EMM Consulting Pty Ltd]

3.4.4 Avenue Road

As identified above, three access points to the Project Area are proposed to be utilised by the Project, with the points located on Avenue Road approximately 2.618 km (SA1), 3.051 km (SA2) and 4.443 km (SA3) north-east of Main Camp Road as shown in **Figure 27**.

Similar to Main Camp Road, it is proposed that as part of the Project works the current configuration (4.5m unsealed) of Avenue Road be widened/upgraded to provide a 6m sealed pavement on a 7m formation, as agreed with Richmond Valley Council. Further details of the proposed upgrade works to Avenue Road are provided in the preliminary design completed by Turnbull Engineering Pty Ltd, which is shown further in Drawing 0426-CV-101 and Drawing 0426-CV-102, included for reference in **Appendix H**.

It is noted that as part of the proposed upgrade works, realignment of sections of the existing road reserve are proposed to ensure the current alignment of Avenue Road is wholly contained within the road reserve. Further details of the locations of the required boundary realignments as well as indicative extents are shown in the preliminary design plans for the works (refer **Appendix H**).

Also in lieu of a suitable Council standard for rural property accesses, it is recommended that the proposed access points to the Project Area on Avenue Road (SA1, SA2 and SA3) be constructed generally in accordance with the site access arrangement for articulated vehicles outlined in TfNSW's Typical Rural Property Access – Northern Region standard drawing (as per Figure 7.4 of Austroads Guide to Road Design Part 4: Intersections and Crossings – General), as shown in **Figure 28**.

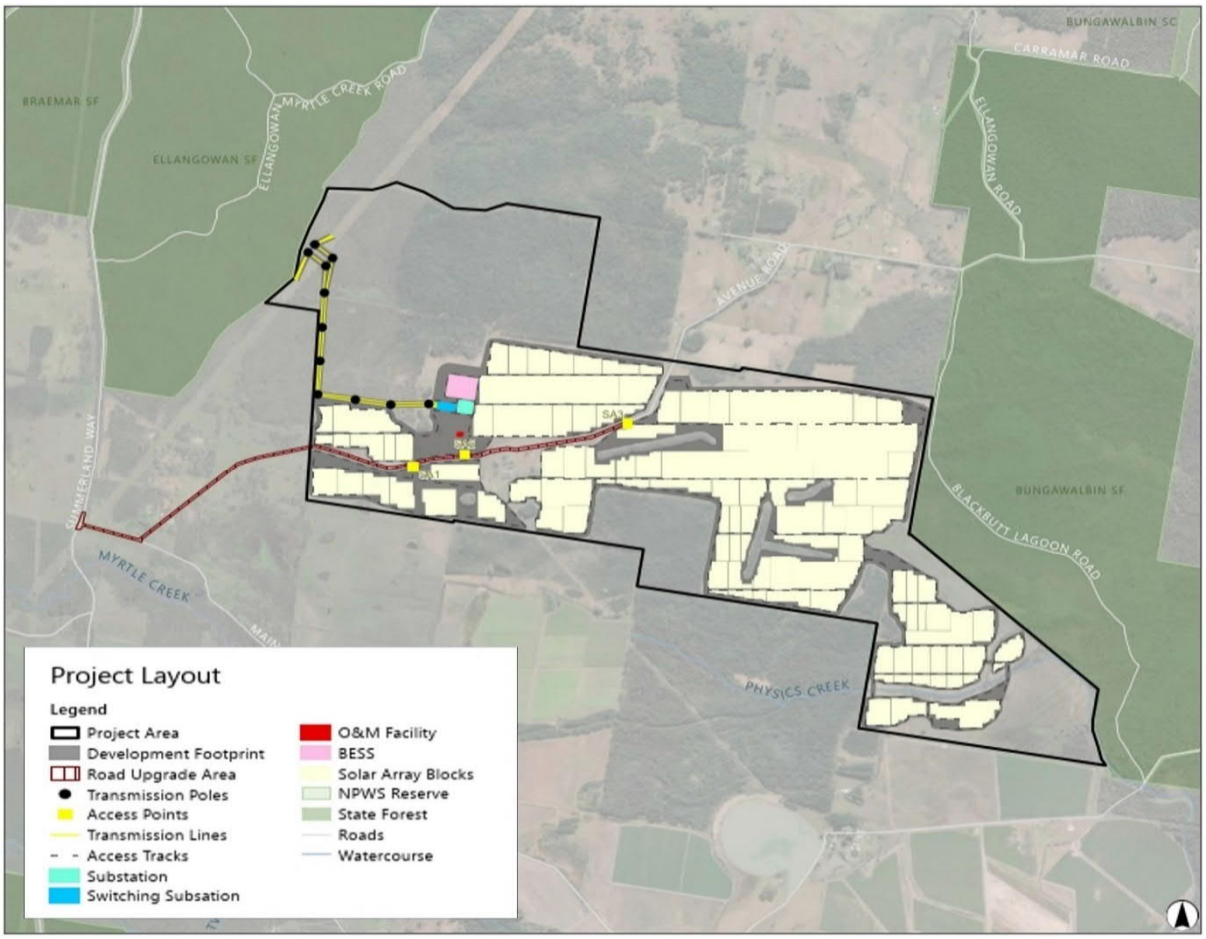

Figure 27 Proposed Site Access Locations (Avenue Road) [Source: Umwelt / Ark Energy]

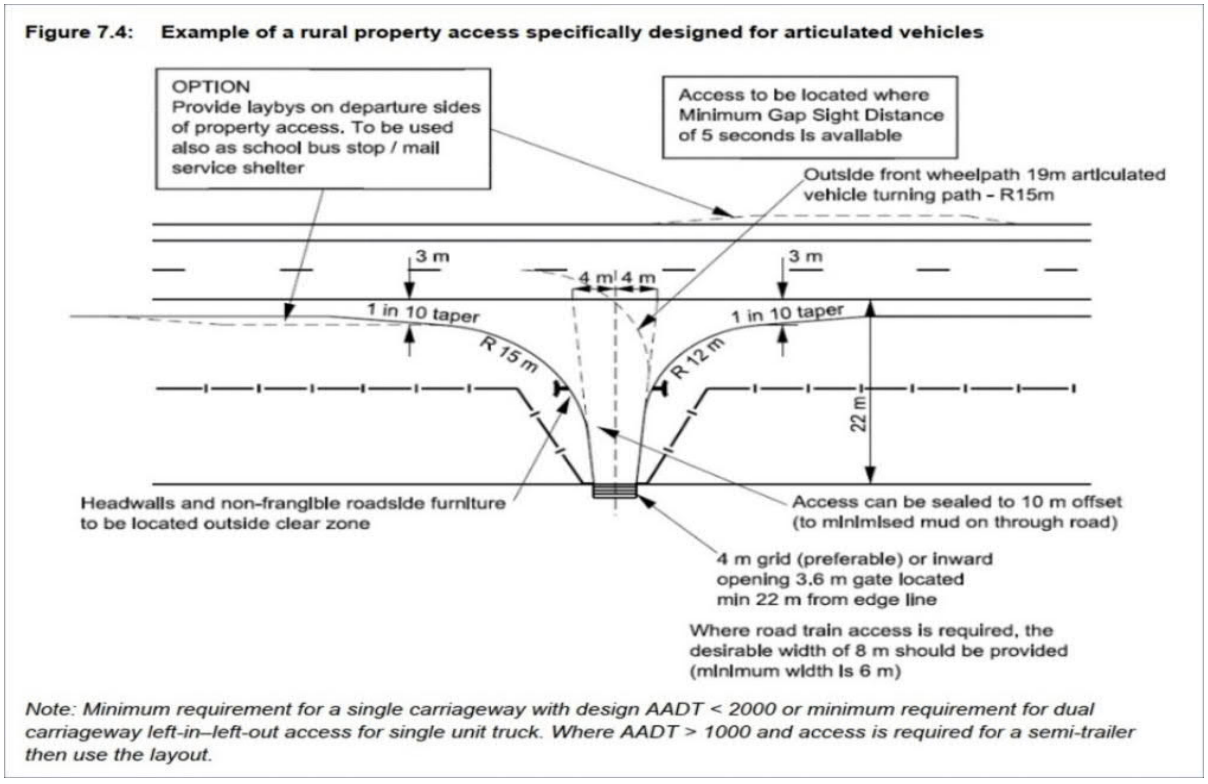

Figure 27 Proposed Site Access Configuration – SA1, SA2 & SA3 Avenue Road [Source: Fig 7.4 Austroads GTRD Pt 4]

It is also expected that additional hardstand area is likely to be required to be provided at the SA2 access to accommodate the swept paths of the OSOM transport vehicles (transformer and electrical switch room), with the exact extents of the hardstand areas will be confirmed in subsequent detailed design phases of the Project once the final configuration of these large electrical infrastructure components and associated transport vehicles are confirmed. An indicative swept path for the OSOM transport vehicle entering the proposed SA2 site access from Avenue Road is provided in **Figure 28**.

Figure 28 OSOM Transport Vehicle Swept Paths – Avenue Road / Site Access SA2 [Source: EMM Consulting Pty Ltd]

3.5 Internal Site Facilities

As previously identified, the conceptual Project layout (refer **Figure 19** above and **Appendix C**) includes a series of internal access tracks throughout the Project Area which provide vehicular access between the external road network (Avenue Road) and the internal site infrastructure including solar arrays, BESS facility and associated internal infrastructure.

The layout also identifies that a number of site compounds or areas within the Project Area, including the proposed substation, BESS facility, construction compound, operations and maintenance compound, site laydown area and staff parking area (SA2) and site laydown areas (SA1 & SA3).

While not currently shown on the conceptual layout it is understood that the identified staff parking area in SA2 will be provided in accordance with the requirements of all relevant standards, guidelines and Council policies. In addition, due to the large area of land available within the SA1, SA2 and SA3 areas and the current setback from the external road network, it is not anticipated that any of the construction, operations or decommissioning phases of the Project will lead to an overspill of parking or vehicle queuing at the Project Area access that would lead to negative impacts on the operation of the surrounding road network.

3.6 OSOM Transport Route Upgrades

As previously identified, a transport route assessment has been separately undertaken for the Project by EMM Consulting Pty Ltd to assess the impact of the movements of the proposed OSOM transformer and switch room transport vehicle configurations on the sections of the external road network identified to form part of the proposed transport routes to the Project Area.

The OSOM route assessment completed (refer **Appendix D**) has identified two separate routes to the Project Area, including one from the Port of Brisbane for the transformers, and another from James Energies at 67 Noosa Street, Heathwood, Queensland for the switch room components. A summary of these identified transport routes was provided previously in **Figure 23** and **Figure 24** above.

In addition to identifying the proposed transport routes, the assessment also highlighted a number of specific locations or pinch points along the two proposed transport routes where additional works are expected to be required to accommodate the swept paths and vehicle clearance envelopes of the proposed transport vehicle configurations.

Further details of the route pinch points, and the currently proposed works are outlined in the route assessment included for reference in **Appendix D**. It is noted that the majority of the route pinch points identified will only require traffic management measures or minimal works (signage relocation works) to accommodate the expected OSOM vehicle movements, while a summary of the pinch points requiring modification works is provided in **Table 11** and **Table 12**for identified transformer and switch room transport routes respectively.

Table 11 Transformer Transport Route – Route Modification Works Summary [Source: EMM Consulting Pty Ltd]

KM Index	Location	Section of Road	Procedure	Comments
0.000	Port of Brisbane, QLD	Port Drive Roundabout near Berths 1-3	Right Hand Turn	Hardstand to be provided for OSOM vehicle, various infrastructure to be temporarily removed, including concrete barriers, boom gates and signage.
0.450	Port of Brisbane, QLD	Port Drive / Seafarers Street roundabout	Through	Roundabout and island will need to be mounted and signage to be temporarily removed.
225.000	South Lismore, NSW	Union Street / Elliott Road roundabout	Left Hand Turn	Island will need to be mounted and signage to be temporarily removed.
254.000	Casino, NSW	Johnston Street / Centre Street roundabout	Left Hand Turn	Island will need to be mounted and signage to be temporarily removed.
255.000	Casino, NSW	Centre Street / Barker Street roundabout	Through	Temporary hardstand to be provided to allow OSOM vehicle to mount footpath, signage to be temporarily removed and roundabout to be mounted on mountable section.
255.000	Casino, NSW	Centre Street / Hare Street roundabout	Through	Temporary hardstand to be provided, signage to be temporarily removed, median strip to be mounted and roundabout to be mounted on mountable section.
284.000	Myrtle Creek, NSW	Summerland Way / Main Camp Road intersection	Left Hand Turn	Additional temporary hardstand to be provided for OSOM vehicle, and three mailboxes to be relocated.
285.000	Myrtle Creek, NSW	Main Camp Road / Avenue Road intersection	Left Hand Turn	Additional temporary hardstand to be provided for OSOM vehicle.
287.000	Myrtle Creek, NSW	Avenue Road / Site Access SA2	Left Hand Turn	Additional temporary hardstand to be provided for OSOM vehicle,

Table 12 Switch Room Transport Route – Route Modification Works Summary [Source: EMM Consulting Pty Ltd]

KM Index	Location	Section of Road	Procedure	Comments
0.700	Heathwood, QLD	Stradbroke Street / Logan Motorway Westbound On-ramp Roundabout	Left Hand Turn	signage to be temporarily removed, islands to be mounted and parking spaces to be temporarily removed to facilitate OSOM movement, subject to consultation with Brisbane City Council.
227.000	South Lismore, NSW	Union Street / Elliott Road roundabout	Left Hand Turn	Island will need to be mounted and signage to be temporarily removed.
256.000	Casino, NSW	Johnston Street / Centre Street roundabout	Left Hand Turn	Island will need to be mounted and signage to be temporarily removed.
257.000	Casino, NSW	Centre Street / Barker Street roundabout	Through	Temporary hardstand to be provided to allow OSOM vehicle to mount footpath, signage to be temporarily removed and roundabout to be mounted on mountable section.
257.000	Casino, NSW	Centre Street / Hare Street roundabout	Through	Temporary hardstand to be provided, signage to be temporarily removed, median strip to be mounted and roundabout to be mounted on mountable section.
286.000	Myrtle Creek, NSW	Summerland Way / Main Camp Road intersection	Left Hand Turn	Additional temporary hardstand to be provided for OSOM vehicle, and three mailboxes to be relocated.
287.000	Myrtle Creek, NSW	Main Camp Road / Avenue Road intersection	Left Hand Turn	Additional temporary hardstand to be provided for OSOM vehicle.
289.000	Myrtle Creek, NSW	Avenue Road / Site Access SA2	Left Hand Turn	Additional temporary hardstand to be provided for OSOM vehicle,

4.0 Development Traffic

As required by the SEARs for the Project, this assessment considers three distinct periods of traffic generation for the Project, including the construction, operations and decommissioning phases. The expected traffic generation and distribution during all three of these phases of the Project is discussed below.

4.1 Construction Phase

The main traffic generating activities occurring within the construction phase of the Project are the transport of the solar and BESS components, the general construction materials / equipment and the larger electrical infrastructure components (transformer and electrical switchroom) to the Project Area and the daily construction staff movements.

Detailed construction traffic calculations were provided by Ark Energy (refer **Appendix F**), in which the average daily traffic volumes for trucks, plant and machinery, buses (50 seat - staff) and light vehicles (staff) within each month of the proposed 24-month construction phase were identified, as summarised in **Figure 29**. The following assumptions were also utilised as part of the Project construction phase traffic volume calculations:

- The truck movements identified include both the general construction and solar and BESS component delivery movements, with the distribution of these movements anticipated to be 7% to/from the south (i.e. Grafton), 15% to/from the north (i.e. Casino and Ballina) and the remaining 78% to/from the Port of Brisbane to cater for the solar and BESS component deliveries.
- The identified plant and machinery movements are to be split via 60% to/from the south (Grafton) and 40% to/from the north (Casino).
- The peak construction phase workforce is proposed to be 327 staff, with the average number of staff on site anticipated to be in the order of 150 staff, although noting that this would vary day to day depending on the required construction activities.
- The main construction workforce is assumed to commute to/from the site daily using 50 seat buses from the nearby regional townships, including 60% to/from the south (Grafton) and 40% to/from the north (Casino and Ballina). Further details regarding the proposed bus services for the Project, including schedule, pick-up locations in each location etc. are anticipated to be provided as part of the detailed construction traffic management plan for the Project.
- Additional light vehicles have been assumed to travel to/from the site daily from the nearby centres to the south (Grafton) and north (Casino and Ballina). These vehicles are proposed to account for the daily movements by Project supervision / management staff, and incidental visitor movements to/from the site. A peak of 33 light vehicle movements per day (i.e. 33vpd each direction – 66vpd overall) are expected, with an average of 25 movements (i.e. 25vpd each direction – 50vpd overall).
- Due to the isolated, rural location of the Project Area, movements via active transport modes such as walking or cycling are not considered a feasible method of transport for staff or material delivery movements associated with the Project.

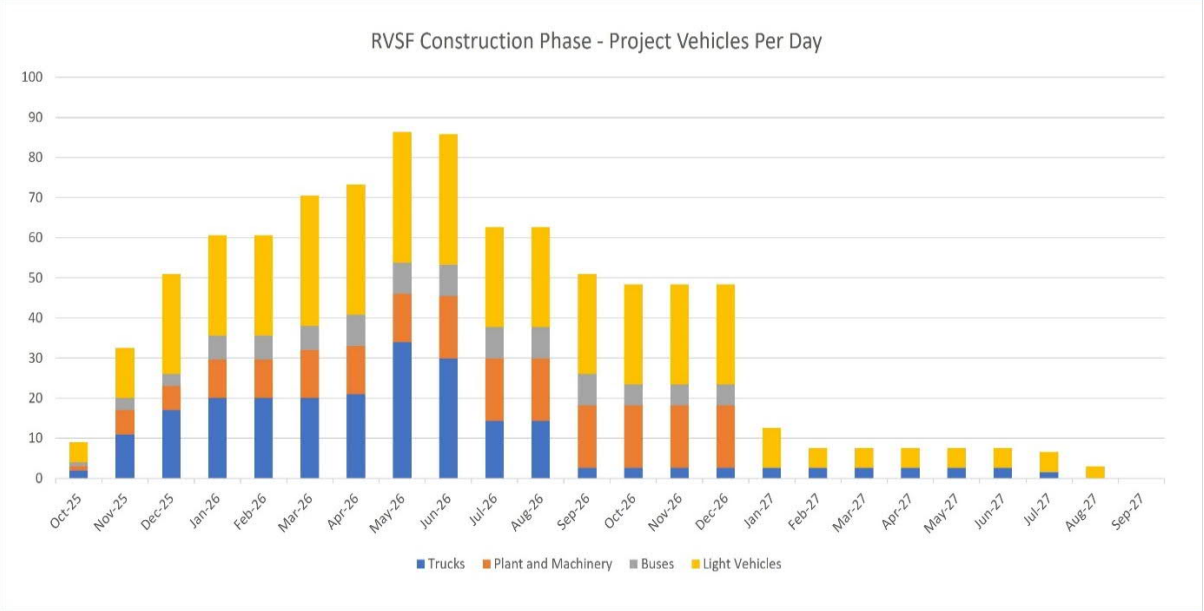

Figure 29 Construction Phase Daily Project Traffic Volume Estimate **[Source: Ark Energy]**

From the calculations and **Figure 29**, it is noted that the peak daily traffic movements to/from the site during the peak construction phase is anticipated to be in the order of 87 movements per day during May 2026, including 53 heavy vehicles (including buses) and 33 light vehicle movements. This equates to an additional 174 vehicles per day (i.e. 87vpd inbound & outbound), including 106 heavy vehicles (53vpd inbound & outbound) and 66 light vehicles (33vpd inbound & outbound).

Estimates of the anticipated hourly volumes throughout the daily work hours associated with the Project construction works were also identified through the provided calculations, with AM and PM peak periods of Project traffic of 6-7am and 5-6pm respectively identified as the period of peak daily traffic generation for the Project. It is noted that these peak hours align with the provided periods of staff movements to/from the Project area, and include a staged departure of staff from the site in the afternoon. A summary of the peak hourly volumes for the Project are shown further in **Figure 30** below.

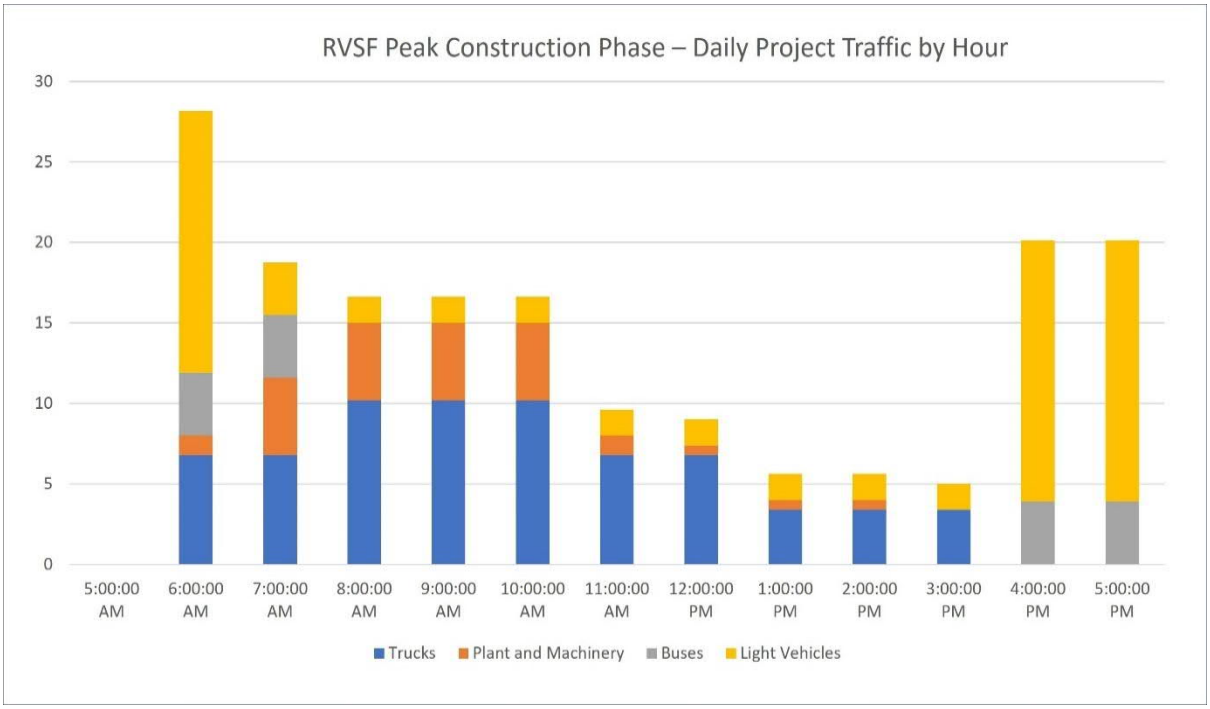

Figure 30 Construction Phase Hourly Project Traffic Volume Estimate **[Source: Ark Energy]**

From **Figure 30** above, it can be seen that the peak hourly Project traffic volumes during the construction phase of the Project include:

- 28 movements during the AM Project Peak (6-7am) and 17 movements during the AM Network Peak(8-9am).
- 20 movements during the PM Project Peak (5-6pm) and 5 movements during the PM Network Peak (3-4pm).

4.2 Operations Phase

The estimated workforce during the proposed 30-year operations phase of the Project (i.e. following the completion of the construction stages) is anticipated to only consist of a small number of local workers (i.e. approximately 10-15 staff FTE) who are expected commute daily to the Project Area.

Further to this, the heavy vehicle movements during the operations phase of the Project are also likely to be extremely low (approx. 1 HV per week) and are considered to be negligible in terms of the traffic impact to the external road network.

4.3 Decommissioning or Upgrading Phase

As previously identified, at the end of the operational life of the Project infrastructure (approx. 30 years) it is proposed that the solar farm would either be decommissioned, removing all infrastructure, and returning the site to the original condition or the Project will be upgraded (pending any additional approval requirements), which would require further traffic assessments to be completed.

Notwithstanding this, based on information provided by Ark Energy it is understood the decommissioning phase works associated with the Project are anticipated to be completed in less than 24 months, with the peak Project traffic movements during decommissioning conservatively estimated to be 70% of the peak construction movements (both daily and during AM and PM peak periods).

However, as these works will occur in more than 30 years' time the exact nature of the works and associated traffic movements are difficult to confirm at this stage. As such it is proposed that prior to the start of the decommissioning works, an updated traffic impact assessment be completed as part of the required decommissioning and rehabilitation strategy, to clearly outline the proposed decommissioning works, the associated traffic movements, their anticipated impact on the surrounding road network and any management and mitigation required.

4.4 Project Traffic Volumes on the Network

The calculated Project traffic volumes for the construction, operations and decommissioning phases of the Project outlined above have been distributed onto the public road network based upon assumed trip origins and destinations based on known equipment / materials sources and other Project operational information provided by the proponent.

Further details of the expected Project traffic volumes on the key road links and intersections of the relevant sections of the external road network are provided in the following sections.

4.4.1 Road Links

As previously identified, the use of the external road network by Project traffic during each stage of the proposed Project is anticipated to generally be limited to sections of Summerland Way (Grafton to Casino), Main Camp Road and Avenue Road.

Additional sections of the Port of Brisbane Motorway (M4), Gateway Motorway (M1), Pacific Motorway (M1), Myocum Road, Hinterland Way (B62), Lismore-Bangalow Road (B62), Bruxner Highway (B60) are also proposed to be utilised by heavy vehicles associated with the solar and BESS component delivery movements. As these roads currently cater for higher traffic volumes (particularly the motorway sections) the addition of a maximum of 27 truck movements per day (each direction) is not anticipated to have a significant impact on their operation.

Detailed calculations were undertaken to establish the peak daily Project traffic volumes for each phase of the Project on the relevant sections of the external road network, with a copy included for reference as

Appendix F. A summary of the calculated construction, operations and decommissioning Project traffic volumes for the identified road links is provided in **Table 11.**

Table 11 Project Traffic Volumes on External Road Network Links

AADT Segment			Maximum Daily Project Traffic Volumes								
			Peak Construction			Operations			Decommissioning		
ID	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Summerland Way (Casino to Grafton)											
Casino to South Casino			53	53	105	7	7	14	37	37	74
South Casino to Main Camp Road			53	53	105	7	7	14	37	37	74
Main Camp Road to Whiporie			34	34	68	10	10	20	24	24	47
Whiporie to Warragai Creek			34	34	68	10	10	20	24	24	47
Warragai Creek to Grafton North			34	34	68	10	10	20	24	24	47
Grafton North to Grafton			34	34	68	10	10	20	24	24	47
Main Camp Road											
Summerland Way to Avenue Road	0.000	0.515	86	86	173	16	16	32	60	60	121
Avenue Road											
North of Main Camp Road	0.000	2.618	86	86	173	16	16	32	60	60	121
	2.618	3.051	86	86	173	16	16	32	60	60	121
	3.051	4.443	86	86	173	1	1	2	60	60	121

Gaz (Gazettal direction of travel or with chainage) / A-Gaz (Against Gazettal direction of travel or against chainage)
Main Camp Road chainage assumed to run east from Summerland Way / Avenue Road chainage assumed to north from Main Camp Road
Main Camp Road Ch. 0.515km – Avenue Road intersection / Avenue Road Ch. 2.618km - Site Access 1 / Avenue Road Ch. 3.501km - Site Access 2 / Avenue Road Ch. 4.443km - Site Access 3

4.4.2 Intersections

Based on the information provided by Ark Energy and the subsequent traffic calculations undertaken, the peak hour traffic volumes from the construction, operations and decommissioning phases of the Project were also established at the key intersection of the Summerland Way / Main Camp Road.

As noted above, to ensure that the critical period at the intersection has been assessed, volumes for two different AM and PM peak hour periods have been established, including the period of peak Project traffic generation (6-7am and 5-6pm) and the periods of peak traffic flow on the adjacent section of the external road network (Summerland Way) identified from the historic traffic data for the link (8-9am & 3-4pm).

The volumes at these periods have been established by combining the expected staff / visitor movements to the Project Area with the calculated hourly heavy vehicle movements for each Project phase.

A summary of the identified construction, operations and decommissioning phase Project traffic volumes at the access intersection is outlined in **Figure 31** to **Figure 33** and **Figure 34** to **Figure 36** for the Project traffic and the external road network (Summerland Way) peaks respectively, with further details of the calculations undertaken to establish these volumes are provided for reference in **Appendix F**.

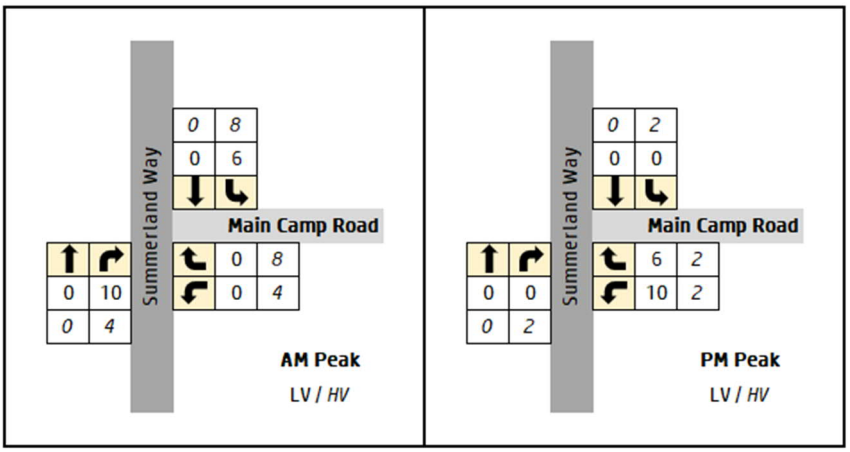

Figure 31 Project Construction Phase Volumes (Project Traffic Peaks 6-7am & 5-6pm)

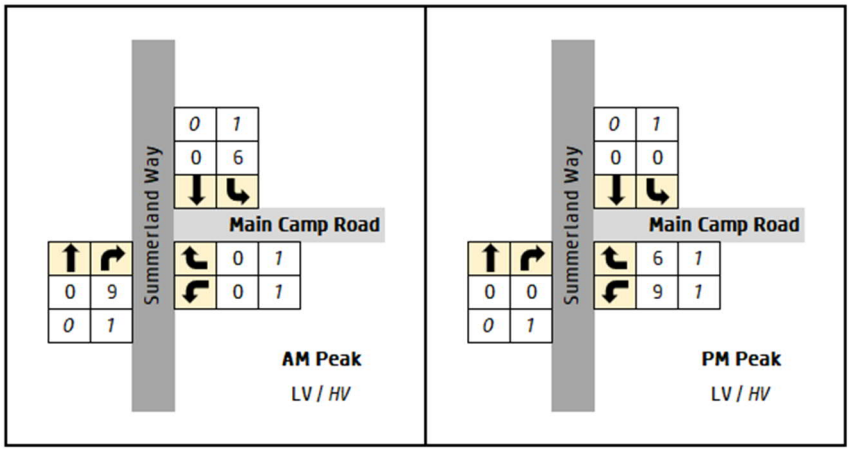

Figure 32 Project Operations Phase Volumes (Project Traffic Peaks 6-7am & 5-6pm)

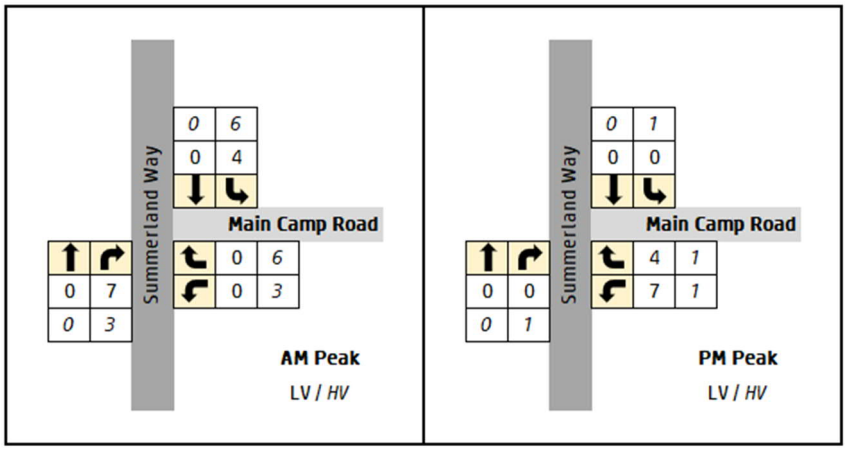

Figure 33 Project Decommissioning Phase Volumes (Project Traffic Peaks 6-7am & 5-6pm)

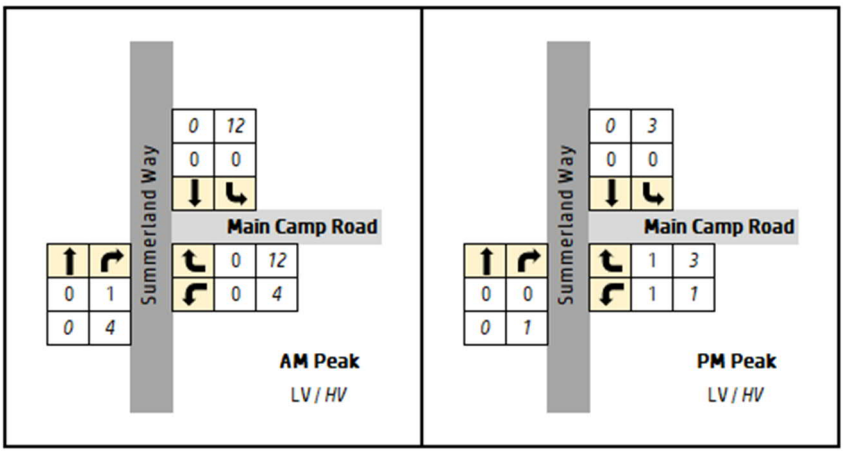

Figure 34 Project Construction Phase Volumes (Network Traffic Peaks 8-9am & 3-4pm)

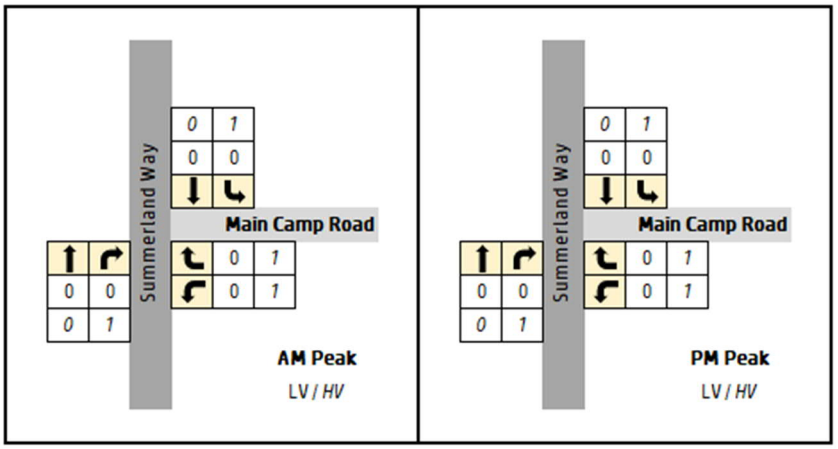

Figure 35 Project Operations Phase Volumes (Network Traffic Peaks 8-9am & 3-4pm)

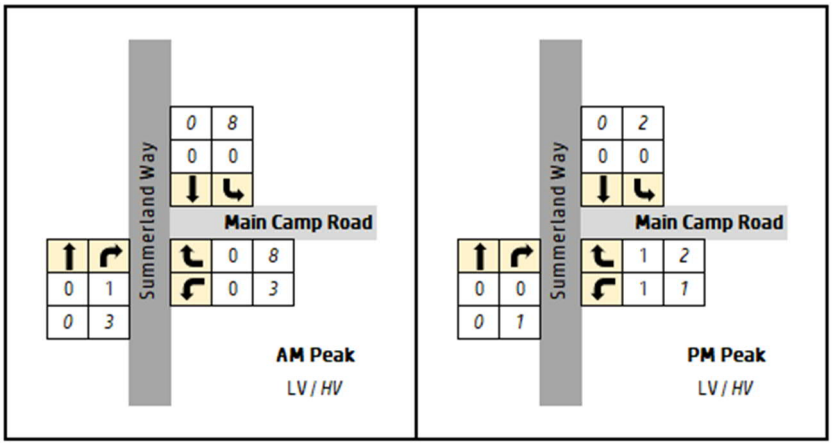

Figure 36 Project Decommissioning Phase Volumes (Network Traffic Peaks 8-9am & 3-4pm)

4.5 Cumulative Project Traffic Volumes

As identified in the SEARs for this Project, an assessment of the potential cumulative traffic impact of the Project in conjunction with other projects in the area was required. As such a review of the known projects in the vicinity of the Project Area was undertaken to determine which were expected to lead to an increase in traffic volumes on the relevant sections of the road network concurrently with anticipated increases from the Project.

A summary of this review, including commentary regarding the requirements to consider each identified Project in the area are provided for reference in **Table 12**.

Table 12 Cumulative Project Traffic Review Summary

Project	Dev. Type	Dev. Stage	Review Comments	Req. for Cumulative Traffic
Summerville Solar Farm (SSF) – 90MW Solar Farm and BESS (1.4 km to West of Project)	Solar	**In Planning - Response to Submissions**	TIA identifies proposed 15-month construction period from Q4 2024. Proposed site access for Summerville Solar Farm located on western side of Summerland Way approx. 400m north of Main Camp Road. As such traffic from SSF is anticipated to utilise the same section of Summerland Way as the Project and add through traffic to the Summerland Way / Main Camp Road intersection.	**Yes**
Myrtle Creek Solar Farm (MCSF) – 100MW Solar Farm (500m South of Project)	Solar	**In Planning - Prepare EIS**	Partial area previously forming part of Myrtle Creek Solar Farm is now part of the Project site area (Lot 2 DP540060). Site access is proposed via Main Camp Road to the east of Avenue Road. As such traffic from MCSF is anticipated to utilise same sections of Summerland Way and Main Camp Road as the Project and add turning movements to the Summerland Way / Main Camp Road intersection.	**Yes**
Clarence Valley Solar Farm (CVSF) (50 km South of Project)	Solar	**In Planning - Prepare EIS**	Project traffic from the proposed Clarence Valley Solar Farm is expected to utilise the southern section of Summerland Way, as the site is located within close proximity to Grafton and is expected to be primarily serviced from this centre. As such Project traffic from CVSF is not expected to travel past the Project or utilise the key Summerland Way / Main Camp Road intersection and road links of Main Camp Road or Avenue Road.	No
Casino Biohub (Bioenergy Facility) (27km North of Project)	Bioenergy	**In Planning - Prepare EIS**	Project traffic from the proposed Casino Biohub is expected to utilise the northern section of Summerland Way, as the site is located within close proximity to Casino and is expected to be primarily serviced from this centre. As such Project traffic from the Casino Biohub is not expected to travel past the Project or utilise the key Summerland Way / Main Camp Road intersection and road links of Main Camp Road or Avenue Road.	No
Lismore BESS – 100MW / 200 MWh Battery Storage System (26km North-East of Project)		**In Planning - Prepare EIS**	Project traffic from the proposed Lismore BESS is expected to the Bruxner Highway and local roads to access the site. As such Project traffic from the Lismore BESS is not expected to travel past the Project or utilise the key Summerland Way / Main Camp Road intersection and road links of Main Camp Road or Avenue Road. There may be some overlap of BESS component transport vehicles with the solar and BESS component transport vehicles for the RVSF as both are proposed to be transported from the Port of Brisbane, but as the common sections of these routes are state controlled roads catering for higher volumes, no significant cumulative impact is expected.	No

Based on the assessment above, additional traffic volumes from both the Summerville Solar Farm and Myrtle Creek Solar Farm projects are proposed to be considered as part of the cumulative assessment for the Project.

For the purpose of this assessment, the worst case scenario of concurrent construction phases has been considered, with the relevant traffic volumes for the Summerville Solar Farm sourced from the TIA for the Project prepared by Impact Traffic Engineering (dated 15 September 2023) adopting the Scenario 2 volumes, while the volumes for the Myrtle Creek Solar Farm have conservatively been assumed to be the same as those identified for the Summerville Solar Farm, noting the differing distribution on the network (i.e. access via Summerland Way / Main Camp Road intersection).

Based on the assumed traffic volumes, the relevant daily road link volumes (refer **Table 13)** and peak hour intersection movement volumes at the Summerland Way / Main Camp Road intersection (refer **Figure 37** to **Figure 39)** for the external projects were established.

Table 13 Project Traffic Volumes on External Road Network Links

Road Segment			Maximum Daily Traffic Volumes								
			Summerville Solar Farm			Myrtle Creek Solar Farm			Total External Projects**		
ID	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Summerland Way (Casino to Grafton)											
Casino to South Casino			120	120	240	120	120	240	240	240	480
South Casino to Main Camp Road			120	120	240	120	120	240	240	240	480
Main Camp Road to Whiporie			80	80	160	80	80	160	160	160	320
Whiporie to Warragai Creek			80	80	160	80	80	160	160	160	320
Warragai Creek Grafton North			80	80	160	80	80	160	160	160	320
Grafton North to Grafton			80	80	160	80	80	160	160	160	320
Main Camp Road											
Summerland Way to Avenue Road	0.000	0.515	0	0	0	200	200	400	200	200	400
Avenue Road											
North of Main Camp Road	0.000	2.618	0	0	0	0	0	0	0	0	0
	2.618	3.051	0	0	0	0	0	0	0	0	0
	3.051	4.443	0	0	0	0	0	0	0	0	0

** Note Total External Project Volumes is combination of forecast Summerville Solar Farm and Myrtle Creek Solar Farm Project Volumes and does note include any volumes from the proposed Richmond Valley Solar Farm.

Gaz (Gazettal direction of travel or with chainage) / A-Gaz (Against Gazettal direction of travel or against chainage)
Main Camp Road chainage assumed to run east from Summerland Way / Avenue Road chainage assumed to north from Main Camp Road
Main Camp Road Ch. 0.515km – Avenue Road intersection / Avenue Road Ch. 2.618km - Site Access 1 / Avenue Road Ch. 3.501km - Site Access 2 / Avenue Road Ch. 4.443km - Site Access 3

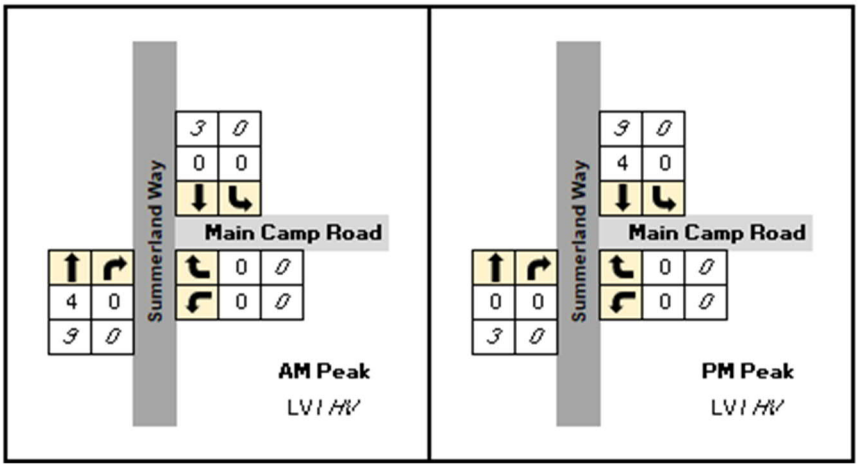

Figure 37 Summerville Solar Farm Construction Phase Volumes (AM & PM Peaks)

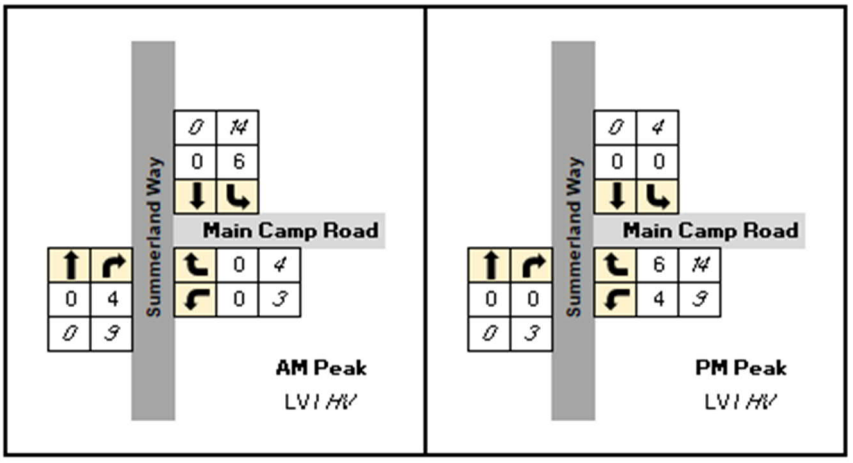

Figure 38 Myrtle Creek Solar Farm Construction Phase Volumes (AM & PM Peaks)

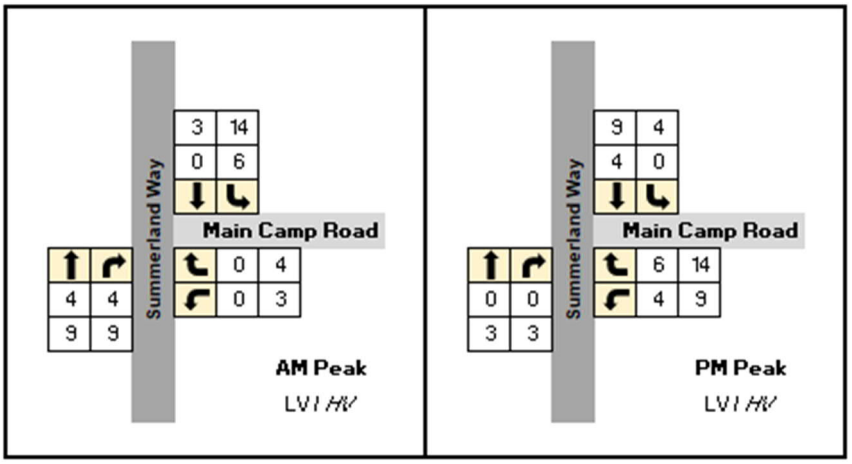

Figure 39 Total External Project Construction Phase Volumes (AM & PM Peaks)

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 Project, particularly the sections of Summerland Way, Main Camp Road and Avenue Road, and the key intersection of Summerland Way / Main Camp Road.

Further assessment of the impact of the Project on these specific elements of the external road network is provided in the following sections.

5.1 With and Without Project Traffic Volumes

5.1.1 Road Link Volumes

As identified above, the peak traffic generation associated with the Project is expected to occur during the peak construction period, with the expected maximum traffic volumes from the Project for the construction and subsequent operations and decommissioning phases identified in **Table 11** above.

Based on these volumes and the adopted distribution of Project traffic identified in **Section 4.0** above, the forecast traffic volumes on the relevant sections of the road network were established for both the with and without Project scenarios. These volumes were developed at the relevant design horizons for each phase of the Project, with summaries for the construction, operations and decommissioning phases outlined in **Table 14** to **Table 17**.

Table 14 Road Link Daily Traffic Volumes (Construction Phase)

Road Segment			Daily Traffic Volumes								
			2026 Background (Without Project)			Peak Project Construction			2026 Peak Construction (With Project)		
ID	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Summerland Way (Casino to Grafton)											
Casino to South Casino			2,326	2,349	4,675	53	53	105	2,378	2,402	4,780
South Casino to Main Camp Road			1,076	1,103	2,179	53	53	105	1,128	1,156	2,284
Main Camp Road to Whiporie			1,076	1,103	2,179	34	34	68	1,110	1,137	2,247
Whiporie to Warragai Creek			2,106	2,215	4,321	34	34	68	2,140	2,248	4,388
Warragai Creek Grafton North			4,979	5,000	9,979	34	34	68	5,013	5,033	10,046
Grafton North to Grafton			15,238	15,407	30,645	34	34	68	15,272	15,440	30,712
Main Camp Road											
Summerland Way to Avenue Road	0.000	0.515	82	82	165	86	86	173	169	169	337
Avenue Road											
North of Main Camp Road	0.000	2.618	41	41	82	86	86	173	128	128	255
	2.618	3.051	41	41	82	86	86	173	128	128	255
	3.051	4.443	41	41	82	86	86	173	128	128	255

Table 15 Road Link Daily Traffic Volumes (Construction Phase – Cumulative Assessment)

Road Segment			Daily Traffic Volumes								
			2026 Peak Construction (With Project)			Total External Projects			2026 Cumulative Construction (Project + External)		
ID	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Summerland Way (Casino to Grafton)											
Casino to South Casino			2,378	2,402	4,780	240	240	480	2,618	2,642	5,260
South Casino to Main Camp Road			1,128	1,156	2,284	240	240	480	1,368	1,396	2,764
Main Camp Road to Whiporie			1,110	1,137	2,247	160	160	320	1,270	1,297	2,567
Whiporie to Warragai Creek			2,140	2,248	4,388	160	160	320	2,300	2,408	4,708
Warragai Creek Grafton North			5,013	5,033	10,046	160	160	320	5,173	5,193	10,366
Grafton North to Grafton			15,272	15,440	30,712	160	160	320	15,432	15,600	31,032
Main Camp Road											
Summerland Way to Avenue Road	0.000	0.515	169	169	337	200	200	400	369	369	737
Avenue Road											
North of Main Camp Road	0.000	2.618	128	128	255	0	0	0	128	128	255
	2.618	3.051	128	128	255	0	0	0	128	128	255
	3.051	4.443	128	128	255	0	0	0	128	128	255

Table 16 Road Link Daily Traffic Volumes (Operations Phase)

Road Segment			Daily Traffic Volumes								
			2037 Background			Project Operations			2037 Operations		
ID	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Sumerland Way (Casino to Grafton)											
Casino to South Casino			3,219	3,252	6,471	7	7	14	3,226	3,259	6,485
South Casino to Main Camp Road			1,489	1,527	3,016	7	7	14	1,496	1,534	3,030
Main Camp Road to Whiporie			1,489	1,527	3,016	10	10	20	1,499	1,537	3,036
Whiporie to Warragai Creek			2,915	3,066	5,981	10	10	20	2,925	3,076	6,001
Warragai Creek Grafton North			6,892	6,921	13,813	10	10	20	6,902	6,931	13,833
Grafton North to Grafton			21,093	21,326	42,420	10	10	20	21,103	21,336	42,440
Main Camp Road											
Summerland Way to Avenue Road	0.000	0.515	92	92	184	16	16	32	108	108	216
Avenue Road											
North of Main Camp Road	0.000	2.618	46	46	92	16	16	32	62	62	124
	2.618	3.051	46	46	92	16	16	32	62	62	124
	3.051	4.443	46	46	92	1	1	2	47	47	94

Table 17 Road Link Daily Traffic Volumes (Decommissioning Phase)

Road Segment			Daily Traffic Volumes								
			2057 Background			Project Decommissioning			2057 Decommissioning		
ID	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Sumerland Way (Casino to Grafton)											
Casino to South Casino			5,814	5,873	11,687	37	37	74	5,851	5,910	11,761
South Casino to Main Camp Road			2,690	2,758	5,448	37	37	74	2,727	2,795	5,522
Main Camp Road to Whiporie			2,690	2,758	5,448	24	24	47	2,714	2,782	5,495
Whiporie to Warragai Creek			5,265	5,537	10,802	24	24	47	5,289	5,561	10,849
Warragai Creek Grafton North			12,449	12,499	24,948	24	24	47	12,472	12,523	24,995
Grafton North to Grafton			38,097	38,518	76,614	24	24	47	38,120	38,541	76,662
Main Camp Road											
Summerland Way to Avenue Road	0.000	0.515	112	112	224	60	60	121	173	173	345
Avenue Road											
North of Main Camp Road	0.000	2.618	56	56	112	60	60	121	117	117	233
	2.618	3.051	56	56	112	60	60	121	117	117	233
	3.051	4.443	56	56	112	60	60	121	117	117	233

5.1.2 Intersection Volumes

In addition to road link volumes, traffic volumes at the key Summerland Way / Main Camp Road intersection were established for the peak construction, operations and decommissioning phases of the Project. To establish these volumes, the Project volumes as identified in **Section 4.4.2** above were added to the forecast background traffic volumes at the relevant design horizons for each phase of the Project.

The resulting turning volumes at the Summerland Way / Main Camp Road intersection for the peak construction, operations and decommissioning phases of the Project are summarised in **Figure 40** to **Figure 47.**

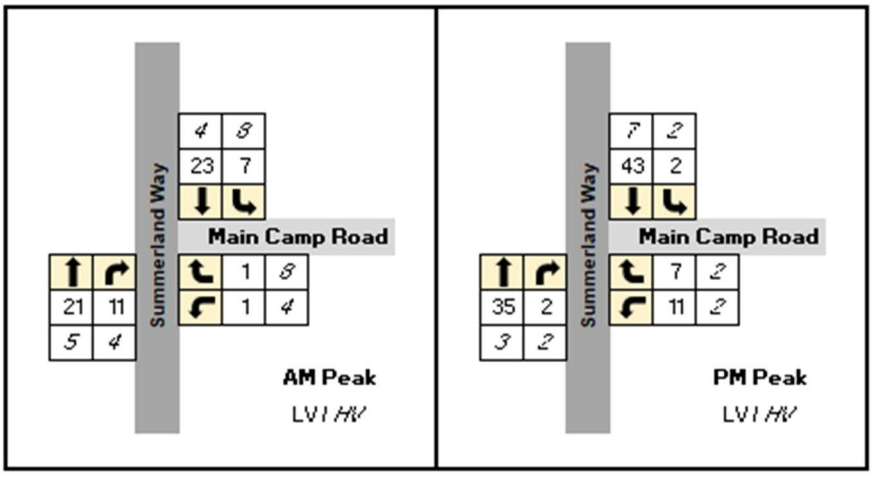

Figure 40 2026 Project Construction Phase Volumes (Project Traffic Peaks 6-7am & 5-6pm)

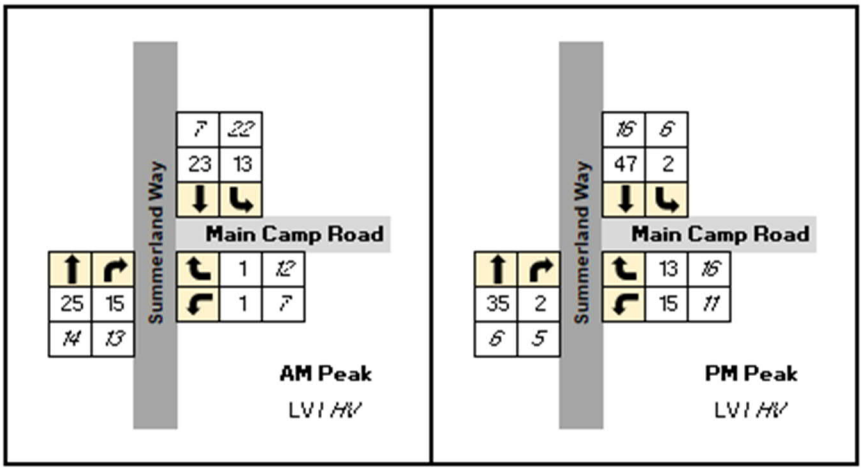

Figure 41 2026 Project Cumulative Construction Phase Volumes (Project Traffic Peaks 6-7am & 5-6pm)

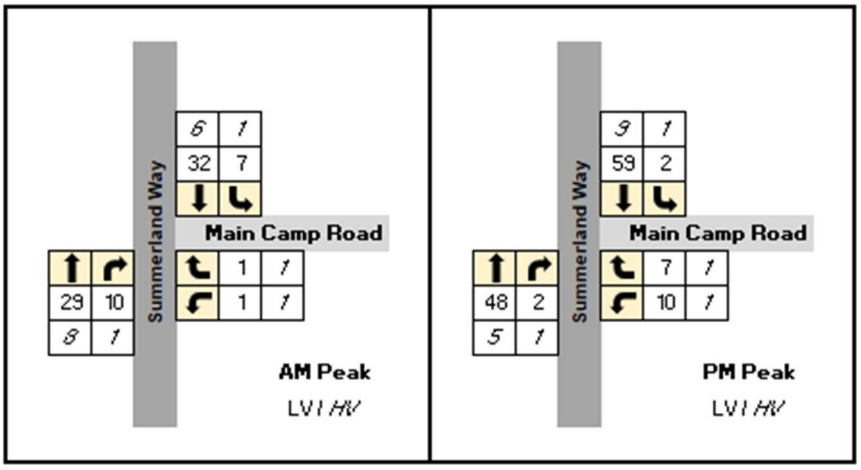

Figure 42 2037 Project Operations Phase Volumes (Project Traffic Peaks 6-7am & 5-6pm)

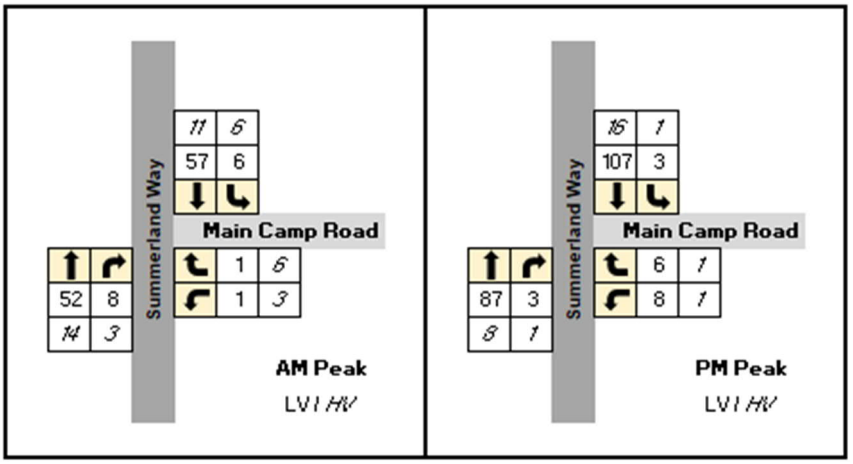

Figure 43 2057 Project Decommissioning Phase Volumes (Project Traffic Peaks 6-7am & 5-6pm)

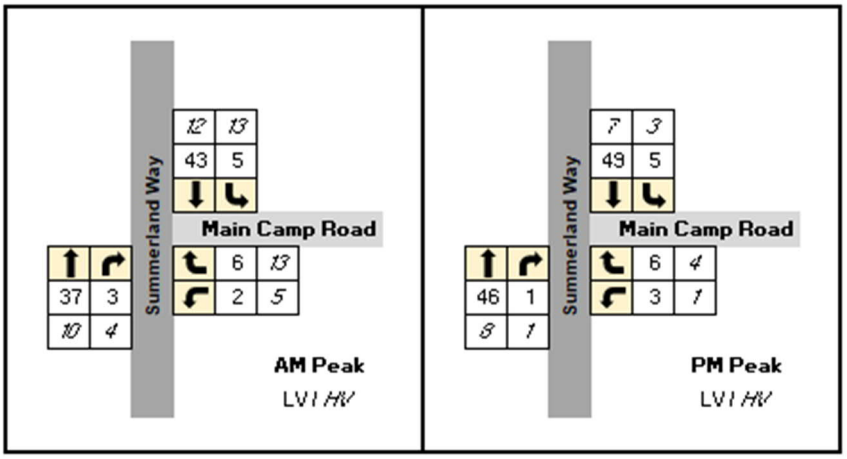

Figure 44 2026 Project Construction Phase Volumes (Network Traffic Peaks 5-9am & 3-4pm)

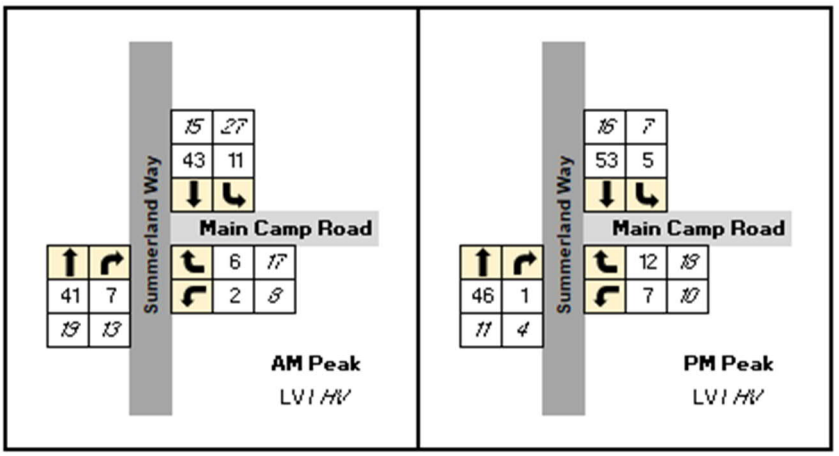

Figure 45 2026 Project Cumulative Construction Phase Volumes (Network Traffic Peaks 5-9am & 3-4pm)

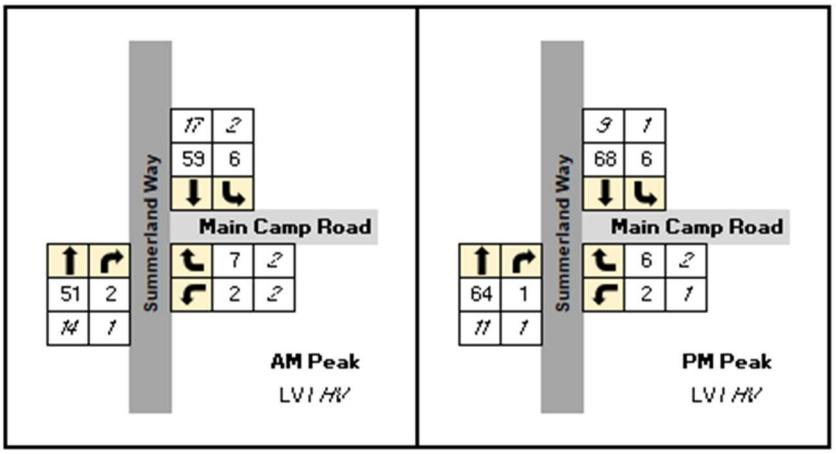

Figure 46 2037 Project Operations Phase Volumes (Network Traffic Peaks 5-9am & 3-4pm)

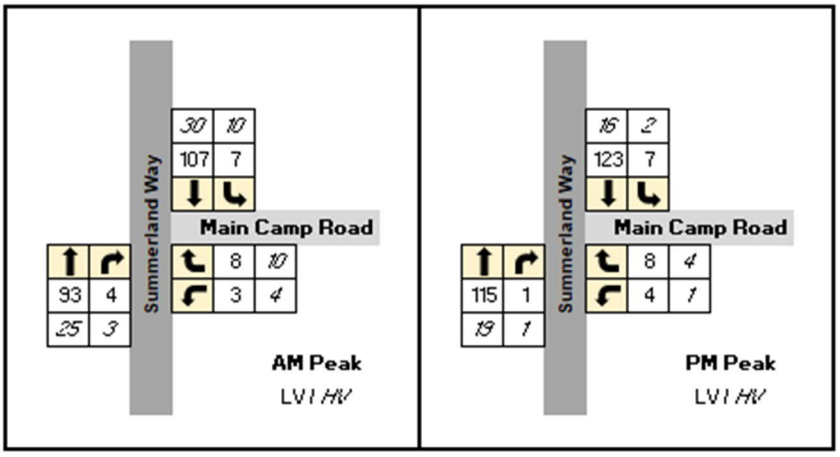

Figure 47 2057 Project Decommissioning Phase Volumes (Network Traffic Peaks 5-9am & 3-4pm)

5.2 Access and Frontage Impact Assessment and Mitigation

As identified in **Section 3.0** and **Section 4.0** above, the Project proposal includes three direct vehicular access points to the Project Area from Avenue Road (Site Access SA1, SA2 & SA3). As part of the Project it is proposed that these access points be constructed generally in accordance with the site access arrangement for articulated vehicles outlined in Figure 7.4 of Austroads Guide to Road Design Part 4: Intersections and Crossings – General (refer **Figure 27** above).

It is noted that additional hardstand area is likely to be required to be provided at Site Access SA2 to accommodate the swept paths of the OSOM transport vehicles (transformer and electrical switch room), with the exact extents of the hardstand areas will be confirmed in subsequent detailed design phases of the Project once the final configuration of these large electrical infrastructure components and associated transport vehicles are confirmed.

5.3 Intersection Impact Assessment and Mitigation

5.3.1 Summerland Way / Main Camp Road

5.3.1.1 Turn Warrant Assessment

Assessment has been completed to establish the turn treatment requirements at the Summerland Way / Main Camp Road intersection to accommodate the additional traffic anticipated from the construction, operations and decommissioning phases of the Project. This assessment is based on the turn treatment warrants graph as per Figure 2.26(a) of Austroads Guide to Traffic Management - Part 6: Intersections, Interchanges and Crossings to reflect the high-speed rural highway traffic environment.

The forecast turning movement volumes at the intersection, as identified in **Figure 40** to **Figure 47** above have been used as the basis of this assessment, with a summary of the resultant turn warrants from the assessment shown in **Table 18**. Further details of the turn warrant calculations (including graphs) for each of the identified traffic scenarios is also included for reference as **Appendix G.**

Table 18 Intersection Turn Warrants Assessment - Summerland Way / Main Camp Road Intersection

Project Traffic Scenario	Recommended Turn Warrants	
	Left Turn Treatment	Right Turn Treatment
Project Construction Phase		
Peak Construction – 2026 AM Peak (Project Peak)	BAL	BAR
Peak Construction – 2026 PM Peak (Project Peak)	BAL	BAR
Peak Construction – 2026 AM Peak (Network Peak)	BAL	BAR
Peak Construction – 2026 PM Peak (Network Peak)	BAL	BAR
Cumulative Construction – 2026 AM Peak (Project Peak)	BAL	BAR
Cumulative Construction – 2026 PM Peak (Project Peak)	BAL	BAR
Cumulative Construction – 2026 AM Peak (Network Peak)	BAL	BAR
Cumulative Construction – 2026 PM Peak (Network Peak)	BAL	BAR
Project Operations Phase		
Operations – 2037 AM Peak (Project Peak)	BAL	BAR
Operations – 2037 PM Peak (Project Peak)	BAL	BAR
Operations – 2037 AM Peak (Network Peak)	BAL	BAR
Operations – 2037 PM Peak (Network Peak)	BAL	BAR
Project Decommissioning Phase		
Decommissioning – 2057 AM Peak (Project Peak)	BAL	BAR
Decommissioning – 2057 PM Peak (Project Peak)	BAL	BAR
Decommissioning – 2057 AM Peak (Network Peak)	BAL	BAR
Decommissioning – 2057 PM Peak (Network Peak)	BAL	BAR
Recommended Turn Treatments	**BAL**	**BAR**

As shown in **Table 18** above, based on the expected peak hour traffic volumes at the access intersection during the critical periods of the construction, operations and decommissioning phases of the Project, it was shown that the required intersection treatments at the Summerland Way / Main Camp Road intersection were a basic left (BAL) and basic right (BAR) treatments.

Based on this, upgrade works are recommended at the intersection to provide a BAL treatment on the northern Summerland Way approach to the intersection. The results also indicate that the existing auxiliary right (AUR) treatment at the intersection is in excess of the required treatment at the intersection based on the Project traffic volume scenarios assessed above. Notwithstanding this, it is recommended that minor works be undertaken to retrofit the current standard CHRs treatment within the pavement extents of the existing AUR treatment.

In addition to the identified left turn upgrade works at the intersection, it is also recommended that traffic management measures including advisory "truck turning" signage be installed on the Summerland Way approaches to the access during the peak construction phase of the Project, to highlight to motorists the presence of the intersections and the potential for turning heavy vehicles to/from Main Camp Road.

The recommended BAL and CHRs turn treatments at the intersection are recommended to be provided generally in accordance with Figure 8.2 of Part 4A (rural BAL) and Figure A7 or Part 4 (rural CHRs) of Austroads Guide to Road Design respectively. A concept layout plan of the proposed intersection upgrade works has been completed by Turnbull Engineering Pty Ltd, with a copy of the proposed configuration of the Summerland Way / Main Camp Road intersection shown further in Drawing 0426-CV-101 included for reference as **Appendix E**.

5.3.1.2 Intersection Capacity Assessment

Detailed analysis utilising software was undertaken to establish the operational performance of the proposed upgraded (BAL/CHRs) configuration of the Summerland Way / Main Camp Road intersection. This analysis was completed for the relevant traffic scenarios for the construction, operations and decommissioning phases of the Project, considering the AM and PM peak periods at the critical design horizons for each phase as outlined in **Section 4.0** above.

A summary of the results of the completed analysis of the Summerland Way / Main Camp Road intersection is provided in **Table 19**, with detailed SIDRA output summaries included for reference in **Appendix B**.

Table 19 SIDRA Results - Summerland Way / Main Camp Road Intersection

Analysis Scenario	Intersection Degree of Saturation	Level of Service**	Intersection Average Delay (sec)	Maximum 95% Back of Queue Length (m)
Unsignalised / Priority Controlled Intersections				
Acceptable Limits of Operation	**< 0.800**	**LOS C**	**< 42.5**	**Varies ***
Peak Construction (2026)				
2026 AM Peak (Project Peak)	0.027	LOS A	2.9	0.8
2026 PM Peak (Project Peak)	0.032	LOS A	1.6	0.6
2026 AM Peak (Network Peak)	0.049	LOS A	2.3	1.5
2026 PM Peak (Network Peak)	0.038	LOS A	1.2	0.5
Cumulative Peak Construction (2026)				
2026 AM Peak (Project Peak)	0.047	LOS A	3.7	1.4
2026 PM Peak (Project Peak)	0.062	LOS A	2.8	2.4
2026 AM Peak (Network Peak)	0.068	LOS A	3.1	2.1
2026 PM Peak (Network Peak)	0.059	LOS A	2.4	2.5
Operations (2037 – 10 years from start of Operations)				
2037 AM Peak (Project Peak)	0.027	LOS A	1.4	0.2
2037 PM Peak (Project Peak)	0.042	LOS A	1.1	0.5
2037 AM Peak (Network Peak)	0.052	LOS A	0.9	0.5
2037 PM Peak (Network Peak)	0.049	LOS A	0.8	0.4
Decommissioning (2057)				
2057 AM Peak (Project Peak)	0.049	LOS A	1.4	0.7
2057 PM Peak (Project Peak)	0.074	LOS A	0.7	0.5
2057 AM Peak (Network Peak)	0.097	LOS A	1.0	1.1
2057 PM Peak (Network Peak)	0.086	LOS A	0.6	0.6

* Acceptable queue lengths are when all queues are contained within the existing lane lengths, with no traffic flows impeded.

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

The results above indicate that the proposed upgraded configuration (BAL / CHRs) of the Summerland Way / Main Camp Road intersection is expected to operate satisfactorily during the peak construction phase traffic scenarios identified for the Project, with all values for intersection DOS, LOS, average delay and vehicle queue lengths being well within acceptable limits of operation for a priority-controlled (give-way) intersection.

The results of the additional cumulative impact assessment undertaken for the construction phase of the Project (refer **Table 19**) also indicated that the proposed configuration of the intersection is also expected to operate satisfactorily (within acceptable limits) considering the potential increase in traffic volumes as a result of the concurrent construction of other renewable Projects in the region.

Based on these results, it can therefore be seen that the proposed configuration of the Summerland Way / Main Camp Road intersection, incorporating BAL and CHRs turn treatment upgrades, can be considered appropriate to cater for the additional traffic volumes generated by the peak construction, operations and decommissioning phases of the Project.

5.3.1.3 Additional Works

Further to the main intersection upgrade works identified above, the following additional works have also been identified to be required at the Summerland Way / Main Camp Road intersection:

- The swept path analysis completed for the expected OSOM transport vehicle movements at the intersection, indicating the transport vehicle will require the provision of additional temporary hardstand area on the north-eastern corner of the intersection to complete the turn into Main Camp Road, as well as the relocation of the existing mailboxes and upgrade to the road edge on the departure of the intersection.
- As identified in **Section 2.3.2.1** above, the provision of sight line vegetation clearing on the south-east corner of the Summerland Way / Main Camp Road intersection is required to enable the provision of compliant safe intersection sight distance to/from the southern approach to the intersection.

5.3.2 Main Camp Road / Avenue Road

Based on the low background traffic volumes observed on both Main Camp Road and Avenue Road, it is proposed that the existing, simple configuration of the intersection will generally be adequate to cater for both the current and expected additional traffic movements associated with the Project.

Notwithstanding this, it is noted that, temporary traffic management measures would be required to be implemented at the intersection (potentially traffic controllers / temporary traffic signals) to enable the larger heavy vehicle movements associated with the Project to safely traverse the intersection clear of opposing traffic, noting their requirement to utilise the full width of the Main Camp Road and Avenue Road legs of the intersection to complete the required turning movements.

Finally, the swept paths completed as part of the OSOM route survey works for the proposed transformer transport vehicle movements, identified that additional route upgrade works, including the provision of hardstand area on the inside (northern) corner of the intersection, are required to accommodate the expected vehicle paths of the oversize transformer transport vehicles movements at the intersection.

5.4 Road Link Capacity Assessment and Mitigation

In addition to the analysis of the key intersection on the external road network, an assessment of the impact of the additional traffic generated by the various phases of the Project on the operation of the road links utilised has also been completed. This assessment identifies the expected increase in daily traffic volumes on the road network during the key construction, operations and decommissioning phases of the Project, and comments on the level of impact the increase in traffic is anticipated to have on the operation of the road links.

It is noted that this assessment is primarily focussed on the section of the Summerland Way between the regional centres of Casino and Grafton, and the local government controlled rural access roads of Main Camp Road and Avenue Road, as these links are proposed to be utilised by the majority of the additional traffic generated by the Project. All of the other road links identified were noted to only be utilised by the transport vehicle movements for the solar and BESS component, and/or the low number of movements for the larger electrical infrastructure (transformer and electrical switchroom) components. Furthermore, the remaining roads also currently cater for higher traffic volumes (particularly the motorway sections) and as such the minor addition of truck movements for the Project is not anticipated to have a significant impact on their operation.

A summary of the assessment of the percentage increase in daily traffic volumes on the relevant sections of Summerland Way, Main Camp Road and Avenue Road as a result of the construction, operations and decommissioning phase traffic from the Project is shown in **Table 20** to **Table 23** below, with further details of the calculations undertaken provided in **Appendix F**.

Table 20 Road Link Daily Traffic Volume Comparison (Construction Phase)

AADT Segment			Daily Traffic Volumes								
			2026 Background			2026 Peak Construction			% Increase		
ID	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Sumerland Way (Casino to Grafton)											
Casino to South Casino			2,326	2,349	4,675	2,378	2,402	4,780	2.26	2.24	2.25
South Casino to Main Camp Road			1,076	1,103	2,179	1,128	1,156	2,284	4.88	4.76	4.82
Main Camp Road to Whiporie			1,076	1,103	2,179	1,110	1,137	2,247	3.14	3.06	3.10
Whiporie to Warragai Creek			2,106	2,215	4,321	2,140	2,248	4,388	1.60	1.52	1.56
Warragai Creek Grafton North			4,979	5,000	9,979	5,013	5,033	10,046	0.68	0.68	0.68
Grafton North to Grafton			15,238	15,407	30,645	15,272	15,440	30,712	0.22	0.22	0.22
Main Camp Road											
Summerland Way to Avenue Road	0.000	0.515	82	82	165	169	169	337	104.70	104.70	104.70
Avenue Road											
North of Main Camp Road	0.000	2.618	41	41	82	128	128	255	209.40	209.40	209.40
	2.618	3.051	41	41	82	128	128	255	209.40	209.40	209.40
	3.051	4.443	41	41	82	128	128	255	209.40	209.40	209.40

Table 21 Road Link Daily Traffic Volume Comparison (Cumulative Construction)

AADT Segment			Daily Traffic Volumes								
			2026 Background			2026 Cumulative Construction			% Increase		
ID	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Sumerland Way (Casino to Grafton)											
Casino to South Casino			2,326	2,349	4,675	2,618	2,642	5,260	12.58	12.45	12.52
South Casino to Main Camp Road			1,076	1,103	2,179	1,368	1,396	2,764	27.19	26.52	26.85
Main Camp Road to Whiporie			1,076	1,103	2,179	1,270	1,297	2,567	18.01	17.56	17.78
Whiporie to Warragai Creek			2,106	2,215	4,321	2,300	2,408	4,708	9.20	8.75	8.97
Warragai Creek Grafton North			4,979	5,000	9,979	5,173	5,193	10,366	3.89	3.88	3.88
Grafton North to Grafton			15,238	15,407	30,645	15,432	15,600	31,032	1.27	1.26	1.26
Main Camp Road											
Summerland Way to Avenue Road	0.000	0.515	82	82	165	369	369	737	347.35	347.35	347.35
Avenue Road											
North of Main Camp Road	0.000	2.618	41	41	82	128	128	255	209.40	209.40	209.40
	2.618	3.051	41	41	82	128	128	255	209.40	209.40	209.40
	3.051	4.443	41	41	82	128	128	255	209.40	209.40	209.40

Table 22 Road Link Daily Traffic Volume Comparison (Operations Phase)

AADT Segment			Daily Traffic Volumes								
			2037 Background			2037 Operations			% Increase		
ID	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Sumerland Way (Casino to Grafton)											
Casino to South Casino			3,219	3,252	6,471	3,226	3,259	6,485	0.22	0.22	0.22
South Casino to Main Camp Road			1,489	1,527	3,016	1,496	1,534	3,030	0.47	0.46	0.46
Main Camp Road to Whiporie			1,489	1,527	3,016	1,499	1,537	3,036	0.67	0.65	0.66
Whiporie to Warragai Creek			2,915	3,066	5,981	2,925	3,076	6,001	0.34	0.33	0.33
Warragai Creek Grafton North			6,892	6,921	13,813	6,902	6,931	13,833	0.15	0.14	0.14
Grafton North to Grafton			21,093	21,326	42,420	21,103	21,336	42,440	0.05	0.05	0.05
Main Camp Road											
Summerland Way to Avenue Road	0.000	0.515	86	103	190	102	119	222	**17.40**	**17.40**	**17.40**
Avenue Road											
North of Main Camp Road	0.000	2.618	46	46	92	62	62	124	**34.80**	**34.80**	**34.80**
	2.618	3.051	46	46	92	62	62	124	**34.80**	**34.80**	**34.80**
	3.051	4.443	46	46	92	47	47	94	2.17	2.17	2.17

Table 23 Road Link Daily Traffic Volume Comparison (Decommissioning Phase)

AADT Segment			Daily Traffic Volumes								
			2057 Background			2057 Decommissioning			% Increase		
ID	Start (km)	End (km)	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Bi-Dir
Sumerland Way (Casino to Grafton)											
Casino to South Casino			5,814	5,873	11,687	5,835	5,894	11,729	0.63	0.63	0.63
South Casino to Main Camp Road			2,690	2,758	5,448	2,711	2,779	5,490	1.37	1.33	1.35
Main Camp Road to Whiporie			2,690	2,758	5,448	2,722	2,790	5,512	0.88	0.86	0.87
Whiporie to Warragai Creek			5,265	5,537	10,802	5,297	5,569	10,866	0.45	0.43	0.44
Warragai Creek Grafton North			12,449	12,499	24,948	12,481	12,531	25,012	0.19	0.19	0.19
Grafton North to Grafton			38,097	38,518	76,614	38,129	38,550	76,678	0.06	0.06	0.06
Main Camp Road											
Summerland Way to Avenue Road	0.000	0.515	105	126	231	158	179	337	**53.84**	**53.84**	**53.84**
Avenue Road											
North of Main Camp Road	0.000	2.618	56	56	112	109	109	218	**107.68**	**107.68**	**107.68**
	2.618	3.051	56	56	112	109	109	218	**107.68**	**107.68**	**107.68**
	3.051	4.443	56	56	112	109	109	218	**107.68**	**107.68**	**107.68**

As can be seen by the results in above, the addition of the expected construction, operations and decommission phase traffic volumes from the Project is shown to generally have an insignificant impact on the operation of the identified sections of the state-controlled Summerland Way, with all increases in daily traffic volumes less than 10% for the construction, operations and decommissioning phase of the Project. The cumulative assessment scenario was shown to lead to an increase greater than 10% for the section of the link between Casino and Whiporie, however the resultant daily traffic volumes (approx. 2,500 – 5,500 vpd) were still well within the generally accepted capacity for a two lane rural highway (approx. 12,000 to 15,000 vpd).

Further to this, the assessment also identified larger increases on the relevant sections of the Council controlled Main Camp Road and Avenue Road. However these larger percentages are primarily caused by the lower background volumes on these rural access roads.

Notwithstanding this, the proposed upgrade works on these two roads, to provide a 6m sealed pavement on a 7m formation, as agreed with Richmond Valley Council, is considered adequate to cater for the additional traffic volumes on both Main Camp Road and Avenue Road anticipated from the construction, operations and decommissioning phases of the Project.

5.4.1 Component Transport Routes

It is also noted that additional sections of the external road network have been identified to be temporarily utilised by the Project as part of the transport routes for both the solar and BESS components, as well as the OSOM transport movements for the large electrical infrastructure (transformer and switch room).

While the solar and BESS components are understood to be containerised and able to be transported on standard rigid truck configurations, the OSOM vehicle movements for the larger electrical infrastructure will be required to be undertaken under permit. As such it is not anticipated that the relatively small number of OSOM movements (approx. 6 total - 3x transformer and 3x switch room) will have a significant ongoing impact on the operation or capacity of the roads forming the proposed transport routes.

Notwithstanding this, it is noted that a detailed Traffic Management Plan (TMP) is proposed to be prepared as part of subsequent stages of the Project once the exact configuration of the large electrical infrastructure and the associated OSOM transport vehicles are confirmed. This TMP will be developed in consultation with TfNSW and the relevant local government agencies.

5.5 Road Safety Assessment

A high-level road safety assessment has also been undertaken to establish the existing and post development road safety risks relevant to the Project. 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 48** was utilised, with the results of the road safety risk assessment summarised in **Table 24**.

		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 48 Adopted Risk Score Matrix

Table 24 Road Safety Assessment – Richmond Valley Solar Farm

		Existing / Pre-Development			With Project				With Project & Mitigation		
Risk Item		Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score	Mitigation Measure	Likelihood	Consequence	Risk Score
1	All phases of the Project are expected to lead to an increase in turning vehicle movements at the proposed Summerland Way / Main Camp Road. The increase in turning vehicles has the potential to lead to an increase in vehicle conflicts at the access intersection.	Unlikely	Hospitalisation / Fatality	**Medium**	Moderate	Hospitalisation / Fatality	**Medium / High**	**Upgrade works are proposed to provide the required BAL treatment on the northern Summerland Way approach to the intersection, and retrofitting a CHRs treatment (current standard) into the existing AUR treatment extents on the southern approach to the intersection.** **In addition, minor vegetation clearing works are proposed on the south-east corner of the intersection to reinstate the required sightlines to the south.** Finally, the detailed intersection analysis identified that the intersection would operate with significant levels of spare capacity and negligible vehicle delays and queuing.	Unlikely	Hospitalisation / Fatality	**Medium**
2	All phases of the Project are also expected to lead to an increase in vehicle movements on the relevant sections of Summerland Way (Casino to Grafton), Main Camp Road and Avenue Road. This increase in vehicle movements on these road sections has the potential to lead to an increase in vehicle conflicts.	Unlikely	Hospitalisation / Fatality	**Medium**	Unlikely	Hospitalisation / Fatality	**Medium**	**Provision of upgrade works to the relevant sections of Main Camp Road and Avenue Road to provide a 6m sealed pavement on a 7m formation, as agreed with Richmond Valley Council.** **These works are anticipated to provide a suitable configuration of these lower order roads to cater for the additional Project traffic volumes.** Further to this, the road link capacity assessment undertaken identified that the increases in daily traffic on the relevant sections of Summerland Way were all less than 5% and as such considered insignificant	Unlikely	Hospitalisation / Fatality	**Medium**
3	All phases of the Project are also expected to lead to an increase in vehicle movements at the Main Camp Road / Avenue Road intersection. This increase in movements at the intersection has the potential to lead to an increase in vehicle conflicts.	Unlikely	Hospitalisation / Fatality	**Medium**	Moderate	Hospitalisation / Fatality	**Medium / High**	**Temporary traffic management measures are proposed to be implemented during the construction phase of the Project to cater for the additional heavy vehicle movements at the intersection.** These upgrade works are anticipated to satisfactorily manage the additional Project traffic volumes at this intersection and reduce the potential for vehicle conflict.	Unlikely	Hospitalisation / Fatality	**Medium**

		Existing / Pre-Development			With Project				With Project & Mitigation		
Risk Item		Likelihood	Consequence	Risk Score	Likelihood	Consequence	Risk Score	Mitigation Measure	Likelihood	Consequence	Risk Score
4	All phases of the Project are also expected to lead to an increase in vehicle turning movements into the proposed site access points on Avenue Road. This increase in turning movements has the potential to lead to an increase in vehicle conflicts on Avenue Road.	Unlikely	Hospitalisation / Fatality	**Medium**	Unlikely	Hospitalisation / Fatality	**Medium**	**Provision of site accesses generally in accordance with Figure 7.4 of Austroads Guide to Road Design Part 4: Intersections and Crossings – General.** These proposed access works will provide a higher standard of access at the required points on Avenue Road and be designed to cater for the expected vehicle types associated with the Project. This is expected to improve the safety and efficiency of vehicle movements into and out of the site.	Unlikely	Hospitalisation / Fatality	**Medium**
5	The Summerland Way / Main Camp Road is currently being utilised as an informal drop off / pick up point for school bus movements, utilising the shoulder area on the western side of the intersection and Main Camp Road approach to stop. The lack of layby / set down areas for the school bus at this location has the potential to lead to conflict between the bus, and even waiting children, with adjacent vehicle movements at the intersection. The addition of Project traffic at the intersection has the potential to increase the potential for conflict between the bus and its patrons with vehicles at the intersection.	Unlikely	Hospitalisation / Fatality	**Medium**	Moderate	Hospitalisation / Fatality	**Medium / High**	**Provision of additional widening areas at the intersection to provide layby / setdown areas for the school bus on the departures to the intersection to enable the school bus to set down clear of the traffic from the adjacent intersection.** **It is also recommended that specific traffic management measures be identified within the construction management plan for the Project to look to further manage the potential interaction of Project traffic, in particular heavy vehicle movements, with both the school bus movements and any waiting children / parents.**	Unlikely	Hospitalisation / Fatality	**Medium**

5.6 Transport Infrastructure

5.6.1 Public Transport Infrastructure

As previously identified, there is currently no public transport infrastructure (i.e. public bus routes) along the key transport routes for the Project of Summerland Way, Main Camp Road or Avenue Road that could be utilised as part of the vehicle movements required for the Project.

Notwithstanding this, as mentioned above existing intersection of Summerland Way and Main Camp Road is currently utilised as an informal stop for school bus movements with the existing shoulder on the western side of the intersection observed for AM pickups of the northbound bus movements, and the Main Camp Road approach on the eastern side of the intersection used for PM drop-offs, with students being driven to/from these points from surrounding areas.

As such it is recommended that additional widening works be provided on the Summerland Way departures to the intersection (in each direction of travel) as part of any required intersection upgrade works for the Project to accommodate layby / set down areas for school bus movements clear of the adjacent intersection traffic. The indicative location and configuration of such school bus set down areas are outlined in **Figure 49** overpage, with further details provided in Drawing UMW0123-007_SK006 included for reference in **Appendix I**.

It is also recommended that specific traffic management measures be identified within the construction management plan for the Project to look to further manage the potential interaction of Project traffic, in particular heavy vehicle movements, with both the school bus movements and any waiting children / parents.

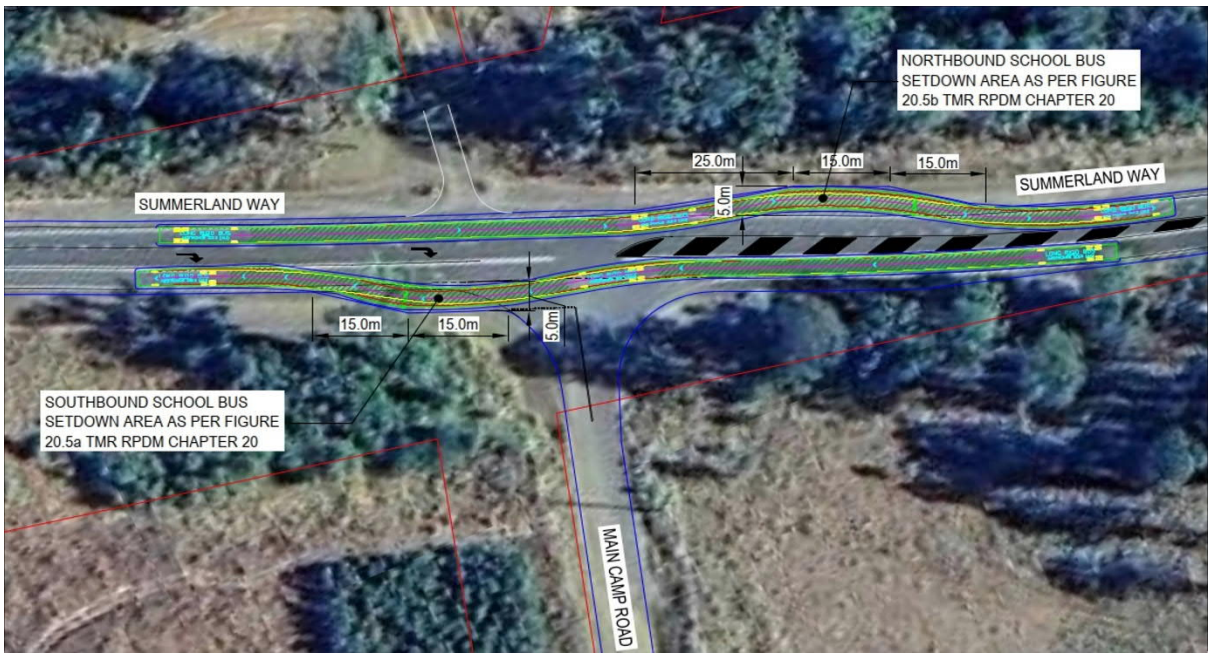

Figure 49 School Bus Setdown Areas – Summerland Way / Main Camp Road [Source: Access Traffic Consulting]

5.6.2 Active Transport Infrastructure

Based on the isolated, rural nature of the Project site there are no specific active transport facilities or infrastructure on the surrounding road network (i.e. bike lanes or pedestrian pathways) that could be utilised as part of required movements for the Project.

Furthermore, due to the location of the site, approximately 26 km to the south and 64 km to the north of the regional centres of Casino and Grafton respectively, staff commuter movements to/from site using active transport modes such as walking or cycling are not considered feasible.

6.0 Conclusions and Recommendations

6.1 Summary of Impacts and Mitigation Measures Proposed

Based on the outcomes of this assessment and the increase in traffic numbers anticipated as a result of the construction, operations and decommissioning phases of the Project, it is anticipated that the impact of the Project on the traffic operation of the surrounding road network can be managed by the provision of the following mitigation treatments:

- Construction of the proposed upgrade works to the Summerland Way / Main Camp Road intersection to provide a rural basic left (BAL) treatment on the northern approach and a rural short channelised right (CHRs) standard treatment on the southern approach, as per Figure 8.2 of Part 4A and Figure A7 of Part 4 of Austroads Guide to Road Design.
- Provision of sight line vegetation clearing on the south-east corner of the Summerland Way / Main Camp Road intersection to enable the provision of compliant safe intersection sight distance to/from the southern approach to the intersection.
- Provision of additional widening areas on the northbound and southbound departures of the Summerland Way / Main Camp Road intersection to provide bus layby / set down areas, enabling school bus pickup and drop off movements to be completed clear of the adjacent vehicle movements at the intersection.
- Provision of upgrade works to the relevant sections of Main Camp Road (Summerland Way to Avenue Road – approx. 0.515 km) and Avenue Road (Main Camp Road to proposed Site Access 3 – approx. 4.443 km) to provide a cross section providing a 6m sealed pavement on a 7m formation, as agreed with Richmond Valley Council.

  Furthermore, it is noted that as part of the upgrade works to Avenue Road, the existing road reserve boundary is to be realigned to enable the upgraded configuration of the link to be wholly contained within the new extents of the road reserve. Further details of the proposed revised alignment of the road reserve boundaries are proposed to be provided as part of the detailed design of the required road upgrade works to Avenue Road.
- Installation of advisory "truck turning" signage on the Summerland Way approaches to the intersection with the Main Camp Road, to highlight to motorists the presence of the Project access and the potential for turning heavy vehicles to/from the side road.
- Provision of suitable traffic management measures (traffic control / temporary traffic signals) at the Main Camp Road / Avenue Road intersection to enable the larger heavy vehicle movements associated with the Project to safely traverse the intersection clear of opposing traffic.
- Construction of the three identified access points to the Project Area on Avenue Road (SA1, SA2 and SA3) generally in accordance with the site access arrangement for articulated vehicles outlined in TfNSW's Typical Rural Property Access – Northern Region standard drawing (as per Figure 7.4 of Austroads Guide to Road Design Part 4: Intersections and Crossings – General).
- Completion of minor works along the identified OSOM transport routes to accommodate the swept paths of the OSOM transformer and switch room transport vehicles, including the relocation of signage infrastructure and construction of required temporary hardstand pavement areas as identified in the OSOM Route Assessment for the Project (refer **Appendix D**).
- Preparation of traffic management plan for Project outlining proposed management measures and processes to minimise the impact of the Project on the external road network.

6.2 Conclusion

Based on the information provided above, it can be seen that conditional to the provision of the identified mitigation measures, the potential impacts of the Project will have been appropriately managed, with minimal traffic impacts anticipated on the relevant sections of the local government and state-controlled road networks.

As such it can be concluded that this report, in combination with the Preliminary Route Assessment demonstrates the compliance of the Project with Schedule 8 of the Environmental and Planning Regulation (2021), as outlined in the traffic and transport items of the Secretary's Environmental Assessment Requirements (SEARs) .

Access Traffic Consulting therefore recommends that the Project be approved from a traffic engineering and traffic impact viewpoint.

Appendix A – Intersection Raw Count Data

Summary of Turning Movement Counts - from Traffic Count on iOS

Study Name Summerland Way - Main Camp Road
Observer Andrew Barrie
Location Summerland Way - Main Camp Road Intersection
Date Thursday 17 August 2023

Streets NB Summerland Way SB Summerland Way EB Nil WB Main Camp Road

Light Vehicles (Cars)

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn
6:00 AM - 6:15 AM		4	0	0	0	5		0					0		0	0
6:15 AM - 6:30 AM		5	1	0	0	5		0					0		1	0
6:30 AM - 6:45 AM		5	0	0	0	6		0					1		0	0
6:45 AM - 7:00 AM		5	0	0	1	5		0					0		0	0
7:00 AM - 7:15 AM		6	0	0	0	6		0					0		0	0
7:15 AM - 7:30 AM		9	0	0	0	9		0					1		0	0
7:30 AM - 7:45 AM		5	1	0	1	6		0					0		0	0
7:45 AM - 8:00 AM		3	0	0	0	3		0					0		1	0
8:00 AM - 8:15 AM		9	0	0	1	9		0					0		2	0
8:15 AM - 8:30 AM		8	1	0	1	11		0					1		1	0
8:30 AM - 8:45 AM		8	0	0	2	9		0					1		2	0
8:45 AM - 9:00 AM		9	1	0	1	10		0					0		1	0
Overall Total		76	4	0	7	84		0					4		8	0
Project Peak (6-7) Total		19	1	0	1	21		0					1		1	0
Road Peak (8-9) Total		34	2	0	5	39		0					2		6	0

Bicycles

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn
6:00 AM - 6:15 AM		0	0	0	0	0		0					0		0	0
6:15 AM - 6:30 AM		0	0	0	0	0		0					0		0	0
6:30 AM - 6:45 AM		0	0	0	0	0		0					0		0	0
6:45 AM - 7:00 AM		0	0	0	0	0		0					0		0	0
7:00 AM - 7:15 AM		0	0	0	0	0		0					0		0	0
7:15 AM - 7:30 AM		0	0	0	0	0		0					0		0	0
7:30 AM - 7:45 AM		0	0	0	0	0		0					0		0	0
7:45 AM - 8:00 AM		0	0	0	0	0		0					0		0	0
8:00 AM - 8:15 AM		0	0	0	0	0		0					0		0	0
8:15 AM - 8:30 AM		0	0	0	0	0		0					0		0	0
8:30 AM - 8:45 AM		0	0	0	0	0		0					0		0	0
8:45 AM - 9:00 AM		0	0	0	0	0		0					0		0	0
Overall Total		0	0	0	0	0		0					0		0	0
Project Peak (6-7) Total		0	0	0	0	0		0					0		0	0
Road Peak (8-9) Total		0	0	0	0	0		0					0		0	0

Heavy Vehicles

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn
6:00 AM - 6:15 AM		1	0	0	0	0		0					0		0	0
6:15 AM - 6:30 AM		1	0	0	0	1		0					0		0	0
6:30 AM - 6:45 AM		2	0	0	0	2		0					0		0	0
6:45 AM - 7:00 AM		1	0	0	0	1		0					0		0	0
7:00 AM - 7:15 AM		1	0	0	0	1		0					0		0	0
7:15 AM - 7:30 AM		2	0	0	0	2		0					0		0	0
7:30 AM - 7:45 AM		2	0	0	0	2		0					0		0	0
7:45 AM - 8:00 AM		3	0	0	0	1		0					0		1	0
8:00 AM - 8:15 AM		2	0	0	0	3		0					0		0	0
8:15 AM - 8:30 AM		2	0	0	1	3		0					0		0	0
8:30 AM - 8:45 AM		3	0	0	0	2		0					1		0	0
8:45 AM - 9:00 AM		2	0	0	0	3		0					0		1	0
Overall Total		22	0	0	1	21		0					1		2	0
Project Peak (6-7) Total		5	0	0	0	4		0					0		0	0
Road Peak (8-9) Total		9	0	0	1	11		0					1		1	0

Pedestrians

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn
6:00 AM - 6:15 AM		0	0	0	0	0		0					0		0	0
6:15 AM - 6:30 AM		0	0	0	0	0		0					0		0	0
6:30 AM - 6:45 AM		0	0	0	0	0		0					0		0	0
6:45 AM - 7:00 AM		0	0	0	0	0		0					0		0	0
7:00 AM - 7:15 AM		0	0	0	0	0		0					0		0	0
7:15 AM - 7:30 AM		0	0	0	0	0		0					0		0	0
7:30 AM - 7:45 AM		0	0	0	0	0		0					0		0	0
7:45 AM - 8:00 AM		0	0	0	0	0		0					0		0	0
8:00 AM - 8:15 AM		0	0	0	0	0		0					0		0	0
8:15 AM - 8:30 AM		0	0	0	0	0		0					0		0	0
8:30 AM - 8:45 AM		0	0	0	0	0		0					0		0	0
8:45 AM - 9:00 AM		0	0	0	0	0		0					0		0	0
Overall Total		0	0	0	0	0		0					0		0	0
Project Peak (6-7) Total		0	0	0	0	0		0					0		0	0
Road Peak (8-9) Total		0	0	0	0	0		0					0		0	0

Summary of Turning Movement Counts - from Traffic Count on iOS

Study Name Summerland Way - Main Camp Road
Observer Andrew Barrie
Location Summerland Way - Main Camp Road Intersection
Date Thursday 17 August 2023

Streets NB Summerland Way SB Summerland Way EB Nil WB Main Camp Road

Light Vehicles (Cars)

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn
3:00 PM - 3:15 PM		10	0	0	2	11		0					1		1	0
3:15 PM - 3:30 PM		12	0	0	1	13		0					0		2	0
3:30 PM - 3:45 PM		9	1	0	1	11		0					1		1	0
3:45 PM - 4:00 PM		11	0	0	1	10		0					0		1	0
4:00 PM - 4:15 PM		9	0	0	0	12		0					1		1	0
4:15 PM - 4:30 PM		10	1	0	1	10		0					0		0	0
4:30 PM - 4:45 PM		9	0	0	0	11		0					0		3	0
4:45 PM - 5:00 PM		7	0	0	0	9		0					0		0	0
5:00 PM - 5:15 PM		9	0	0	0	10		0					0		0	0
5:15 PM - 5:30 PM		8	1	0	1	13		0					0		1	0
5:30 PM - 5:45 PM		7	0	0	0	9		0					1		0	0
5:45 PM - 6:00 PM		8	1	0	1	7		0					0		0	0
Overall Total		109	4	0	8	126		0					4		10	0
Project Peak (5-6) Total		32	2	0	2	39		0					1		1	0
Road Peak (3-4) Total		42	1	0	5	45		0					2		5	0

Bicycles

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn
3:00 PM - 3:15 PM		0	0	0	0	0		0					0		0	0
3:15 PM - 3:30 PM		0	0	0	0	0		0					0		0	0
3:30 PM - 3:45 PM		0	0	0	0	0		0					0		0	0
3:45 PM - 4:00 PM		0	0	0	0	0		0					0		0	0
4:00 PM - 4:15 PM		0	0	0	0	0		0					0		0	0
4:15 PM - 4:30 PM		0	0	0	0	0		0					0		0	0
4:30 PM - 4:45 PM		0	0	0	0	0		0					0		0	0
4:45 PM - 5:00 PM		0	0	0	0	0		0					0		0	0
5:00 PM - 5:15 PM		0	0	0	0	0		0					0		0	0
5:15 PM - 5:30 PM		0	0	0	0	0		0					0		0	0
5:30 PM - 5:45 PM		0	0	0	0	0		0					0		0	0
5:45 PM - 6:00 PM		0	0	0	0	0		0					0		0	0
Overall Total		0	0	0	0	0		0					0		0	0
Project Peak (5-6) Total		0	0	0	0	0		0					0		0	0
Road Peak (3-4) Total		0	0	0	0	0		0					0		0	0

Heavy Vehicles

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn
3:00 PM - 3:15 PM		2	0	0	0	2		0					0		0	0
3:15 PM - 3:30 PM		2	0	0	0	1		0					0		0	0
3:30 PM - 3:45 PM		2	0	0	0	2		0					0		1	0
3:45 PM - 4:00 PM		1	0	0	0	1		0					0		0	0
4:00 PM - 4:15 PM		1	0	0	0	1		0					0		0	0
4:15 PM - 4:30 PM		2	0	0	0	2		0					0		0	0
4:30 PM - 4:45 PM		0	0	0	0	1		0					0		0	0
4:45 PM - 5:00 PM		3	0	0	0	1		0					0		1	0
5:00 PM - 5:15 PM		0	0	0	0	2		0					0		0	0
5:15 PM - 5:30 PM		2	0	0	0	2		0					0		0	0
5:30 PM - 5:45 PM		0	0	0	0	0		0					0		0	0
5:45 PM - 6:00 PM		1	0	0	0	2		0					0		0	0
Overall Total		16	0	0	0	17		0					0		2	0
Project Peak (5-6) Total		3	0	0	0	6		0					0		0	0
Road Peak (3-4) Total		7	0	0	0	6		0					0		1	0

Pedestrians

Time	Northbound				Southbound				Eastbound				Westbound			
	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn	Left	Thru	Right	UTurn
3:00 PM - 3:15 PM		0	0	0	0	0		0					0		0	0
3:15 PM - 3:30 PM		0	0	0	0	0		0					0		0	0
3:30 PM - 3:45 PM		0	0	0	0	0		0					0		0	0
3:45 PM - 4:00 PM		0	0	0	0	0		0					0		0	0
4:00 PM - 4:15 PM		0	0	0	0	0		0					0		0	0
4:15 PM - 4:30 PM		0	0	0	0	0		0					0		0	0
4:30 PM - 4:45 PM		0	0	0	0	0		0					0		0	0
4:45 PM - 5:00 PM		0	0	0	0	0		0					0		0	0
5:00 PM - 5:15 PM		0	0	0	0	0		0					0		0	0
5:15 PM - 5:30 PM		0	0	0	0	0		0					0		0	0
5:30 PM - 5:45 PM		0	0	0	0	0		0					0		0	0
5:45 PM - 6:00 PM		0	0	0	0	0		0					0		0	0
Overall Total		0	0	0	0	0		0					0		0	0
Project Peak (5-6) Total		0	0	0	0	0		0					0		0	0
Road Peak (3-4) Total		0	0	0	0	0		0					0		0	0

Appendix B – SIDRA Results

MOVEMENT SUMMARY

Site: 1 [EXIST 2024 AM PEAK (PROJECT) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	26	20.0	26	20.0	0.011	0.0	LOS A	0.0	0.0	0.01	0.02	0.01	59.7
3	R2	All MCs	1	0.0	1	0.0	0.011	5.5	LOS A	0.0	0.0	0.01	0.03	0.01	56.8
Approach			27	19.2	27	19.2	0.011	0.2	NA	0.0	0.0	0.01	0.02	0.01	59.6
East: Main Camp Road															
4	L2	All MCs	1	0.0	1	0.0	0.002	5.6	LOS A	0.0	0.0	0.12	0.54	0.12	52.6
6	R2	All MCs	1	0.0	1	0.0	0.002	5.7	LOS A	0.0	0.0	0.12	0.54	0.12	52.3
Approach			2	0.0	2	0.0	0.002	5.7	LOS A	0.0	0.0	0.12	0.54	0.12	52.5
North: Summerland Way															
7	L2	All MCs	1	0.0	1	0.0	0.016	5.5	LOS A	0.0	0.0	0.00	0.02	0.00	57.3
8	T1	All MCs	27	15.4	27	15.4	0.016	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach			28	14.8	28	14.8	0.016	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles			58	16.4	58	16.4	0.016	0.4	NA	0.0	0.0	0.01	0.04	0.01	59.3

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 [EXIST 2024 PM PEAK (PROJECT) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	38	8.3	38	8.3	0.015	0.0	LOS A	0.0	0.1	0.02	0.03	0.02	59.6
3	R2	All MCs	2	0.0	2	0.0	0.015	5.5	LOS A	0.0	0.1	0.02	0.05	0.02	56.7
Approach			40	7.9	40	7.9	0.015	0.3	NA	0.0	0.1	0.02	0.03	0.02	59.5
East: Main Camp Road															
4	L2	All MCs	1	0.0	1	0.0	0.003	5.7	LOS A	0.0	0.1	0.19	0.54	0.19	52.4
6	R2	All MCs	2	50.0	2	50.0	0.003	6.8	LOS A	0.0	0.1	0.19	0.54	0.19	50.0
Approach			3	33.3	3	33.3	0.003	6.4	LOS A	0.0	0.1	0.19	0.54	0.19	50.8
North: Summerland Way															
7	L2	All MCs	3	33.3	3	33.3	0.029	5.9	LOS A	0.0	0.0	0.00	0.04	0.00	55.6
8	T1	All MCs	48	13.0	48	13.0	0.029	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.7
Approach			52	14.3	52	14.3	0.029	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.5
All Vehicles			95	12.2	95	12.2	0.029	0.5	NA	0.0	0.1	0.01	0.05	0.01	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.

MOVEMENT SUMMARY

Site: 1 [EXIST 2024 AM PEAK (NETWORK) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	46	20.5	46	20.5	0.019	0.0	LOS A	0.0	0.1	0.01	0.03	0.01	59.7
3	R2	All MCs	2	0.0	2	0.0	0.019	5.5	LOS A	0.0	0.1	0.02	0.04	0.02	56.8
Approach			48	19.6	48	19.6	0.019	0.3	NA	0.0	0.1	0.01	0.03	0.01	59.5
East: Main Camp Road															
4	L2	All MCs	3	33.3	3	33.3	0.010	6.1	LOS A	0.0	0.3	0.21	0.54	0.21	51.0
6	R2	All MCs	7	14.3	7	14.3	0.010	6.3	LOS A	0.0	0.3	0.21	0.54	0.21	51.5
Approach			11	20.0	11	20.0	0.010	6.2	LOS A	0.0	0.3	0.21	0.54	0.21	51.3
North: Summerland Way															
7	L2	All MCs	6	16.7	6	16.7	0.035	5.7	LOS A	0.0	0.0	0.00	0.06	0.00	56.1
8	T1	All MCs	54	21.6	54	21.6	0.035	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.4
Approach			60	21.1	60	21.1	0.035	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.0
All Vehicles			119	20.4	119	20.4	0.035	1.0	NA	0.0	0.3	0.02	0.09	0.02	58.4

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 [EXIST 2024 PM PEAK (NETWORK) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	53	14.0	53	14.0	0.021	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	59.8
3	R2	All MCs	1	0.0	1	0.0	0.021	5.5	LOS A	0.0	0.0	0.01	0.02	0.01	57.0
Approach			54	13.7	54	13.7	0.021	0.1	NA	0.0	0.0	0.01	0.01	0.01	59.8
East: Main Camp Road															
4	L2	All MCs	3	33.3	3	33.3	0.009	6.1	LOS A	0.0	0.3	0.20	0.54	0.20	51.0
6	R2	All MCs	6	16.7	6	16.7	0.009	6.3	LOS A	0.0	0.3	0.20	0.54	0.20	51.4
Approach			9	22.2	9	22.2	0.009	6.3	LOS A	0.0	0.3	0.20	0.54	0.20	51.3
North: Summerland Way															
7	L2	All MCs	6	16.7	6	16.7	0.034	5.7	LOS A	0.0	0.0	0.00	0.06	0.00	56.2
8	T1	All MCs	55	11.5	55	11.5	0.034	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.5
Approach			61	12.1	61	12.1	0.034	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.1
All Vehicles			124	13.6	124	13.6	0.034	0.8	NA	0.0	0.3	0.02	0.08	0.02	58.7

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 [PEAK CONSTRUCTION 2026 AM PEAK (PROJECT) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	27	19.2	27	19.2	0.016	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	16	26.7	16	26.7	0.010	6.0	LOS A	0.0	0.4	0.14	0.55	0.14	51.2
Approach			43	22.0	43	22.0	0.016	2.2	NA	0.0	0.4	0.05	0.20	0.05	56.4
East: Main Camp Road															
4	L2	All MCs	5	80.0	5	80.0	0.018	6.6	LOS A	0.1	0.8	0.18	0.53	0.18	49.3
6	R2	All MCs	9	88.9	9	88.9	0.018	7.5	LOS A	0.1	0.8	0.18	0.53	0.18	48.8
Approach			15	85.7	15	85.7	0.018	7.2	LOS A	0.1	0.8	0.18	0.53	0.18	49.0
North: Summerland Way															
7	L2	All MCs	16	53.3	16	53.3	0.027	6.2	LOS A	0.0	0.0	0.00	0.21	0.00	53.9
8	T1	All MCs	28	14.8	28	14.8	0.027	0.0	LOS A	0.0	0.0	0.00	0.21	0.00	58.7
Approach			44	28.6	44	28.6	0.027	2.2	NA	0.0	0.0	0.00	0.21	0.00	56.9
All Vehicles			102	34.0	102	34.0	0.027	2.9	NA	0.1	0.8	0.05	0.25	0.05	55.4

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 [PEAK CONSTRUCTION 2026 PM PEAK (PROJECT) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	40	7.9	40	7.9	0.021	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	4	50.0	4	50.0	0.003	6.3	LOS A	0.0	0.1	0.17	0.54	0.17	50.1
Approach			44	11.9	44	11.9	0.021	0.6	NA	0.0	0.1	0.02	0.05	0.02	58.9
East: Main Camp Road															
4	L2	All MCs	14	15.4	14	15.4	0.019	5.9	LOS A	0.1	0.6	0.17	0.54	0.17	51.8
6	R2	All MCs	9	22.2	9	22.2	0.019	6.4	LOS A	0.1	0.6	0.17	0.54	0.17	51.4
Approach			23	18.2	23	18.2	0.019	6.1	LOS A	0.1	0.6	0.17	0.54	0.17	51.6
North: Summerland Way															
7	L2	All MCs	4	50.0	4	50.0	0.032	6.1	LOS A	0.0	0.0	0.00	0.04	0.00	54.9
8	T1	All MCs	53	14.0	53	14.0	0.032	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.7
Approach			57	16.7	57	16.7	0.032	0.5	NA	0.0	0.0	0.00	0.04	0.00	59.4
All Vehicles			124	15.3	124	15.3	0.032	1.6	NA	0.1	0.6	0.04	0.14	0.04	57.6

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 [PEAK CONSTRUCTION 2026 AM PEAK (NETWORK) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	49	21.3	49	21.3	0.029	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	7	57.1	7	57.1	0.006	6.6	LOS A	0.0	0.3	0.21	0.54	0.21	49.7
Approach			57	25.9	57	25.9	0.029	0.9	NA	0.0	0.3	0.03	0.07	0.03	58.4
East: Main Camp Road															
4	L2	All MCs	7	71.4	7	71.4	0.034	6.7	LOS A	0.1	1.5	0.26	0.55	0.26	49.3
6	R2	All MCs	20	68.4	20	68.4	0.034	7.7	LOS A	0.1	1.5	0.26	0.55	0.26	49.3
Approach			27	69.2	27	69.2	0.034	7.4	LOS A	0.1	1.5	0.26	0.55	0.26	49.3
North: Summerland Way															
7	L2	All MCs	19	72.2	19	72.2	0.049	6.4	LOS A	0.0	0.0	0.00	0.14	0.00	53.6
8	T1	All MCs	58	21.8	58	21.8	0.049	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	59.4
Approach			77	34.2	77	34.2	0.049	1.6	NA	0.0	0.0	0.00	0.14	0.00	57.9
All Vehicles			161	37.3	161	37.3	0.049	2.3	NA	0.1	1.5	0.05	0.19	0.05	56.4

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 [PEAK CONSTRUCTION 2026 PM PEAK (NETWORK) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	57	14.8	57	14.8	0.032	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	2	50.0	2	50.0	0.002	6.4	LOS A	0.0	0.1	0.19	0.54	0.19	50.1
Approach			59	16.1	59	16.1	0.032	0.2	NA	0.0	0.1	0.01	0.02	0.01	59.6
East: Main Camp Road															
4	L2	All MCs	4	25.0	4	25.0	0.016	6.0	LOS A	0.1	0.5	0.23	0.54	0.23	51.2
6	R2	All MCs	11	40.0	11	40.0	0.016	7.0	LOS A	0.1	0.5	0.23	0.54	0.23	50.5
Approach			15	35.7	15	35.7	0.016	6.7	LOS A	0.1	0.5	0.23	0.54	0.23	50.7
North: Summerland Way															
7	L2	All MCs	8	37.5	8	37.5	0.038	6.0	LOS A	0.0	0.0	0.00	0.07	0.00	55.2
8	T1	All MCs	59	12.5	59	12.5	0.038	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	59.5
Approach			67	15.6	67	15.6	0.038	0.8	NA	0.0	0.0	0.00	0.07	0.00	58.9
All Vehicles			141	17.9	141	17.9	0.038	1.2	NA	0.1	0.5	0.03	0.10	0.03	58.2

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 [CUMULATIVE CONSTRUCTION 2026 AM PEAK (PROJECT) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	41	35.9	41	35.9	0.026	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	29	46.4	29	46.4	0.022	6.4	LOS A	0.1	1.0	0.20	0.55	0.20	50.2
Approach			71	40.3	71	40.3	0.026	2.7	NA	0.1	1.0	0.08	0.23	0.08	55.5
East: Main Camp Road															
4	L2	All MCs	8	87.5	8	87.5	0.029	6.7	LOS A	0.1	1.4	0.21	0.53	0.21	48.8
6	R2	All MCs	14	92.3	14	92.3	0.029	8.2	LOS A	0.1	1.4	0.21	0.53	0.21	48.4
Approach			22	90.5	22	90.5	0.029	7.7	LOS A	0.1	1.4	0.21	0.53	0.21	48.6
North: Summerland Way															
7	L2	All MCs	37	62.9	37	62.9	0.047	6.3	LOS A	0.0	0.0	0.00	0.31	0.00	52.9
8	T1	All MCs	32	23.3	32	23.3	0.047	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	58.1
Approach			68	44.6	68	44.6	0.047	3.4	NA	0.0	0.0	0.00	0.31	0.00	55.2
All Vehicles			161	49.0	161	49.0	0.047	3.7	NA	0.1	1.4	0.07	0.31	0.07	54.3

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 [CUMULATIVE CONSTRUCTION 2026 PM PEAK (PROJECT) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	43	14.6	43	14.6	0.024	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	7	71.4	7	71.4	0.006	6.8	LOS A	0.0	0.3	0.22	0.54	0.22	49.2
Approach			51	22.9	51	22.9	0.024	1.0	NA	0.0	0.3	0.03	0.08	0.03	58.1
East: Main Camp Road															
4	L2	All MCs	27	42.3	27	42.3	0.062	6.4	LOS A	0.2	2.4	0.24	0.55	0.24	50.5
6	R2	All MCs	31	55.2	31	55.2	0.062	7.4	LOS A	0.2	2.4	0.24	0.55	0.24	49.9
Approach			58	49.1	58	49.1	0.062	6.9	LOS A	0.2	2.4	0.24	0.55	0.24	50.2
North: Summerland Way															
7	L2	All MCs	8	75.0	8	75.0	0.046	6.4	LOS A	0.0	0.0	0.00	0.06	0.00	53.8
8	T1	All MCs	66	25.4	66	25.4	0.046	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.8
Approach			75	31.0	75	31.0	0.046	0.7	NA	0.0	0.0	0.00	0.06	0.00	59.0
All Vehicles			183	34.5	183	34.5	0.062	2.8	NA	0.2	2.4	0.08	0.22	0.08	55.7

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 [CUMULATIVE CONSTRUCTION 2026 AM PEAK (NETWORK) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	63	31.7	63	31.7	0.039	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	21	65.0	21	65.0	0.018	6.9	LOS A	0.1	0.9	0.26	0.55	0.26	49.3
Approach			84	40.0	84	40.0	0.039	1.7	NA	0.1	0.9	0.07	0.14	0.07	56.9
East: Main Camp Road															
4	L2	All MCs	11	80.0	11	80.0	0.047	6.9	LOS A	0.2	2.1	0.30	0.56	0.30	48.7
6	R2	All MCs	24	73.9	24	73.9	0.047	8.5	LOS A	0.2	2.1	0.30	0.56	0.30	48.8
Approach			35	75.8	35	75.8	0.047	8.0	LOS A	0.2	2.1	0.30	0.56	0.30	48.7
North: Summerland Way															
7	L2	All MCs	40	71.1	40	71.1	0.068	6.4	LOS A	0.0	0.0	0.00	0.23	0.00	53.2
8	T1	All MCs	61	25.9	61	25.9	0.068	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	58.9
Approach			101	43.8	101	43.8	0.068	2.5	NA	0.0	0.0	0.00	0.23	0.00	56.5
All Vehicles			220	47.4	220	47.4	0.068	3.1	NA	0.2	2.1	0.07	0.25	0.07	55.3

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 [CUMULATIVE CONSTRUCTION 2026 PM PEAK (NETWORK) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	60	19.3	60	19.3	0.034	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	5	80.0	5	80.0	0.005	6.9	LOS A	0.0	0.2	0.24	0.54	0.24	48.8
Approach			65	24.2	65	24.2	0.034	0.6	NA	0.0	0.2	0.02	0.04	0.02	58.9
East: Main Camp Road															
4	L2	All MCs	18	58.8	18	58.8	0.059	6.6	LOS A	0.2	2.5	0.28	0.56	0.28	49.7
6	R2	All MCs	32	60.0	32	60.0	0.059	7.8	LOS A	0.2	2.5	0.28	0.56	0.28	49.6
Approach			49	59.6	49	59.6	0.059	7.4	LOS A	0.2	2.5	0.28	0.56	0.28	49.6
North: Summerland Way															
7	L2	All MCs	13	58.3	13	58.3	0.052	6.2	LOS A	0.0	0.0	0.00	0.09	0.00	54.3
8	T1	All MCs	73	23.2	73	23.2	0.052	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	59.5
Approach			85	28.4	85	28.4	0.052	0.9	NA	0.0	0.0	0.00	0.09	0.00	58.7
All Vehicles			200	34.7	200	34.7	0.059	2.4	NA	0.2	2.5	0.07	0.19	0.07	56.2

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 [OPERATIONS 2037 AM PEAK (PROJECT) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	39	21.6	39	21.6	0.023	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	12	9.1	12	9.1	0.007	5.7	LOS A	0.0	0.2	0.14	0.55	0.14	51.9
Approach			51	18.8	51	18.8	0.023	1.3	NA	0.0	0.2	0.03	0.13	0.03	57.9
East: Main Camp Road															
4	L2	All MCs	2	50.0	2	50.0	0.004	6.3	LOS A	0.0	0.2	0.17	0.53	0.17	50.4
6	R2	All MCs	2	50.0	2	50.0	0.004	6.9	LOS A	0.0	0.2	0.17	0.53	0.17	50.3
Approach			4	50.0	4	50.0	0.004	6.6	LOS A	0.0	0.2	0.17	0.53	0.17	50.3
North: Summerland Way															
7	L2	All MCs	8	12.5	8	12.5	0.027	5.7	LOS A	0.0	0.0	0.00	0.10	0.00	56.0
8	T1	All MCs	40	15.8	40	15.8	0.027	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	59.0
Approach			48	15.2	48	15.2	0.027	1.0	NA	0.0	0.0	0.00	0.10	0.00	58.5
All Vehicles			103	18.4	103	18.4	0.027	1.4	NA	0.0	0.2	0.02	0.13	0.02	57.8

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.

MOVEMENT SUMMARY

Site: 1 [OPERATIONS 2037 PM PEAK (PROJECT) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	56	9.4	56	9.4	0.030	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	3	33.3	3	33.3	0.002	6.2	LOS A	0.0	0.1	0.19	0.54	0.19	50.8
Approach			59	10.7	59	10.7	0.030	0.3	NA	0.0	0.1	0.01	0.03	0.01	59.4
East: Main Camp Road															
4	L2	All MCs	12	9.1	12	9.1	0.017	5.9	LOS A	0.1	0.5	0.20	0.54	0.20	51.9
6	R2	All MCs	8	12.5	8	12.5	0.017	6.5	LOS A	0.1	0.5	0.20	0.54	0.20	51.7
Approach			20	10.5	20	10.5	0.017	6.1	LOS A	0.1	0.5	0.20	0.54	0.20	51.8
North: Summerland Way															
7	L2	All MCs	3	33.3	3	33.3	0.042	5.9	LOS A	0.0	0.0	0.00	0.02	0.00	55.7
8	T1	All MCs	72	13.2	72	13.2	0.042	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach			75	14.1	75	14.1	0.042	0.3	NA	0.0	0.0	0.00	0.02	0.00	59.6
All Vehicles			154	12.3	154	12.3	0.042	1.1	NA	0.1	0.5	0.03	0.09	0.03	58.4

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 [OPERATIONS 2037 AM PEAK (NETWORK) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	68	21.5	68	21.5	0.040	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	3	33.3	3	33.3	0.002	6.2	LOS A	0.0	0.1	0.21	0.54	0.21	50.7
Approach			72	22.1	72	22.1	0.040	0.3	NA	0.0	0.1	0.01	0.02	0.01	59.5
East: Main Camp Road															
4	L2	All MCs	4	50.0	4	50.0	0.014	6.5	LOS A	0.1	0.5	0.27	0.54	0.27	50.1
6	R2	All MCs	9	22.2	9	22.2	0.014	6.9	LOS A	0.1	0.5	0.27	0.54	0.27	51.1
Approach			14	30.8	14	30.8	0.014	6.8	LOS A	0.1	0.5	0.27	0.54	0.27	50.8
North: Summerland Way															
7	L2	All MCs	8	25.0	8	25.0	0.052	5.8	LOS A	0.0	0.0	0.00	0.06	0.00	55.8
8	T1	All MCs	80	22.4	80	22.4	0.052	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.5
Approach			88	22.6	88	22.6	0.052	0.6	NA	0.0	0.0	0.00	0.06	0.00	59.1
All Vehicles			174	23.0	174	23.0	0.052	0.9	NA	0.1	0.5	0.02	0.08	0.02	58.5

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 [OPERATIONS 2037 PM PEAK (NETWORK) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	79	14.7	79	14.7	0.044	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	2	50.0	2	50.0	0.002	6.5	LOS A	0.0	0.1	0.22	0.53	0.22	50.0
Approach			81	15.6	81	15.6	0.044	0.2	NA	0.0	0.1	0.01	0.01	0.01	59.7
East: Main Camp Road															
4	L2	All MCs	3	33.3	3	33.3	0.012	6.3	LOS A	0.0	0.4	0.27	0.54	0.27	50.8
6	R2	All MCs	8	25.0	8	25.0	0.012	7.0	LOS A	0.0	0.4	0.27	0.54	0.27	51.0
Approach			12	27.3	12	27.3	0.012	6.8	LOS A	0.0	0.4	0.27	0.54	0.27	50.9
North: Summerland Way															
7	L2	All MCs	7	14.3	7	14.3	0.049	5.7	LOS A	0.0	0.0	0.00	0.05	0.00	56.4
8	T1	All MCs	81	11.7	81	11.7	0.049	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.5
Approach			88	11.9	88	11.9	0.049	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.3
All Vehicles			181	14.5	181	14.5	0.049	0.8	NA	0.0	0.4	0.02	0.07	0.02	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.

MOVEMENT SUMMARY

Site: 1 [DECOMMISSIONING 2057 AM PEAK (PROJECT) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	69	21.2	69	21.2	0.040	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	12	27.3	12	27.3	0.008	6.1	LOS A	0.0	0.3	0.20	0.54	0.20	51.0
Approach			81	22.1	81	22.1	0.040	0.9	NA	0.0	0.3	0.03	0.08	0.03	58.5
East: Main Camp Road															
4	L2	All MCs	4	75.0	4	75.0	0.016	6.8	LOS A	0.1	0.7	0.29	0.54	0.29	49.0
6	R2	All MCs	7	85.7	7	85.7	0.016	8.4	LOS A	0.1	0.7	0.29	0.54	0.29	48.5
Approach			12	81.8	12	81.8	0.016	7.8	LOS A	0.1	0.7	0.29	0.54	0.29	48.7
North: Summerland Way															
7	L2	All MCs	13	50.0	13	50.0	0.049	6.1	LOS A	0.0	0.0	0.00	0.09	0.00	54.7
8	T1	All MCs	72	16.2	72	16.2	0.049	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	59.5
Approach			84	21.3	84	21.3	0.049	0.9	NA	0.0	0.0	0.00	0.09	0.00	58.7
All Vehicles			177	25.6	177	25.6	0.049	1.4	NA	0.1	0.7	0.03	0.11	0.03	57.8

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.

MOVEMENT SUMMARY

Site: 1 [DECOMMISSIONING 2057 PM PEAK (PROJECT) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	100	8.4	100	8.4	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	4	25.0	4	25.0	0.003	6.3	LOS A	0.0	0.1	0.26	0.54	0.26	50.9
Approach			104	9.1	104	9.1	0.054	0.3	NA	0.0	0.1	0.01	0.02	0.01	59.5
East: Main Camp Road															
4	L2	All MCs	9	11.1	9	11.1	0.016	6.1	LOS A	0.1	0.5	0.29	0.55	0.29	51.6
6	R2	All MCs	7	14.3	7	14.3	0.016	7.3	LOS A	0.1	0.5	0.29	0.55	0.29	51.4
Approach			17	12.5	17	12.5	0.016	6.6	LOS A	0.1	0.5	0.29	0.55	0.29	51.5
North: Summerland Way															
7	L2	All MCs	4	25.0	4	25.0	0.074	5.8	LOS A	0.0	0.0	0.00	0.02	0.00	56.1
8	T1	All MCs	129	13.0	129	13.0	0.074	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach			134	13.4	134	13.4	0.074	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles			255	11.6	255	11.6	0.074	0.7	NA	0.1	0.5	0.02	0.05	0.02	59.0

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 [DECOMMISSIONING 2057 AM PEAK (NETWORK) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	124	21.2	124	21.2	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	7	42.9	7	42.9	0.006	6.8	LOS A	0.0	0.3	0.31	0.55	0.31	50.0
Approach			132	22.4	132	22.4	0.072	0.4	NA	0.0	0.3	0.02	0.03	0.02	59.3
East: Main Camp Road															
4	L2	All MCs	7	57.1	7	57.1	0.040	7.0	LOS A	0.1	1.5	0.42	0.61	0.42	48.8
6	R2	All MCs	19	55.6	19	55.6	0.040	9.5	LOS A	0.1	1.5	0.42	0.61	0.42	48.8
Approach			26	56.0	26	56.0	0.040	8.8	LOS A	0.1	1.5	0.42	0.61	0.42	48.8
North: Summerland Way															
7	L2	All MCs	18	58.8	18	58.8	0.097	6.2	LOS A	0.0	0.0	0.00	0.06	0.00	54.4
8	T1	All MCs	144	21.9	144	21.9	0.097	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	59.6
Approach			162	26.0	162	26.0	0.097	0.7	NA	0.0	0.0	0.00	0.06	0.00	59.0
All Vehicles			320	27.0	320	27.0	0.097	1.2	NA	0.1	1.5	0.04	0.10	0.04	58.1

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.

MOVEMENT SUMMARY

Site: 1 [DECOMMISSIONING 2057 PM PEAK (NETWORK) (Site Folder: Summerland - Main Camp)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Summerland Way / Main Camp Road
Existing Intersection Configuration

Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Summerland Way															
2	T1	All MCs	141	14.2	141	14.2	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	All MCs	2	50.0	2	50.0	0.002	6.8	LOS A	0.0	0.1	0.30	0.53	0.30	49.8
Approach			143	14.7	143	14.7	0.078	0.1	NA	0.0	0.1	0.00	0.01	0.00	59.8
East: Main Camp Road															
4	L2	All MCs	5	20.0	5	20.0	0.023	6.3	LOS A	0.1	0.8	0.38	0.59	0.38	50.6
6	R2	All MCs	13	33.3	13	33.3	0.023	8.5	LOS A	0.1	0.8	0.38	0.59	0.38	50.0
Approach			18	29.4	18	29.4	0.023	7.9	LOS A	0.1	0.8	0.38	0.59	0.38	50.2
North: Summerland Way															
7	L2	All MCs	9	22.2	9	22.2	0.086	5.8	LOS A	0.0	0.0	0.00	0.04	0.00	56.1
8	T1	All MCs	146	11.5	146	11.5	0.086	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.7
Approach			156	12.2	156	12.2	0.086	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.4
All Vehicles			317	14.3	317	14.3	0.086	0.7	NA	0.1	0.8	0.02	0.05	0.02	59.0

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.

Appendix C – Proposed Plan of Development

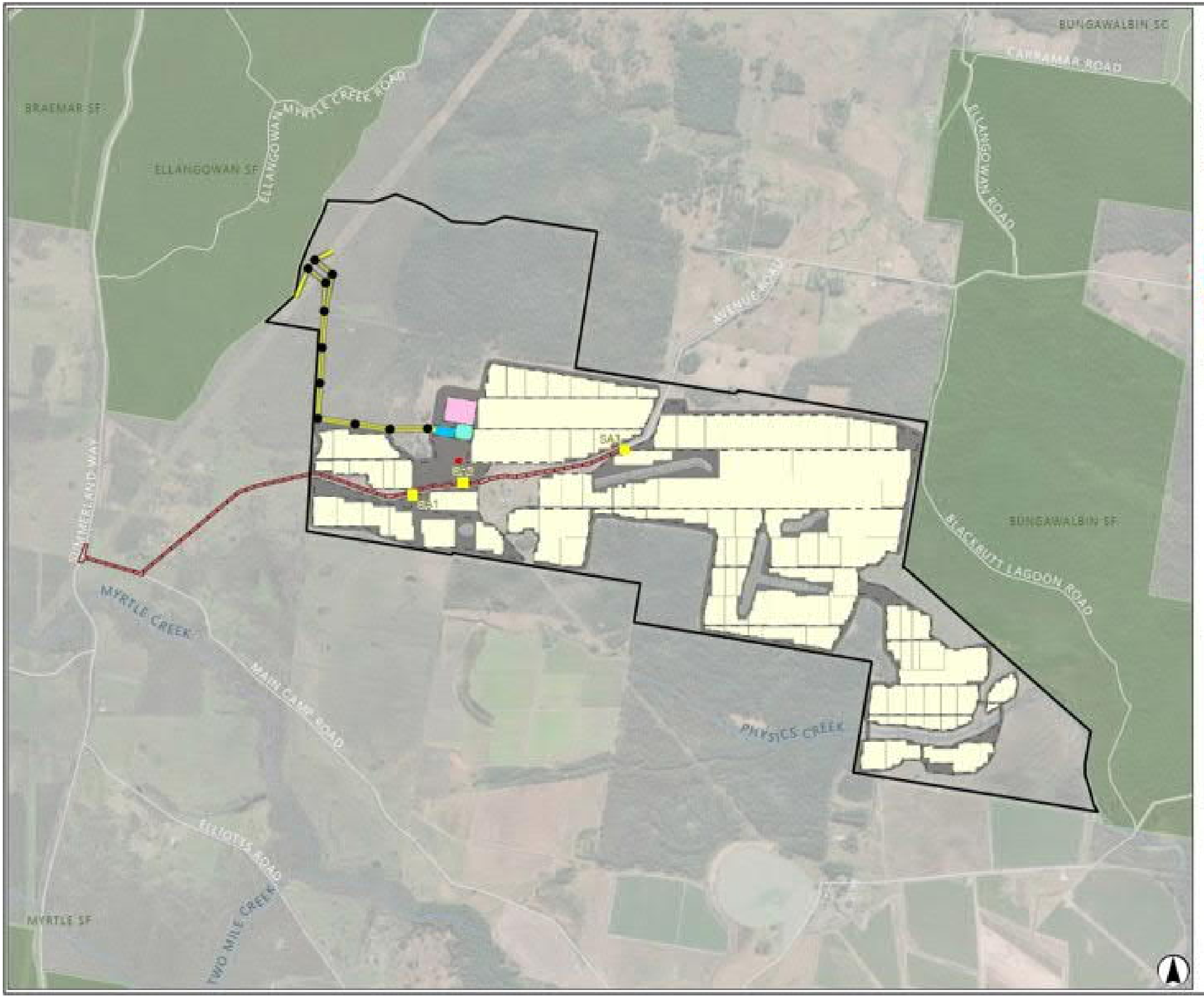

FIGURE 3.1

Project Layout

Legend

- Project Area
- Development Footprint
- Road Upgrade Area
- Transmission Poles
- Access Points
- Transmission Lines
- Access Tracks
- Substation
- Switching Subsation
- O&M Facility
- BESS
- Solar Array Blocks
- NPWS Reserve
- State Forest
- Roads
- Watercourse

0 1 2

Kilometers

Scale 1:85,000 at A4
GDA 1994 MGA Zone 56

Appendix D – OSOM Route Assessment

Richmond Valley Solar Farm

OSOM assessment

Prepared for Ark Energy

May 2024

Richmond Valley Solar Farm

OSOM assessment

Ark Energy

E240318 OSOM Assessment

May 2024

Version	Date	Prepared by	Reviewed by	Comments
V1	12 April 2024	John Mai	Abdullah Uddin	Draft
V2	3 May 2024	John Mai	Abdullah Uddin	Final

Approved by

Abdullah Uddin
Associate Traffic Engineer
3 May 2024

Ground floor 20 Chandos Street
St Leonards NSW 2065
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Figures

1 Introduction

1.1 Overview

EMM Consulting Pty Limited (EMM) has been engaged by Ark Energy to prepare a desktop Over Size Over Mass (OSOM) vehicle route assessment for the transport of transformers and substation buildings to Richmond Valley Solar Farm (the project). The project site is in the locality of Myrtle Creek, New South Wales (NSW), approximately 27 kilometres (km) south of Casino, NSW.

A total of three transformers and three switch rooms will be transported by OSOM vehicles. This means there will be a total of six OSOM movements as a part of this project. The maximum OSOM convoy length for the transport of each transformer and substation building will be 53.36 metres (m).

1.2 Limitations of this report

The primary purpose of this desktop OSOM report is to highlight the key traffic safety, efficiency, and constraint locations along the haulage route to facilitate the OSOM movements to/from the site and to identify likely mitigation measures. No site inspection of the route has been undertaken as part of this OSOM assessment to confirm the actual clearances to any affected roadside obstructions. Therefore, the report recommendations are based on satellite imagery information only. The route assessment within Queensland (Qld) has been undertaken based on Department of Transport and Main Roads (DTMR) heavy vehicle routes, by selecting the layers on their website[1]. Similarly, the route assessment within NSW has been undertaken based on Transport for New South Wales (TfNSW) approved OSOM routes, as stated on their website[2].

This OSOM assessment does not undertake any height assessment where the heights along the haulage routes are not clearly defined, such as trees and overhead cables. Furthermore, no bridge or culvert assessment has been undertaken as a part of this desktop assessment.

The traffic volumes, transformer size and switch room size have been provided by Ark Energy for this analysis. Therefore, any change of these parameters may initiate changes to the recommended mitigation measures. As such, upon approval of this project and appointment of the OSOM transportation contactor, a detailed field assessment will be undertaken. All OSOM movement approvals must be obtained from National Heavy Vehicle Regulator (NHVR) by lodging an application on NHVR[3]. NHVR will consult with the affected road authorities, such as DTMR, TfNSW and relevant councils, as part of the application approval process.

1.3 External resources

The following external resources were used undertake this desktop OSOM assessment:

- Google Maps
- Google StreetView
- MetroMap
- SIX Maps.

1 https://qldglobe.information.qld.gov.au/?topic=heavy-vehicle-routes-and-restrictions

2 https://maps.transport.nsw.gov.au/egeomaps/load-carrying-vehicles-network/

3 https://www.nhvr.gov.au/road-access/access-management/applications/oversize-overmass-permit

2 OSOM vehicle

The transport configuration for largest OSOM vehicle includes one prime mover, one 16 x 8 wheel platform trailer, followed by another prime mover.

Pilot vehicles will be required all along the route to control and manage following traffic and traffic travelling in the oncoming direction. Six OSOM vehicle return trips will be required during the construction phase, and the OSOM vehicle movements may occur outside of standard construction hours, and outside of peak hours.

2.1 OSOM vehicle with transformer

One 345 MVA and two 252 MVA transformers will be required for the project. It is assumed that the 345MVA transformer is the largest transformer. The 345 MVA transformer is expected to weigh up to 168 tonnes (t). The dimensions of the 345 MVA transformer are 8.5 m (length) x 4.0 m (width) x 4.35 m (height). While carrying the transformer, the OSOM vehicle will have a Gross Combination Mass (GCM) of up to 295 t, with a maximum load of 15.44 t per axle row on the platform trailer. When the transformer is loaded onto the OSOM vehicle, the overall OSOM vehicle will be 53.36 m long, 4.2 m wide and 5.57 m high.

Given a typical travel lane is approximately 3.5 m wide on a motorway, this OSOM vehicle will occupy more than one lane. Hence, an escort from the front and back will be required.

2.2 OSOM vehicle with switch room

Three switch rooms will be required for the project. The switch rooms are expected to weigh up to 52.1 t each. The dimensions of the substation building are 15.5 m (length) x 4.92 m (width) x 3.5 m (height). When the transformer is loaded onto the OSOM vehicle, the overall OSOM vehicle will be 53.36 m long, 4.92 m wide and 4.72 m high. While a smaller OSOM vehicle will most likely be required to transport the switch room due to the lower weight of the load, the switch room dimensions that are larger than the transformer have been considered to perform a conservative OSOM assessment.

2.3 Overall OSOM vehicle profile

For the OSOM assessment, a combination of the largest dimensions from the transformer and switch room has been used to create the load profile on the OSOM vehicle to perform a conservative OSOM assessment. The height and mass of the transformer has been used while the length and width of the switch room has been used. Therefore, the load profile on the OSOM vehicle is 15.5 m (length) x 4.92 m (width) x 4.35 m (height) with a mass of 168 t.

When the load profile is added onto the OSOM vehicle, the overall dimensions of the OSOM vehicle convoy assessed is **53.36 m long, 4.92 m wide and 5.57 m high**. This OSOM vehicle configuration has been used for all routes leading to the project site.

The expected OSOM vehicle configuration with the transformer is shown in Figure 2.1. The OSOM vehicle configuration used to conduct the swept path assessment is shown in Figure 2.2. While the OSOM vehicle configuration in Figure 2.2 reports the dimensions without the load profile, the load profile has been considered in the swept path analyses.

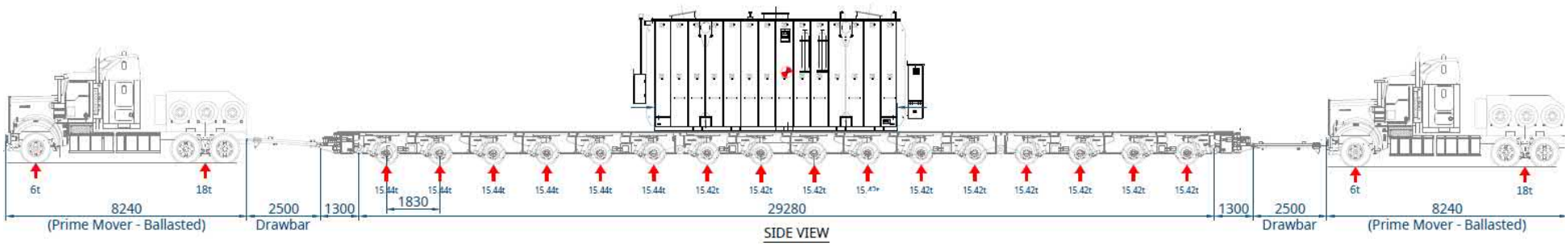


Figure 2.1 **Expected OSOM vehicle configuration with transformer**

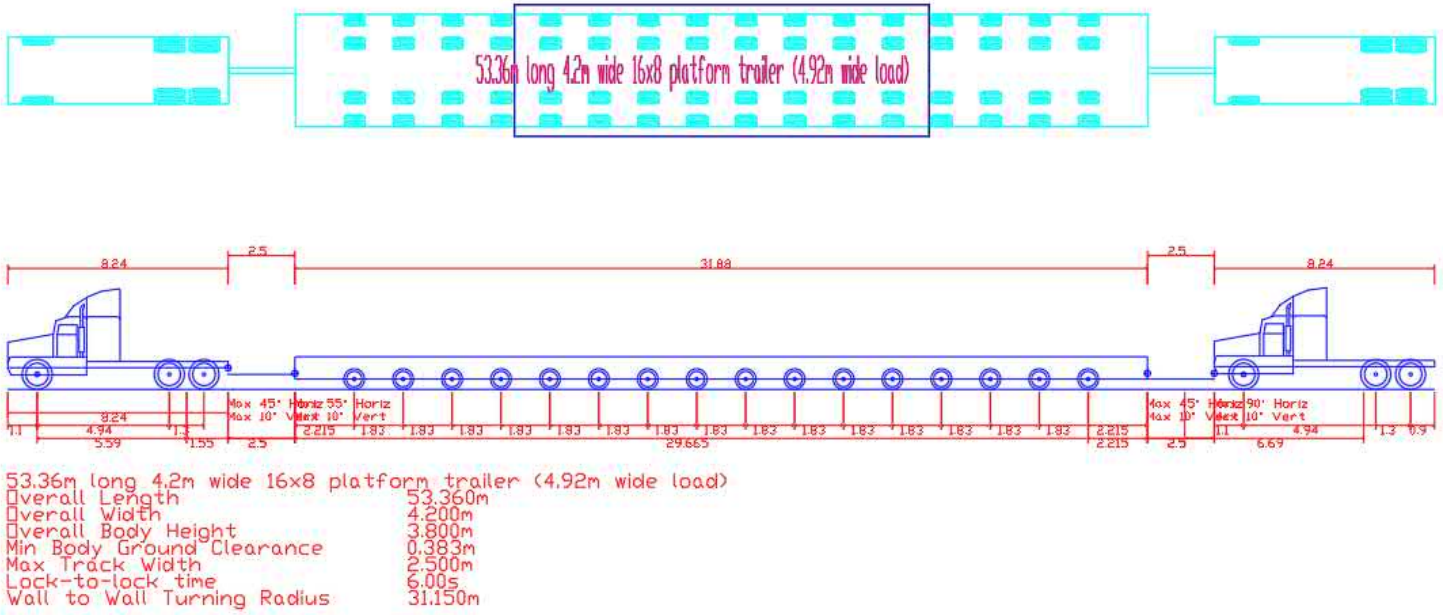


Figure 2.2 **OSOM vehicle configuration for swept path assessment**

3 OSOM route

3.1 Overview of OSOM routes

Ark Energy has advised the origin of the OSOM vehicle for transformer delivery should be assumed to come from/via Port of Brisbane, Qld, while the switch room delivery should be assumed to come from James Energies at 67 Noosa Street, Heathwood, Qld.

The NSW OSOM website[4] presents the approved routes for OSOM vehicles up to 30 m long, 5 m wide and 5 m high. The assessed routes for transformer transport[5] and switch room transport[6] are currently approved for vehicles up to 4.6 m high. Since the proposed OSOM vehicle is 5.57 m high with the transformer, the existing height clearances along the route need to be assessed at all critical locations as part of a detailed Transport Management Plan. According to vehicle manufacturer specifications, the height of the OSOM vehicle combination can be varied by up to 325 mm based on vertical clearances required.

3.2 Transformer transport

The assessed OSOM route for transformer transport from Port of Brisbane to the project site at Myrtle Creek is shown in Figure 3.1. The travel time in the figure may not be accurate for OSOM vehicles as Google generally calculates travel time for light vehicles.

The 287 km route comprises the following roads:

- Port of Brisbane near berths 1–3 to Port Drive, Port of Brisbane Motorway (M4), Gateway Motorway (M1), Pacific Motorway (M1), Tugun Currumbin Road, Gold Coast Highway, Pacific Motorway (M1), Bruxner Highway (B60), Centre Street, Summerland Way (B91), Main Camp Road, and Avenue Road before entering into the site via a new site access at 255 Avenue Road, Myrtle Creek.

The route will be used for OSOM transport for the following reasons:

- Port of Brisbane is the closest port to the site that can accept OSOM deliveries.
- The route along Pacific Motorway is generally suitable for OSOM vehicles.
- The route avoids Tugun Bypass Tunnel, which has a height limit of 4.6 m[7].
- The route within NSW generally follow approved OSOM routes.
- The route avoids arterial roads with lots of bends and unsuitable for OSOM travel, including Mount Lindesay Highway, Qld and Summerland Way, NSW near the NSW/Qld border.

The swept path assessment has been undertaken for all critical turning movements along the route to ensure manoeuvrability for the OSOM vehicle. The swept path assessment showing all critical turning movements is presented in Appendix A and the constraints at each location are listed in Table 3.1 and shown in Figure 3.2.

4 https://maps.transport.nsw.gov.au/egeomaps/load-carrying-vehicles-network/

5 https://maps.app.goo.gl/wx6vXvwohzAMJ7RX6

6 https://maps.app.goo.gl/3wbwRbVw1r7xKyTHA

7 https://www.miragenews.com/tugun-pacific-motorway-m1-revised-access-815107/

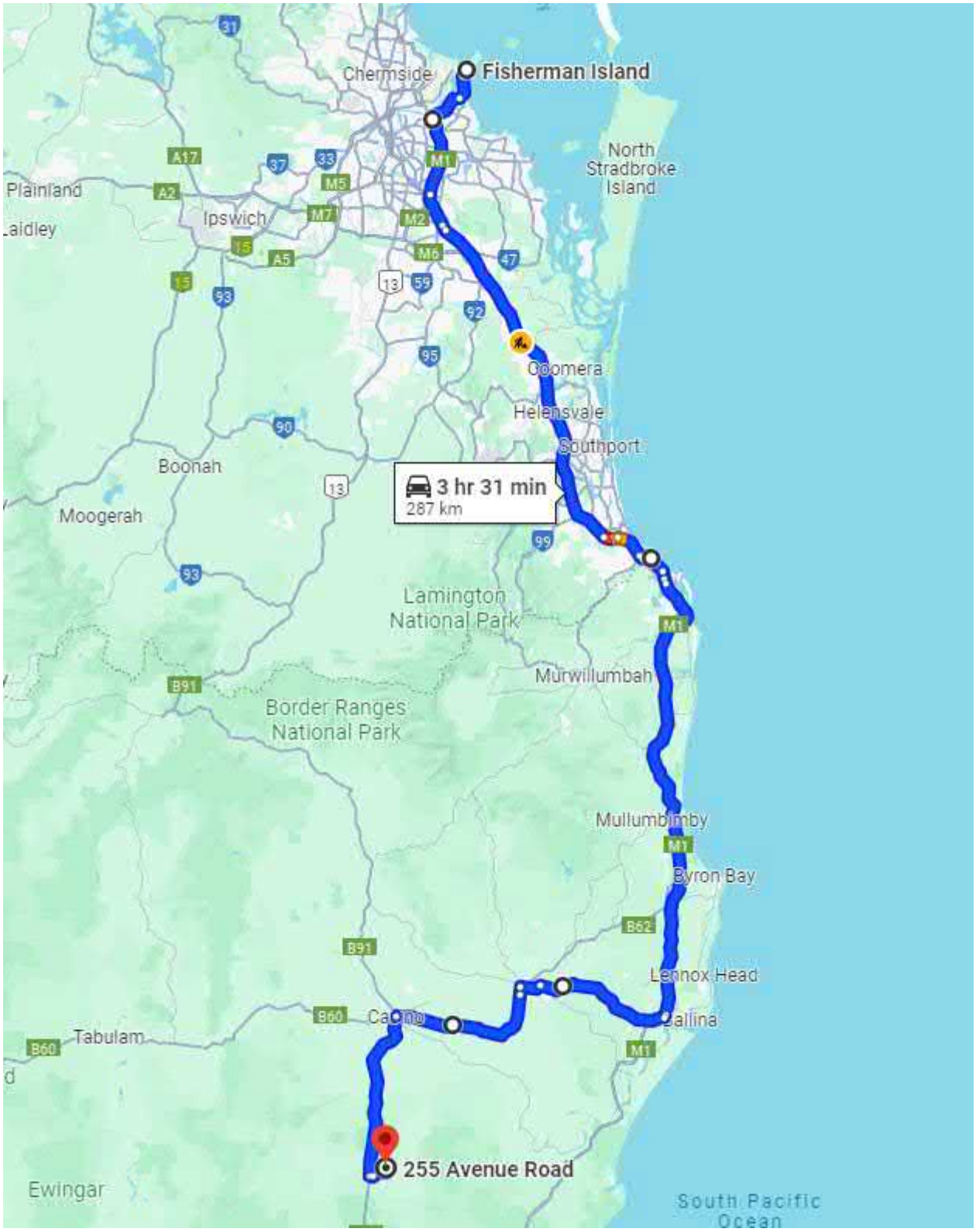
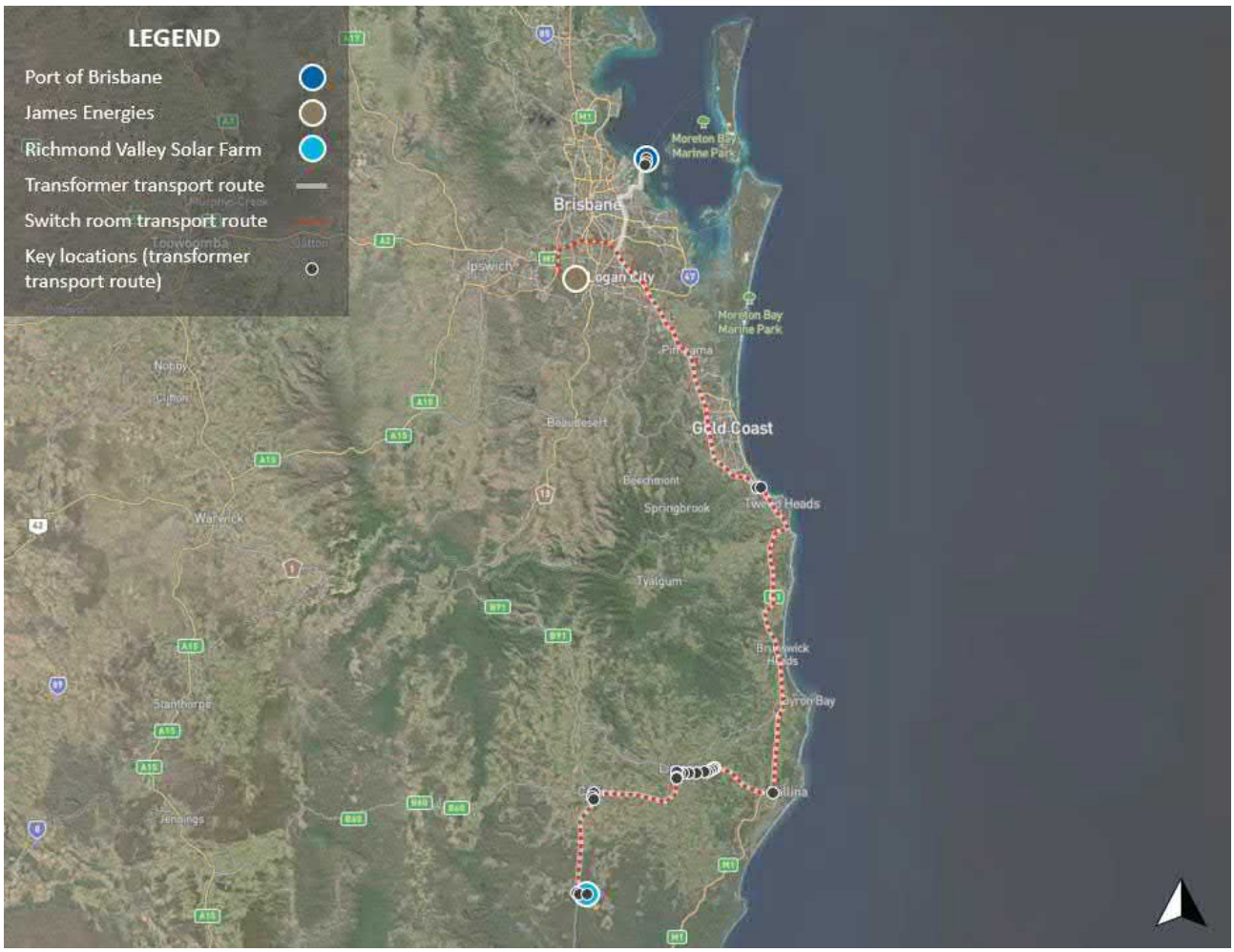


Figure 3.1 **OSOM route for transformer transport from Port of Brisbane to the site**



Source: MetroMap

Figure 3.2 Key locations on OSOM route for transformer transport

The swept path assessment for the return journey of the OSOM vehicle (Figure 2.2) from Myrtle Creek to Port of Brisbane is not required as generally the unladen OSOM vehicle can be dismantled into smaller sections to turn more easily at intersections.

Photographic and video evidence of the existing condition of infrastructure are to be taken before and after the travel over any median island, kerb or unsealed sections of road. Road authorities may require a dilapidation report before and after any specific section of road.

A colour code has been used in Table 3.1 to highlight the severity of road infrastructure impacts:

- Green: No impact
- Yellow: Minor impact, but generally no infrastructure removal or upgrades required
- Red: Major impact, infrastructure changes required

Table 3.1 Key locations on OSOM route for transformer transport

Chainage	Suburb	Location	Drawing reference	Turning occurs on correct side of the road? (Yes/No)	Road infrastructure affected?
0 km	Port of Brisbane, Qld	Port Drive roundabout near berths 1–3	EMM-001	Yes	Yes, hardstand to be provided for OSOM vehicle, various infrastructure to be temporarily removed, including concrete barriers, boom gates and signage.
450 m	Port of Brisbane, Qld	Port Drive/Seafarers Street roundabout	EMM-002	Yes	Yes, roundabout and island will need to be mounted and signage to be temporarily removed.
1.3 km	Port of Brisbane, Qld	Port Drive/Bulk Terminals Drive roundabout	EMM-003	No	Yes, roundabout and median island will need to be mounted.
105 km	Currumbin, Qld	Pacific Motorway southbound off-ramp to Tugun Currumbin Road	EMM-004	Yes	No
106 km	Tugun, Qld	Gold Coast Highway/Tugun Currumbin Road signalised intersection	EMM-005	Yes	No
196 km	West Ballina, NSW	Pacific Motorway ramps/Bruxner Highway roundabout	EMM-006	Yes	No
215 km	Goonellabah, NSW	Bruxner Highway/Ballina Road/Pineapple Road/Oliver Avenue roundabout	EMM-007	Yes	Yes, OSOM vehicle to mount roundabout on mountable section.
216 km	Goonellabah, NSW	Ballina Road/Holland Street roundabout	EMM-008	Yes	Yes, OSOM vehicle to travel over the mountable section of the roundabout.
217 km	Goonellabah, NSW	Ballina Road/Sunrise Court	EMM-009	No	No
217 km	Goonellabah, NSW	Ballina Road/Kadina Street roundabout	EMM-010	Yes	Yes, OSOM vehicle to mount the dual lane roundabout on mountable section. At the north-east of the roundabout, the OSOM vehicle will require to be lowered by up to 300 mm to clear pedestrian bridge with 5.3 m height clearance.
218 km	Goonellabah, NSW	Ballina Road/Gordon Blair Drive roundabout	EMM-011	Yes	Yes, roundabout and median strip will need to be mounted.
219 km	Goonellabah, NSW	Ballina Road/Rous Road roundabout	EMM-012	No	Yes, roundabout and median strip will need to be mounted.
221 km	Lismore, NSW	Ballina Road/Rotary Drive/Ross Street/Kellas Street roundabout	EMM-013	No	Yes, roundabout and median strip will need to be mounted.

Table 3.1 Key locations on OSOM route for transformer transport

Chainage	Suburb	Location	Drawing reference	Turning occurs on correct side of the road? (Yes/No)	Road infrastructure affected?
223 km	Lismore, NSW	Ballina Road/Conway Street/Wyrallah Road roundabout	EMM-014	Yes	Yes, OSOM vehicle to mount the roundabout on mountable section.
224 km	Lismore, NSW	Ballina Road/Dawson Street roundabout	EMM-015	Yes	Yes, OSOM vehicle to mount roundabout on mountable section
224 km	Lismore, NSW	Ballina Road/Molesworth Street roundabout	EMM-016	Yes	Yes, roundabout and median island will need to be mounted.
225 km	South Lismore, NSW	Union Street/Elliott Road roundabout	EMM-017	No	Yes, island will need to be mounted and signage to be temporarily removed.
226 km	South Lismore, NSW	Union Street/Three Chain Road roundabout	EMM-018	Yes	Yes, OSOM vehicle to mount the roundabout on mountable section
226 km	South Lismore, NSW	Union Street/Lismore Homemaker Centre Access Road roundabout	EMM-019	Yes	Yes, OSOM vehicle to mount the roundabout on mountable section
254 km	Casino, NSW	Johnston Street/Centre Street roundabout	EMM-020	No	Yes, islands will need to be mounted and signage to be temporarily removed.
255 km	Casino, NSW	Centre Street/Barker Street roundabout	EMM-021	Yes	Yes, temporary hardstand to be provided to allow OSOM vehicle to mount footpath, signage to be temporarily removed and roundabout to be mounted on mountable section.
255 km	Casino, NSW	Centre Street/Hare Street roundabout	EMM-022	Yes	Yes, temporary hardstand to be provided, signage to be temporarily removed, median strip to be mounted and roundabout to be mounted on mountable section.
284 km	Myrtle Creek, NSW	Summerland Way/Main Camp Road	EMM-023	No	Yes, additional temporary hardstand to be provided for OSOM vehicle, and three mailboxes to be relocated
285 km	Myrtle Creek, NSW	Main Camp Road/Avenue Road	EMM-024	No	Yes, additional temporary hardstand to be provided for OSOM vehicle
287 km	Myrtle Creek, NSW	Avenue Road/Site Access to 255 Avenue Road	EMM-025	No	Yes, additional temporary hardstand to be provided for OSOM vehicle

A general summary of the route is as follows:

- General longitudinal slope: suitable for OSOM vehicle access, generally flat with no steep gradients.
- Bends: no sharp bends, all bends are suitable for OSOM vehicle access.
- Overhead structures: there are several overhead structures which will need to be checked for height clearance during field observations as part of the detailed Transport Management Plan. A summary of some of these overhead structures are provided in Section 3.6.
- Escort: the entire route including all key locations identified in Table 3.1 will require escort vehicles starting from Port Drive at Port of Brisbane.
- Removal of infrastructure – the following roads and intersections will require temporary removal of road infrastructure, such as signage:
    - Port Drive roundabout near berths 1–3, Port of Brisbane, Qld
    - Port Drive/Seafarers Street roundabout, Port of Brisbane, Qld
    - Union Street/Elliott Road roundabout, South Lismore, NSW
    - Johnston Street/Centre Street roundabout, Casino, NSW
    - Centre Street/Barker Street roundabout, Casino, NSW
    - Centre Street/Hare Street roundabout, Casino, NSW
- Intersection upgrades – the following roads and intersections will require the addition of hardstands to accommodate the OSOM vehicle:
    - Port Drive roundabout near berths 1–3, Port of Brisbane, Qld
    - Centre Street/Barker Street roundabout, Casino, NSW
    - Centre Street/Hare Street roundabout, Casino, NSW
    - Summerland Way/Main Camp Road, Myrtle Creek, NSW
    - Main Camp Road/Avenue Road, Myrtle Creek, NSW
    - Avenue Road/Site Access to 255 Avenue Road, Myrtle Creek, NSW
- Removal of parking: no locations have been identified that will require the removal of parking.
- Bridges with load limits: no bridges with significant load limits have been identified along the route.
- Overall, the route is suitable for OSOM vehicle access according to the conditions imposed by NHVR, DTMR and TfNSW. The OSOM vehicle is not permitted to travel on Bruxner Highway between Wollongbar and South Lismore from Monday to Saturday from 7:30 am to 9:30 am and from Monday to Friday from 3:00 pm to 6:00 pm. These conditions are correct at the time of the writing of this report and may be subject to change. Hence, the transport contractor should consult with NHVR before finalising the route.

3.3 Switch room transport

The assessed OSOM route for switch room transport from James Energies to the project site at Myrtle Creek is shown in Figure 3.3. The travel time in the figure may not be accurate for OSOM vehicles as Google generally calculates travel time for light vehicles.

The 289 km route comprises the following roads:

- 67 Noosa Street to Noosa Street, Stradbroke Street, Logan Motorway (M2), Centenary Highway (M5), Ipswich Motorway (M7), Granard Road, Riawena Road, Kessels Road, Logan Road, Pacific Motorway (M3 and M1), Tugun Currumbin Road, Gold Coast Highway, Pacific Motorway (M1), Bruxner Highway (B60), Centre Street, Summerland Way (B91), Main Camp Road, and Avenue Road before entering into the site via a new site access at 255 Avenue Road, Myrtle Creek.

The route will be used for OSOM transport for the following reasons:

- The route avoids a right turn from Stapylton Road to Logan Motorway eastbound on-ramp, and therefore avoids associated infrastructure upgrades required to make the turn.
- The route along Pacific Motorway is generally suitable for OSOM vehicles.
- The route avoids Tugun Bypass Tunnel, which has a height limit of 4.6 m.
- The route within NSW generally follow approved OSOM routes.
- The route avoids arterial roads with lots of bends and unsuitable for OSOM travel, including Mount Lindesay Highway, Qld and Summerland Way, NSW near the NSW/Qld border.

The swept path assessment has been undertaken for all critical turning movements along the route to ensure manoeuvrability for the OSOM vehicle. The swept path assessment showing all critical turning movements is presented in Appendix A and the constraints at each location are listed in Table 3.2 and shown in Figure 3.4.

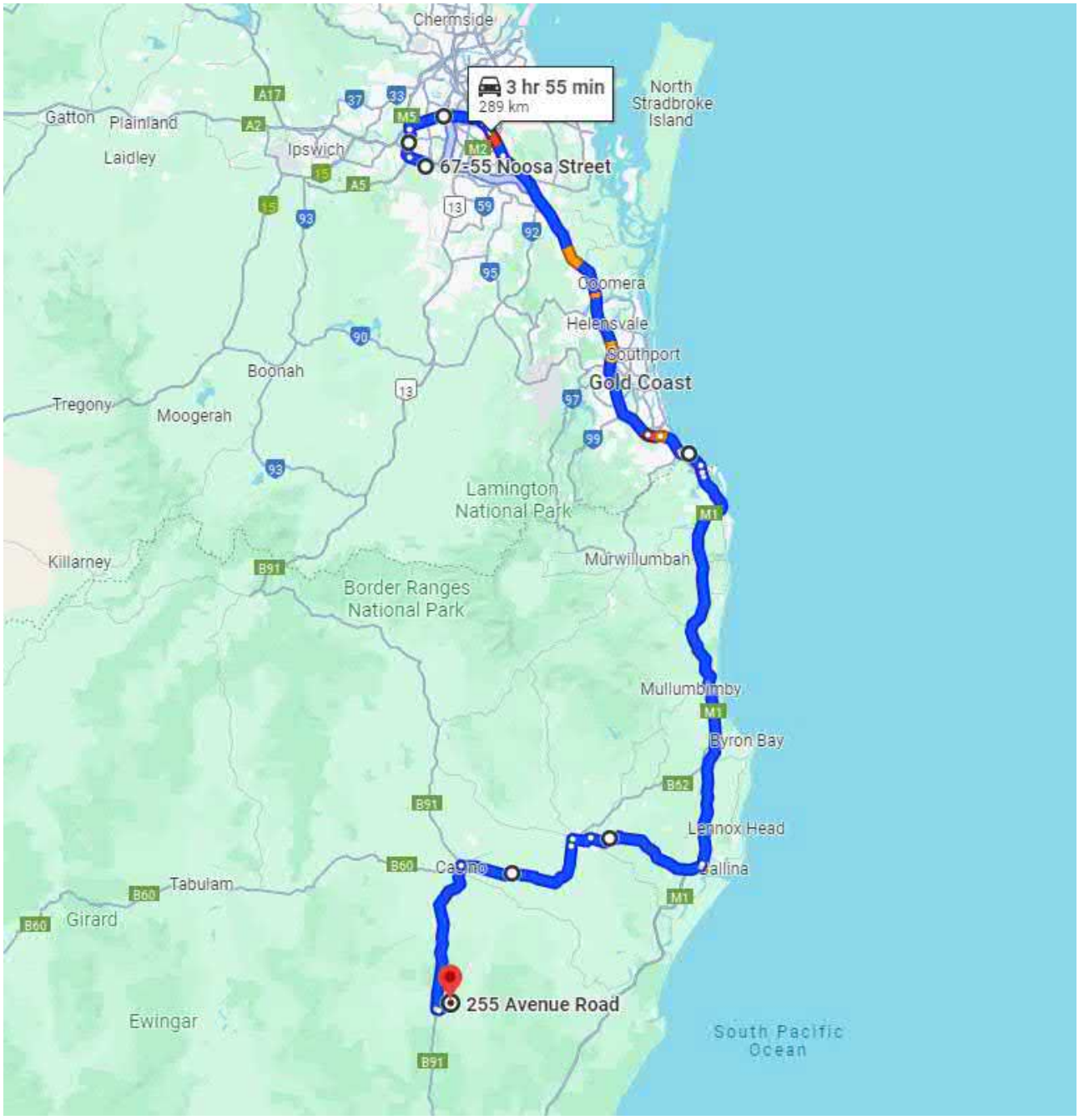
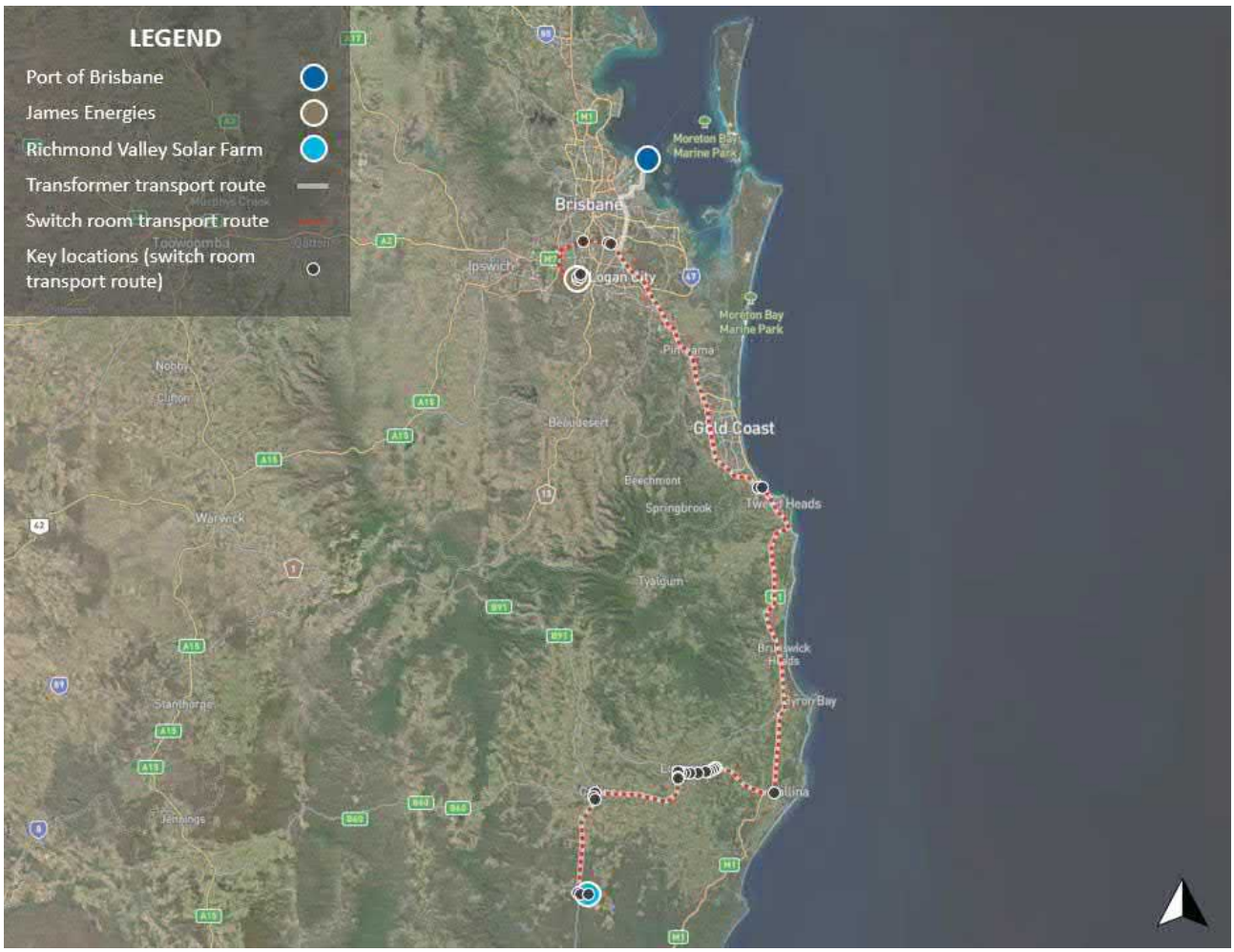


Figure 3.3 OSOM route for switch room transport from James Energies to the site



Source: MetroMap

Figure 3.4 Key locations on OSOM route for switch room transport

The swept path assessment for the return journey of the OSOM vehicle (Figure 2.2) from Myrtle Creek to James Energies is not required as generally the unladen OSOM vehicle can be dismantled into smaller sections to turn more easily at intersections.

Photographic and video evidence of the existing condition of infrastructure are to be taken before and after the travel over any median island, kerb or unsealed sections of road. Road authorities may require a dilapidation report before and after any specific section of road.

A colour code has been used in Table 3.2 to highlight the severity of road infrastructure impacts:

- Green: No impact
- Yellow: Minor impact, but generally no infrastructure removal or upgrades required
- Red: Major impact, infrastructure changes required

Table 3.2 Key locations on OSOM route for switch room transport

Chainage	Suburb	Location	Drawing reference	Turning occurs on correct side of the road? (Yes/No)	Road infrastructure affected?
0 km	Heathwood, Qld	67 Noosa Street	EMM-101	Yes	No
300 m	Heathwood, Qld	Stradbroke Street/Noosa Street	EMM-102	No	Yes, parking spaces to be temporarily removed to facilitate OSOM movement, subject to consultation with Brisbane City Council
450 m	Heathwood, Qld	62 Stradbroke Street	EMM-103	No	Yes, parking spaces to be temporarily removed to facilitate OSOM movement, subject to consultation with Brisbane City Council
700 m	Heathwood, Qld	Stradbroke Street/Logan Motorway Westbound On-ramp roundabout	EMM-104	No	Yes, signage to be temporarily removed, islands to be mounted and parking spaces to be temporarily removed to facilitate OSOM movement, subject to consultation with Brisbane City Council
18 km	Rocklea, Qld	Ipswich Motorway/Granard Road signalised intersection	EMM-105	Yes	No
25 km	Upper Mount Gravatt, Qld	Logan Road/Kessels Road/Mount Gravatt Capalaba Road signalised intersection	EMM-106	Yes	No
27 km	Eight Mile Plains, Qld	Logan Road/Pacific Motorway Southbound On-ramp	EMM-107	Yes	No
107 km	Currumbin, Qld	Pacific Motorway southbound off-ramp to Tugun Currumbin Road	EMM-004	Yes	No
108 km	Tugun, Qld	Gold Coast Highway/Tugun Currumbin Road signalised intersection	EMM-005	Yes	No
198 km	West Ballina, NSW	Pacific Motorway ramps/Bruxner Highway roundabout	EMM-006	Yes	No
217 km	Goonellabah, NSW	Bruxner Highway/Ballina Road/Pineapple Road/Oliver Avenue roundabout	EMM-007	Yes	Yes, OSOM vehicle to mount roundabout on mountable section.

Table 3.2 Key locations on OSOM route for switch room transport

Chainage	Suburb	Location	Drawing reference	Turning occurs on correct side of the road? (Yes/No)	Road infrastructure affected?
218 km	Goonellabah, NSW	Ballina Road/Holland Street roundabout	EMM-008	Yes	Yes, OSOM vehicle to mount roundabout on mountable section.
219 km	Goonellabah, NSW	Ballina Road/Sunrise Court	EMM-009	No	No
219 km	Goonellabah, NSW	Ballina Road/Kadina Street roundabout	EMM-010	Yes	Yes, OSOM vehicle to mount roundabout on mountable section.
220 km	Goonellabah, NSW	Ballina Road/Gordon Blair Drive roundabout	EMM-011	Yes	Yes, roundabout and median strip will need to be mounted.
221 km	Goonellabah, NSW	Ballina Road/Rous Road roundabout	EMM-012	No	Yes, roundabout and median strip will need to be mounted.
223 km	Lismore, NSW	Ballina Road/Rotary Drive/Ross Street/Kellas Street roundabout	EMM-013	No	Yes, roundabout and median strip will need to be mounted.
225 km	Lismore, NSW	Ballina Road/Conway Street/Wyrallah Road roundabout	EMM-014	Yes	Yes, OSOM vehicle to mount roundabout on mountable section.
226 km	Lismore, NSW	Ballina Road/Dawson Street roundabout	EMM-015	Yes	Yes, OSOM vehicle to mount roundabout on mountable section
226 km	Lismore, NSW	Ballina Road/Molesworth Street roundabout	EMM-016	Yes	Yes, roundabout and median island will need to be mounted.
227 km	South Lismore, NSW	Union Street/Elliott Road roundabout	EMM-017	No	Yes, island will need to be mounted and signage to be temporarily removed.
228 km	South Lismore, NSW	Union Street/Three Chain Road roundabout	EMM-018	Yes	Yes, OSOM vehicle to mount roundabout on mountable section
228 km	South Lismore, NSW	Union Street/Lismore Homemaker Centre Access Road roundabout	EMM-019	Yes	Yes, OSOM vehicle to mount roundabout on mountable section
256 km	Casino, NSW	Johnston Street/Centre Street roundabout	EMM-020	No	Yes, islands will need to be mounted and signage to be temporarily removed.
257 km	Casino, NSW	Centre Street/Barker Street roundabout	EMM-021	Yes	Yes, temporary hardstand to be provided to allow OSOM vehicle to mount footpath, signage to be temporarily removed and roundabout to be mounted on mountable section.
257 km	Casino, NSW	Centre Street/Hare Street roundabout	EMM-022	Yes	Yes, temporary hardstand to be provided, signage to be temporarily removed, median strip to be mounted and roundabout to be mounted on mountable section.

Table 3.2 Key locations on OSOM route for switch room transport

Chainage	Suburb	Location	Drawing reference	Turning occurs on correct side of the road? (Yes/No)	Road infrastructure affected?
286 km	Myrtle Creek, NSW	Summerland Way/Main Camp Road	EMM-023	No	Yes, additional temporary hardstand to be provided for OSOM vehicle, and three mailboxes to be relocated
287 km	Myrtle Creek, NSW	Main Camp Road/Avenue Road	EMM-024	No	Yes, additional temporary hardstand to be provided for OSOM vehicle
289 km	Myrtle Creek, NSW	Avenue Road/Site Access to 255 Avenue Road	EMM-025	No	Yes, additional temporary hardstand to be provided for OSOM vehicle

A general summary of the route is as follows:

- General longitudinal slope: suitable for OSOM vehicle access, generally flat with no steep gradients.
- Bends: no sharp bends, all bends are suitable for OSOM vehicle access.
- Overhead structures: there are several overhead structures which will need to be checked for height clearance during field observations as part of the detailed Transport Management Plan. A summary of some of these overhead structures are provided in Section 3.6.
- Escort: the entire route including all key locations identified in Table 3.2 will require escort vehicles starting from 67 Noosa Street, Heathwood.
- Removal of infrastructure – the following roads and intersections will require temporary removal of road infrastructure, such as signage:
  - Stradbroke Street/Logan Motorway Westbound On-ramp roundabout, Heathwood, Qld
  - Union Street/Elliott Road roundabout, South Lismore, NSW
  - Johnston Street/Centre Street roundabout, Casino, NSW
  - Centre Street/Barker Street roundabout, Casino, NSW
  - Centre Street/Hare Street roundabout, Casino, NSW.
- Intersection upgrades – the following roads and intersections will require the addition of hardstands to accommodate the OSOM vehicle:
  - Centre Street/Barker Street roundabout, Casino, NSW
  - Centre Street/Hare Street roundabout, Casino, NSW
  - Summerland Way/Main Camp Road, Myrtle Creek, NSW

- Main Camp Road/Avenue Road, Myrtle Creek, NSW
- Avenue Road/Site Access to 255 Avenue Road, Myrtle Creek, NSW.

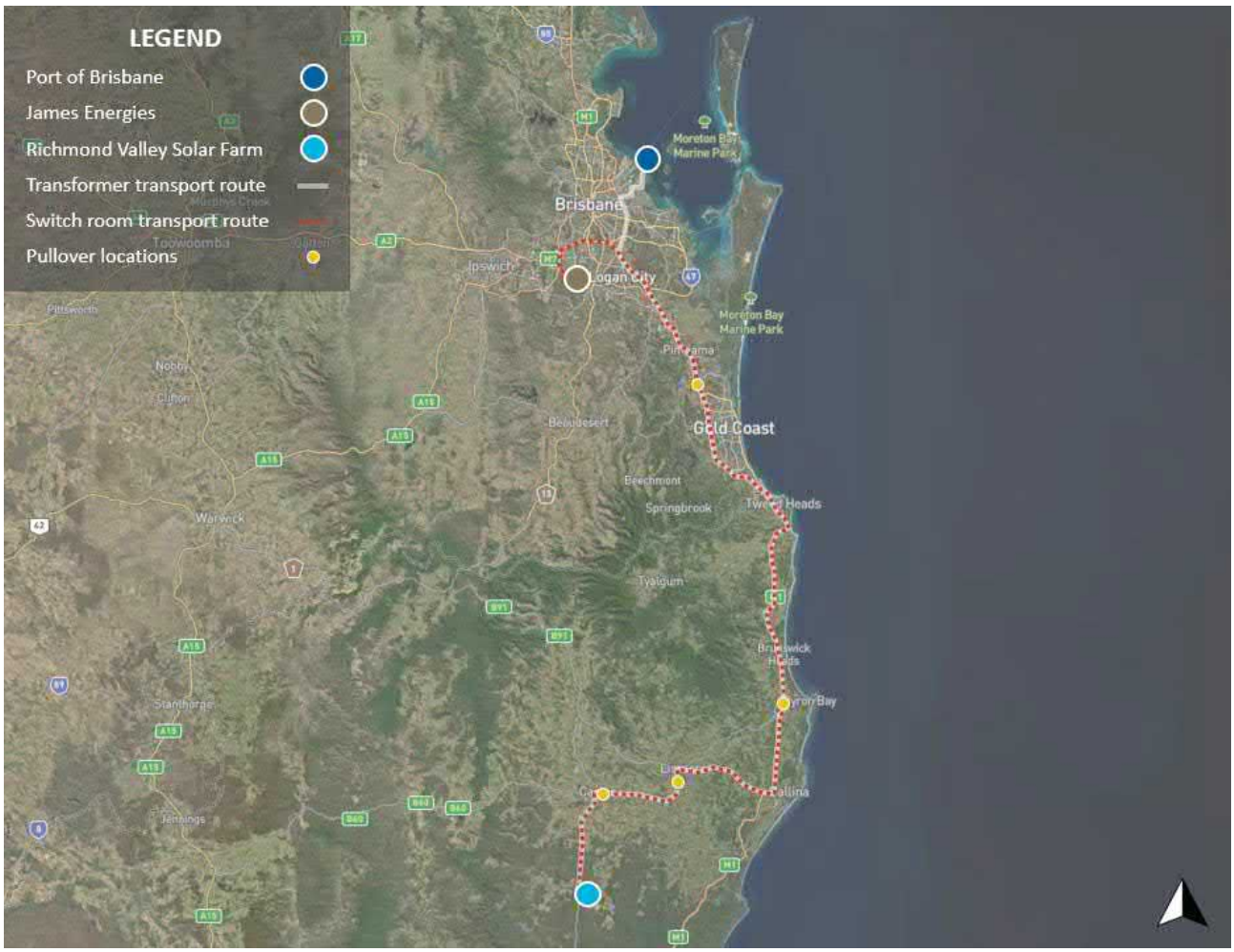
- Removal of parking: the following locations will require the temporary removal of parking, subject to consultation with relevant councils in the respective areas:
  - Stradbroke Street/Noosa Street, Heathwood, Qld
  - Stradbroke Street bend at 62 Stradbroke Street, Heathwood, Qld
  - Stradbroke Street/Logan Motorway Westbound On-ramp roundabout, Heathwood, Qld.
- Bridges with load limits: no bridges with significant load limits have been identified along the route.
- Overall, the route is suitable for OSOM vehicle access according to the conditions imposed by NHVR, DTMR and TfNSW. The OSOM vehicle is not permitted to travel on Bruxner Highway between Wollongbar and South Lismore from Monday to Saturday from 7:30 am to 9:30 am and from Monday to Friday from 3:00 pm to 6:00 pm. These conditions are correct at the time of the writing of this report and may be subject to change. Hence, the transport contractor should consult with NHVR before finalising the route.

3.4 Pullover locations

Some potential pullover locations have been identified for the OSOM vehicles along the haulage route from either Port of Brisbane or James Energies to the site, as shown in Figure 3.5 and Table 3.3 below.

Table 3.3 Suggested pullover locations

Chainage	Location	Description	Length of pullover location	Width of pullover location
69 km	Pacific Motorway, Helensvale, Qld	Roadside pullover bay on the same side of the road in the direction of travel	500 m	6.5 m
171 km	Pacific Motorway north of St Helena Tunnel, Ewingsdale, NSW	Roadside pullover bay on the same side of the road in the direction of travel	70 m	6.5 m
228 km	Bruxner Highway, Loftville, NSW	Parking area on the opposite side of the road in the direction of travel. Potentially only suitable for the OSOM vehicle carrying the switch room due to the unsealed surface of the parking area.	90 m	9 m
252 km	Johnston Street (Bruxner Highway), Casino, NSW	Roadside parking, next to United service station. Potentially only suitable for the OSOM vehicle carrying the transformer due to the width of the roadside parking.	80 m	4.2 m



Source: MetroMap

Figure 3.5 Suggested pullover locations on haulage routes

Given the distance of 287 km for the transformer OSOM route and 289 km for the switch room OSOM route, a minimum of one pullover location would be sufficient for the entire OSOM journey.

3.5 Railway level crossings

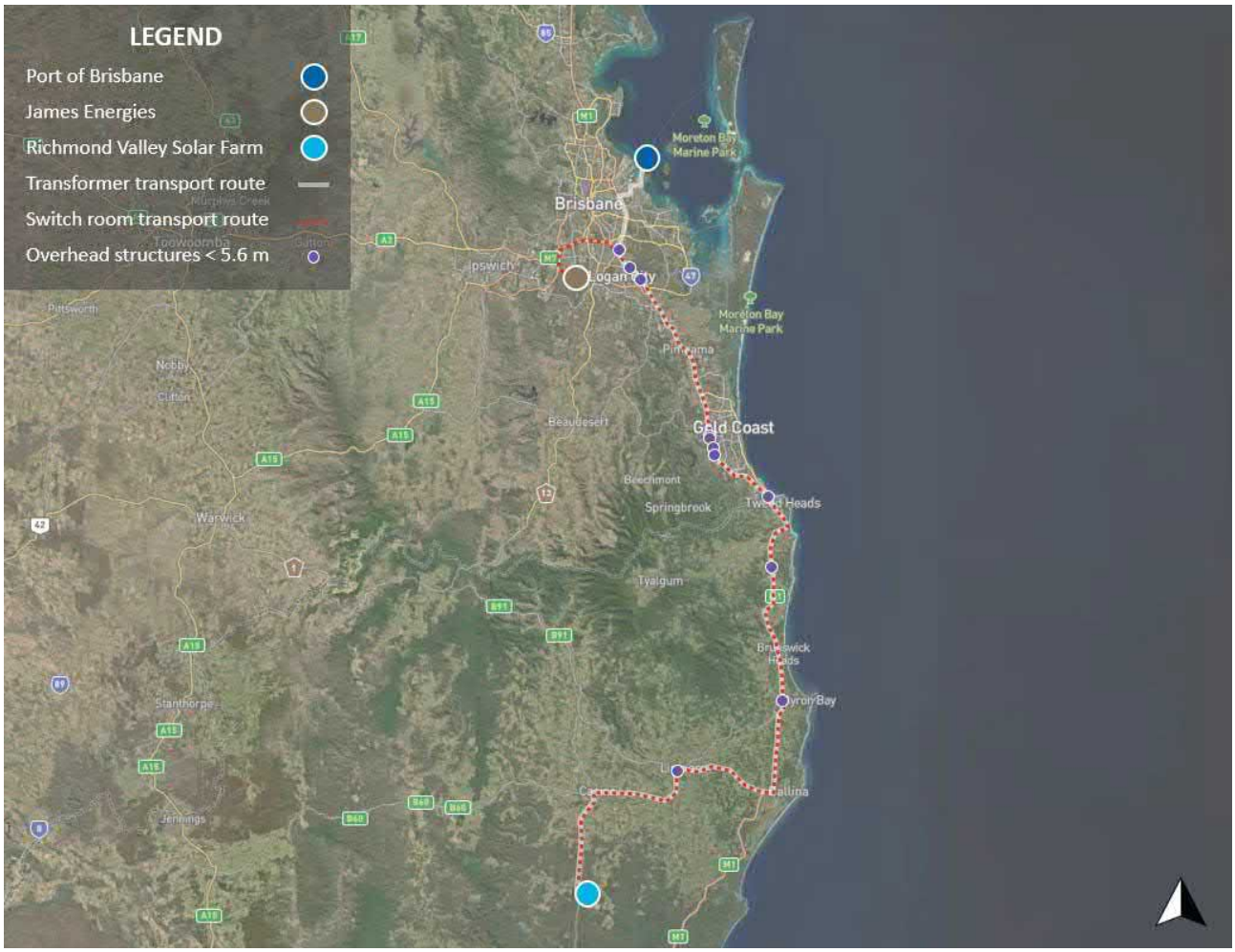
No railway level crossings have been identified along the OSOM haulage route from Port of Brisbane or James Energies to the site.

3.6 Height clearances

Structures that impose height restrictions on vehicles passing underneath have been identified based on a desktop analysis of the OSOM haulage route from Port of Brisbane or James Energies to the site, as shown in Table 3.4. The known critical overhead structures with height clearances under 5.6 m along the transformer haulage route from Port of Brisbane to the site are also shown in Figure 3.6.

While the OSOM vehicle carrying the transformer will have a height of 5.57 m when operating in the standard configuration, the vehicle can be lowered by up to 325 mm if the vehicle needs to pass under structures with lower height clearances.

Furthermore, other overhead or roadside obstructions have not been identified, such as tree branches and electricity transmission infrastructure. A further height clearance assessment will need to be undertaken for these obstructions via a live test as part of a detailed Transport Management Plan.



Source: MetroMap

Figure 3.6 Structures on transformer haulage route with height restrictions under 5.6 m

Table 3.4 Structures on haulage routes with height restrictions

Location	Description	Height clearance	OSOM vehicle height adjustment or vertical clearance check required?
Switch room haulage route			
Woogaroo Street overbridge, Logan Motorway, Forest Lake, Qld	Road bridge over motorway	5.7 m	No
Logan Motorway/Centenary Highway interchange, Forest Lake, Qld	Motorway interchange	5.9 m	No
Progress Road overbridge, Centenary Highway, Richlands, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel

Table 3.4 Structures on haulage routes with height restrictions

Location	Description	Height clearance	OSOM vehicle height adjustment or vertical clearance check required?
Garden Road overbridge, Centenary Highway, Richlands, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Boundary Road overbridge, Centenary Highway, Darra, Qld	Road bridge over motorway	6.3 m	No
Ipswich Motorway/Centenary Highway interchange, Darra, Qld	Motorway interchange	6.1 m	No
Harcourt Road overbridge, Ipswich Motorway, Darra, Qld	Road bridge over motorway	5.6 m	No
Blunder Road overbridge roundabout, Ipswich Motorway, Oxley, Qld	Roundabout bridges over motorway	5.7 m	No
Donaldson Road overbridge, Ipswich Motorway, Rocklea, Qld	Road bridge over motorway	6.1 m	No
Ipswich Motorway/Granard Road, Rocklea, Qld	Motorway bridge over haulage route	Unknown	Height clearance is to be checked prior to OSOM travel
Kessels Road underpass, Macgregor, Qld	Road bridge over haulage route	Unknown	Height clearance is to be checked prior to OSOM travel
South East Busway overbridge, Logan Road, Upper Mount Gravatt, Qld	Motorway bridge over haulage route	Unknown	Height clearance is to be checked prior to OSOM travel
Miles Platting Road overbridge, Pacific Motorway, Eight Mile Plains, Qld	Road bridge over motorway	5.1 m	No, location will only be passed during switch room transport, and OSOM vehicle carrying switch room is not anticipated to be greater than 4.72 m high
Pacific Motorway/Gateway Motorway interchange	Motorway interchange	Unknown	Height clearance is to be checked prior to OSOM travel
Transformer haulage route			
Overpass at Port Drive/Seafarers Street, Port of Brisbane, Qld	Road bridge over haulage route	7.5 m	No
Bulk materials bridge over Port Drive near Bulk Terminals Drive, Port of Brisbane, Qld	Structure carrying bulk materials over haulage route	9.8 m	No
Lucinda Drive overbridge, Port Drive, Port of Brisbane, Qld	Road bridge over haulage route	6.8 m	No
Pritchard Street overbridge, Port of Brisbane Motorway, Lytton, Qld	Road bridge over motorway	7.7 m	No
Lindum Road overbridge, Port of Brisbane Motorway, Hemmant, Qld	Road bridge over motorway	6.2 m	No
Link Road overbridge, Port of Brisbane Motorway, Murarrie, Qld	Road bridge over motorway	6.1 m	No

Table 3.4 Structures on haulage routes with height restrictions

Location	Description	Height clearance	OSOM vehicle height adjustment or vertical clearance check required?
Gateway Motorway near Wynnum Road, Tingalpa, Qld	Typical electronic speed limit sign gantry	6.1 m[8]	No, all sign gantries on Gateway Motorway are expected to have a minimum clearance of 6.1 m.
Meadowlands Road overbridge, Gateway Motorway, Belmont, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Miles Platting Road overbridge, Gateway Motorway, Eight Miles Plains, Qld	Road bridge over motorway	5.9 m	No
Gateway Motorway on-ramp overpass, Pacific Motorway slip road, Rochedale, Qld	Road bridge over motorway slip road	5.3 m	Yes, vehicle to be lowered by up to 300 mm before passing through underpass
Both transformer and switch room haulage routes			
Underwood Road overbridge, Pacific Motorway, Rochedale, Qld	Road bridge over motorway	6.0 m	No
Watland Street overbridge, Pacific Motorway, Springwood, Qld	Road bridge over motorway	5.5 m	Yes, vehicle to be lowered by up to 100 mm before passing through underpass
Loganlea Road overbridge, Pacific Motorway, Daisy Hill, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Mandew Street overbridge, Pacific Motorway, Slacks Creek, Qld	Road bridge over motorway	5.4 m	Yes, vehicle to be lowered by up to 200 mm before passing through underpass
Grandis Street overbridge, Pacific Motorway, Shailer Park, Qld	Road bridge over motorway	5.9 m	No
Logan Motorway/Pacific Motorway interchange, Loganholme, Qld	Motorway interchange	Unknown	Height clearance is to be checked prior to OSOM travel
Fryar Road overbridge, Pacific Motorway, Beenleigh, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Distillery Road roundabout, Pacific Motorway, Beenleigh, Qld	Roundabout structure over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Computer Road overbridge, Pacific Motorway, Ormeau, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Peachey Road overbridge, Pacific Motorway, Ormeau, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Mirambeena Drive overbridge, Pacific Motorway, Pimpama, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Yawalpah Road overbridge, Pacific Motorway, Pimpama, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Coomera Overpass, Pacific Motorway, Upper Coomera, Qld	Road bridge over motorway	Unknown	Height clearance to be checked prior to OSOM travel

[8] https://eisdocs.dsdip.qld.gov.au/Gateway%20Upgrade/EIS/Volume%201%20-%20EIS/3-project-description.pdf

Table 3.4 Structures on haulage routes with height restrictions

Location	Description	Height clearance	OSOM vehicle height adjustment or vertical clearance check required?
Hope Island Road overbridge, Pacific Motorway, Helensvale, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Pacific Motorway near Leo Graham Way, Helensvale, Qld	Pedestrian overpass	Unknown	Height clearance is to be checked prior to OSOM travel
Pacific Motorway near Goldwyn Way, Oxenford, Qld	Pedestrian overpass	Unknown	Height clearance is to be checked prior to OSOM travel
Gold Coast Highway overbridge, Pacific Motorway, Helensvale, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Smith Street overbridge, Pacific Motorway, Arundel, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Smith Street Motorway overbridge, Pacific Motorway, Gaven, Qld	Motorway interchange	Unknown	Height clearance is to be checked prior to OSOM travel
Nerang Broadbeach Road overbridge, Pacific Motorway, Nerang, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Grenfell Street overbridge, Pacific Motorway, Nerang, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Nielsens Road Overpass, Pacific Motorway, Carrara, Qld	Road bridge over motorway	5.5 m	Yes, vehicle to be lowered by up to 100 mm before passing through underpass
Elysium Road Overpass, Pacific Motorway, Carrara, Qld	Road bridge over motorway	5.5 m	Yes, vehicle to be lowered by up to 100 mm before passing through underpass
Gooding Drive overbridge, Pacific Motorway, Mudgeeraba, Qld	Road bridge over motorway	5.5 m	Yes, vehicle to be lowered by up to 100 mm before passing through underpass
Mudgeeraba Road overbridge, Pacific Motorway, Robina, Qld	Road bridge over motorway	5.3 m	Yes, vehicle to be lowered by up to 300 mm before passing through underpass
Robina Parkway overbridge, Pacific Motorway, Mudgeeraba, Qld	Road bridge over motorway	Unknown	Height clearance to be checked prior to OSOM travel
Stapley Drive overbridge, Pacific Motorway, Varsity Lakes, Qld	Road bridge over motorway	6.5 m	No
Oyster Creek Drive overbridge, Burleigh Heads, Qld	Road bridge over motorway	6.1 m	No
Nineteenth Avenue overbridge, Elanora, Qld	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Musgrave Street on-ramp, Gold Coast Highway, Bilinga, Qld	Road bridge over highway	5.4 m	Yes, vehicle to be lowered by up to 200 mm before passing through the underpass
Laura Street overbridge, Pacific Motorway, Banora Point, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Tweed Valley Way overbridge, Pacific Motorway, Chinderah, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel

Table 3.4 Structures on haulage routes with height restrictions

Location	Description	Height clearance	OSOM vehicle height adjustment or vertical clearance check required?
Cudgen Road tunnel, Pacific Motorway, Stotts Creek, NSW	Motorway tunnel under local road	Unknown	Height clearance is to be checked prior to OSOM travel
Eviron Road overbridge, Pacific Motorway, Duranbah, NSW	Arch road bridge over motorway	Unknown	No, height clearance appears to be sufficient
Clothiers Creek Road overbridge, Pacific Motorway, Clothiers Creek, NSW	Road bridge over motorway	5.1 m	Yes, OSOM vehicle to be lowered by the maximum 325 mm before passing through underpass. Alternatively, transport contractor to select OSOM vehicle that allows a lower height configuration. Actual height clearance is to be checked in a live test prior to OSOM travel and documented as part of a detailed Transport Management Plan. The actual height clearance is likely be higher than the signposted clearance of 5.1 m, which needs to be checked with the road authorities. If the height clearance is an issue, an alternative route can be undertaken. The transport contractor will be required to review the alternative route to determine its suitability, if necessary.
Round Mountain Road overbridge, Pacific Motorway, Round Mountain, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Kanes Road overbridge, Pacific Motorway, Cudgera Creek, NSW	Road bridge over motorway	Unknown	No, height clearance appears to be sufficient
Cudgera Creek Road overbridge, Pacific Motorway, Cudgera Creek, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Pottsville Mooball Road overbridge, Pacific Motorway, Sleep Hollow, NSW	Arch road bridge over motorway	Unknown	No, height clearance appears to be sufficient
Cowell Park Road overbridge, Pacific Motorway, Mooball, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Hulls Road overbridge, Pacific Motorway, Mooball, NSW	Road bridge over motorway	Unknown	No, height clearance appears to be sufficient
Wooyung Road overbridge, Pacific Motorway, Crabbes Creek, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Tweed Valley Way overbridge, Pacific Motorway, Wooyung, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Pacific Motorway on-ramp from Yelgun Rest Area, Billinudgel, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Lloyd Poynting Bridge, Pacific Motorway, Ocean Shores, NSW	Pedestrian bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Gulgan Road overbridge, Pacific Motorway, Brunswick Heads, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel

Table 3.4 Structures on haulage routes with height restrictions

Location	Description	Height clearance	OSOM vehicle height adjustment or vertical clearance check required?
Tandys Lane overbridge, Pacific Motorway, Brunswick Heads, NSW	Road bridge over motorway	Unknown	No, height clearance appears to be sufficient
Gulgan Road overbridge, Pacific Motorway, Tyagarah, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Myocum Road overbridge, Pacific Motorway, Ewingsdale, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
St Helena Tunnel, Pacific Motorway, Ewingsdale, NSW	Southbound tunnel through St Helena Hill	5.3 m[9]	Yes, vehicle to be lowered by up to 300 mm before passing through the tunnel
Wiley Road overbridge, Pacific Motorway, Bangalow, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Broken Head Road overbridge, Pacific Motorway, Newrybar, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Ross Lane overbridge, Pacific Motorway, Tintenbar, NSW	Road bridge over motorway	Unknown	Height clearance is to be checked prior to OSOM travel
Pacific Motorway overbridges, Bruxner Highway, West Ballina, NSW	Motorway bridges over roundabout	Unknown	Height clearance is to be checked prior to OSOM travel
Wardell Road overbridge, Bruxner Highway, Alstonville, NSW	Road bridge over highway	Unknown	Height clearance is to be checked prior to OSOM travel
Bruxner Highway bridge over Wilsons River, South Lismore, NSW	Truss road bridge over river	5.2 m	Yes, OSOM vehicle to be lowered by the maximum 325 mm before passing through truss road bridge. Alternatively, transport contractor to select OSOM vehicle that allows a lower height configuration. Actual height clearance to be checked in a live test prior to OSOM travel and documented as part of a detailed Transport Management Plan. The actual height clearance will likely be higher than the signposted clearance of 5.2 m.

The height clearance of all overhead structures must be checked prior to OSOM travel. Several overhead structures with height restrictions have been identified that will require the OSOM vehicle carrying the transformer to be lowered before continuing its travel from Port of Brisbane to the site.

The actual height clearance of the following overbridges should be checked in a live test prior to OSOM travel and documented as part of a detailed Transport Management Plan:

- Clothiers Creek Road overbridge, Pacific Motorway, Clothiers Creek, NSW
- Bruxner Highway bridge over Wilsons River, South Lismore, NSW.

Following the results of the live test, the transport contractor may select an OSOM vehicle that allows a lower height configuration, if required.

9 https://ancr.com.au/Tintenbar_to_Ewingsdale_Highway.pdf

4 Summary and conclusion

Overall, the swept path assessment in Appendix A indicates the identified route is generally suitable for the OSOM vehicles proposed for the project.

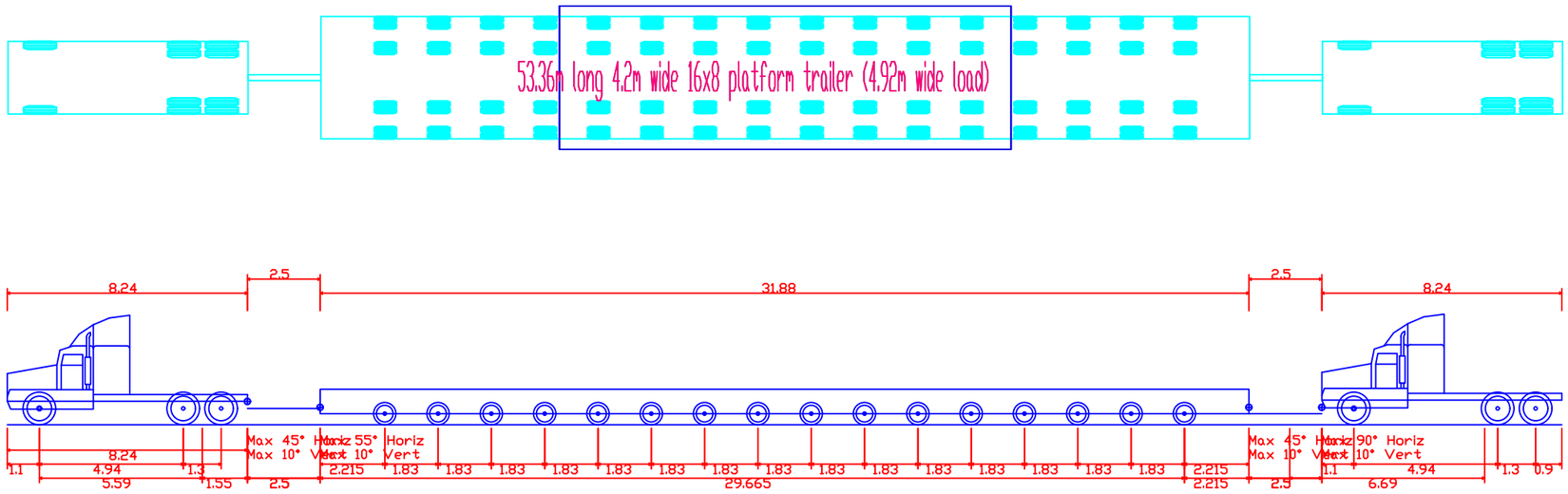
Documented consultation will be required with all the councils responsible for the road networks that are affected on the route, e.g. Brisbane City Council and Richmond Valley Council, where temporary changes to the roadside street furniture, including landscaping and car parking are likely to be required to facilitate the passage of the OSOM vehicle through these areas.

As this is a desktop assessment based on satellite imagery, a further detailed field survey may be required to accurately identify all existing height restrictions and any road infrastructure that requires relocation along the route to facilitate each OSOM vehicle movement from Port of Brisbane or James Energies to the site.

The necessary application(s) for each OSOM vehicle movement will be required to be lodged to NHVR by the transport operator. Due to the proposed width of the vehicle platform trailer (4.92 m), police escort will also be required, subject to NHVR determination.

Appendix A
Swept path assessment

EMM
creating opportunities



53.36m long 4.2m wide 16x8 platform trailer (4.92m wide load)

Overall Length	53.360m
Overall Width	4.200m
Overall Body Height	3.800m
Min Body Ground Clearance	0.383m
Max Track Width	2.500m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	31.150m

COMMENTS

A3

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Ground Floor
20 Chandos Street,
St Leonards NSW 2065

Phone # 02 9493 9500

www.emmconsulting.com.au

REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
OSOM vehicle specifications

CLIENT: Ark Energy
DRG. #: EMM-000
PROJECT #: E240318
SCALE: 1:200

REV: 2

Concrete barriers and boom gate infrastructure to be temporarily removed

Kerb to be avoided by wheels

WHARF 1-3 ACCESS ROAD

Signage and light pole to be avoided

Temporary hardstand to be provided

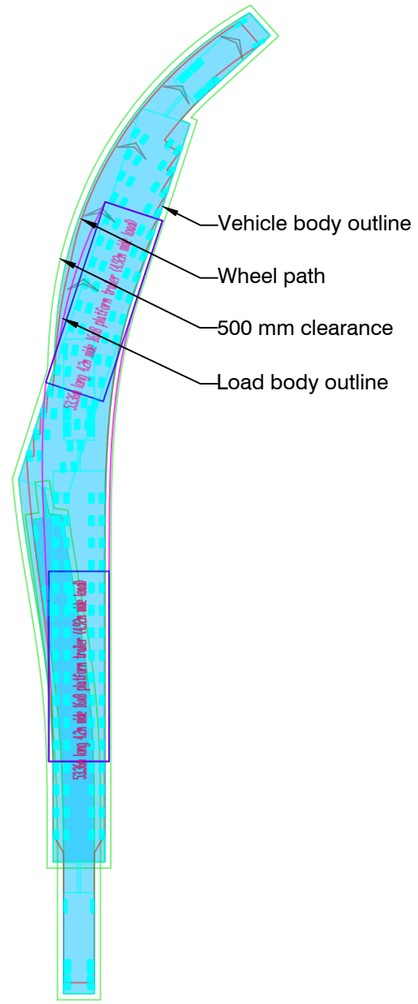
Signage to be temporarily removed

PORT DRIVE

0 10 20 m

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Port Drive near Wharf 1-3, Port of Brisbane, Queensland

CLIENT:	Ark Energy
DRG. #:	EMM-001
PROJECT #:	E240318
SCALE:	1:500

REV: 2

SEAFARERS STREET

PORT DRIVE

Signage to be temporarily removed and island to be mounted

7.5 m height clearance

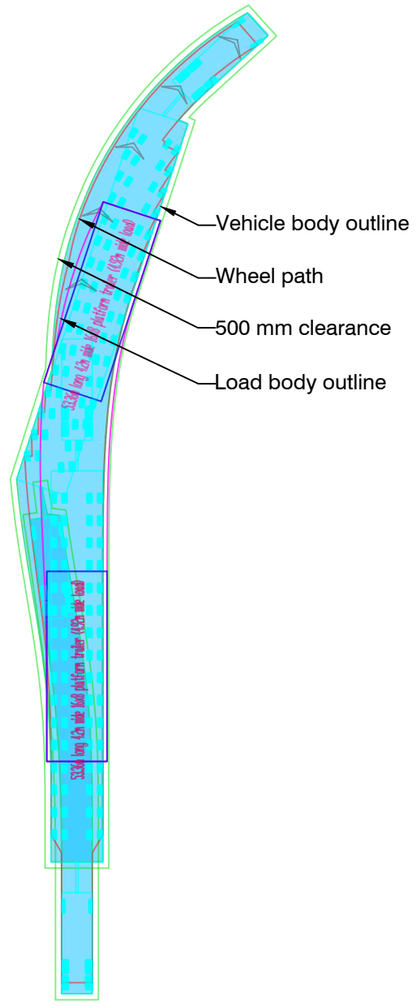
Kerb to be avoided by wheels

Roundabout to be mounted on mountable section

10.8 m height clearance

0 10 20 m

COMMENTS A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

EMM Creating opportunities

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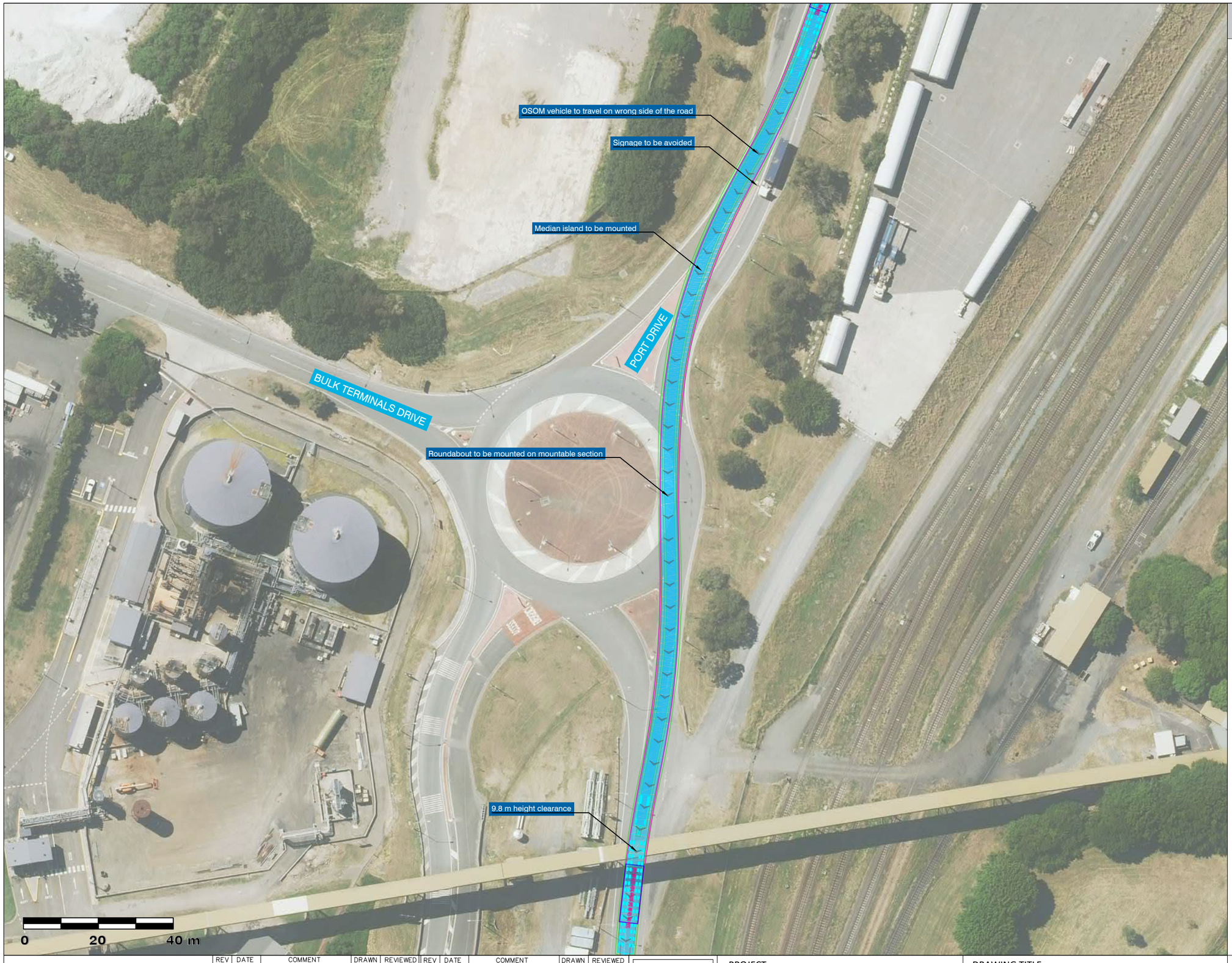
REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Port Drive/Seafarers Street, Port of Brisbane, Queensland

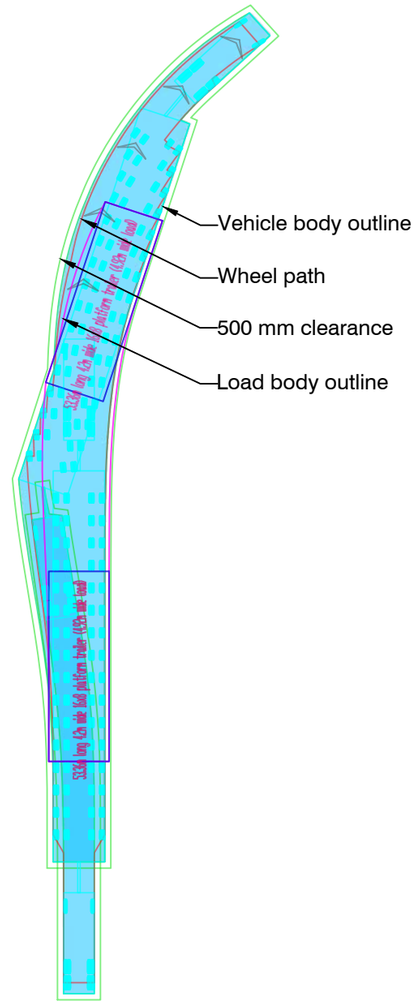
CLIENT:	Ark Energy
DRG. #:	EMM-002
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS

A3



- Vehicle body outline
- Wheel path
- 500 mm clearance
- Load body outline

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REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

REV	DATE	COMMENT	DRAWN	REVIEWED

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

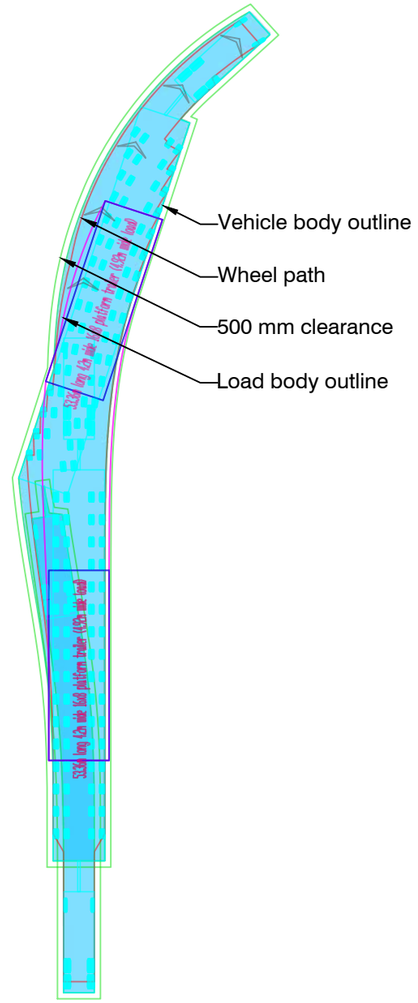
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site
Port Drive/Bulk Terminals Drive, Port of Brisbane, Queensland

CLIENT:	Ark Energy
DRG. #:	EMM-003
PROJECT #:	E240318
SCALE:	1:1000

REV: 2

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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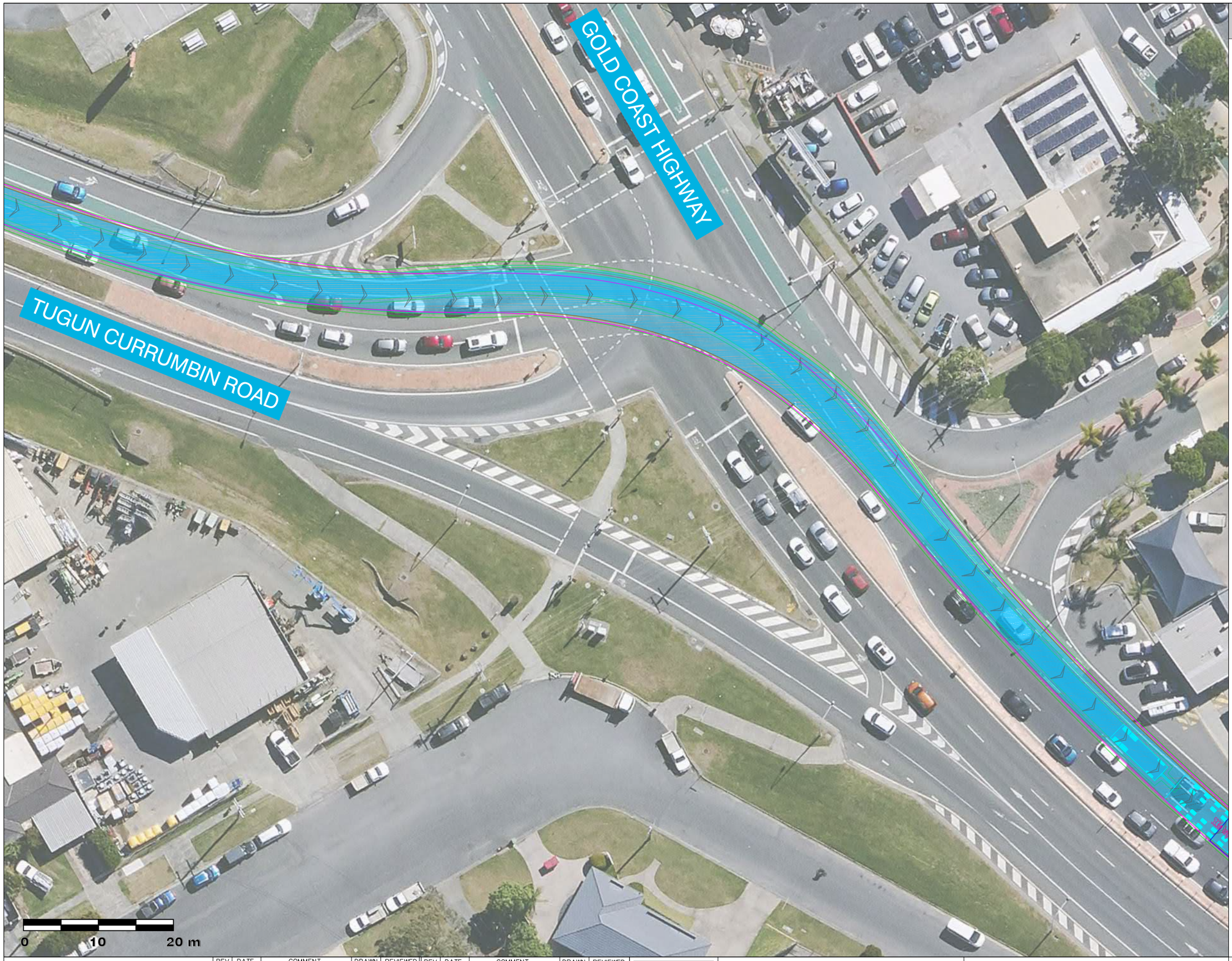
2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Pacific Motorway/Tugun Currumbin Road, Currumbin, Queensland

CLIENT:	Ark Energy
DRG. #:	EMM-004
PROJECT #:	E240318
SCALE:	1:1000

REV: 2



COMMENTS

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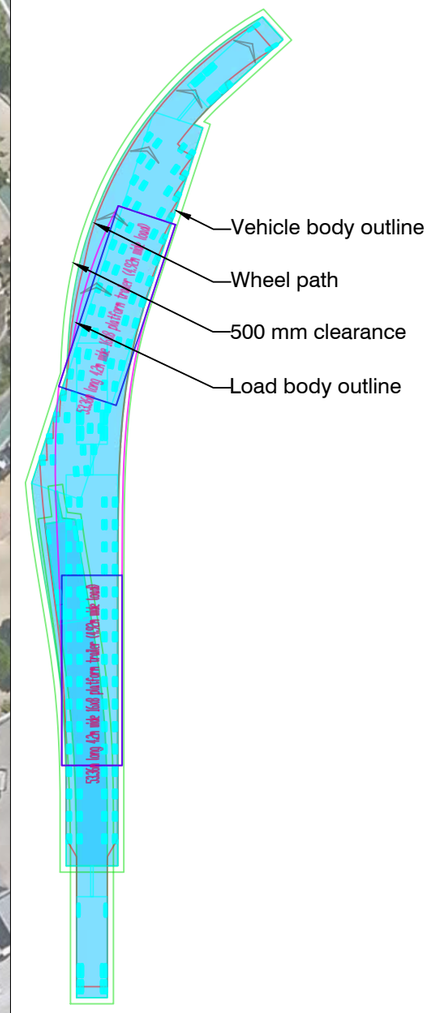

Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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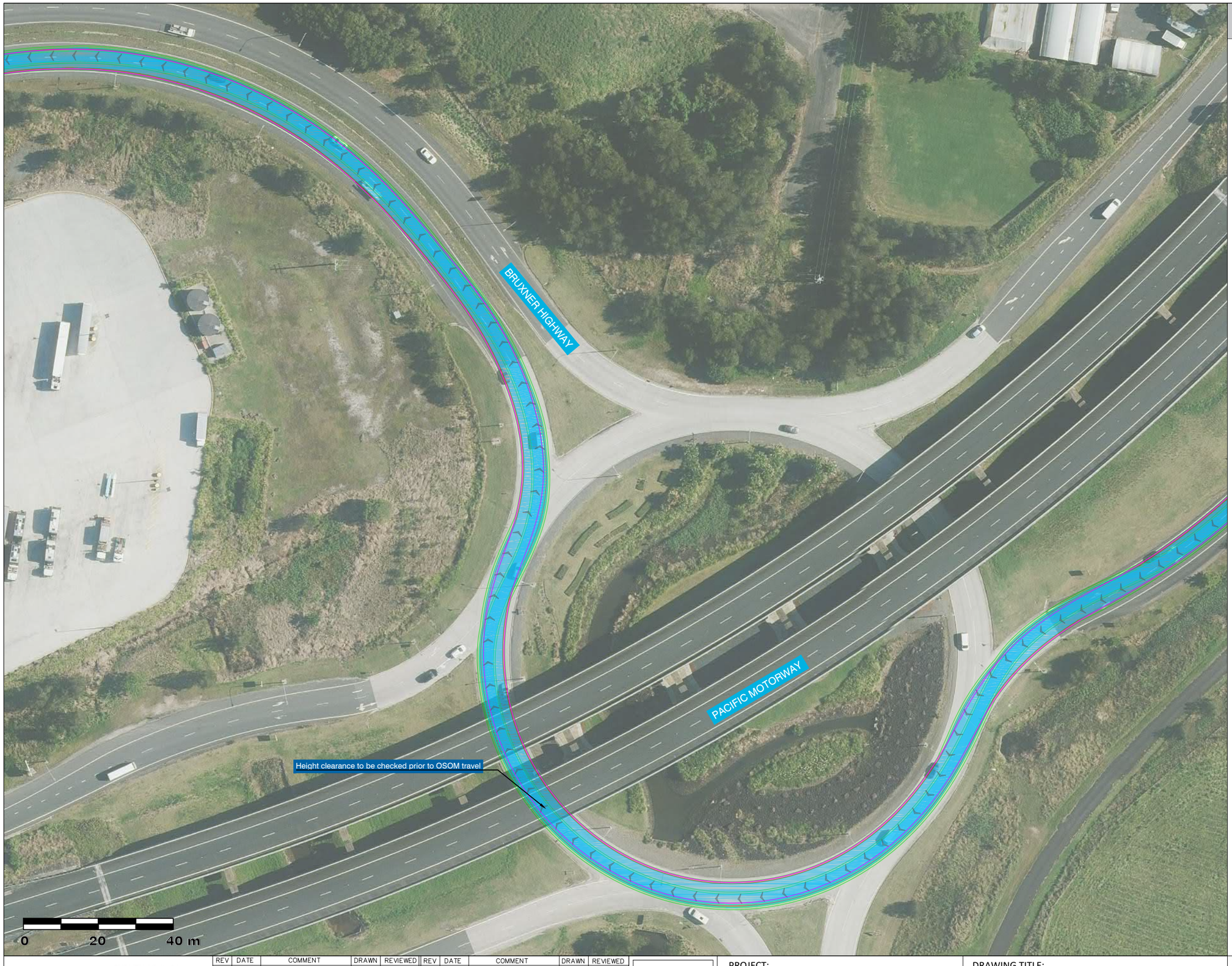
2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Gold Coast Highway/Tugun Currumbin Road, Tugun, Queensland

CLIENT:	Ark Energy
DRG. #:	EMM-005
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS

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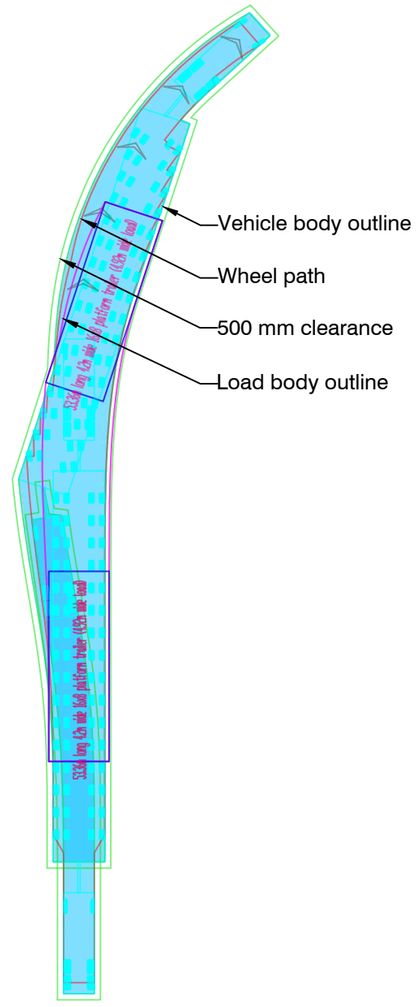

Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

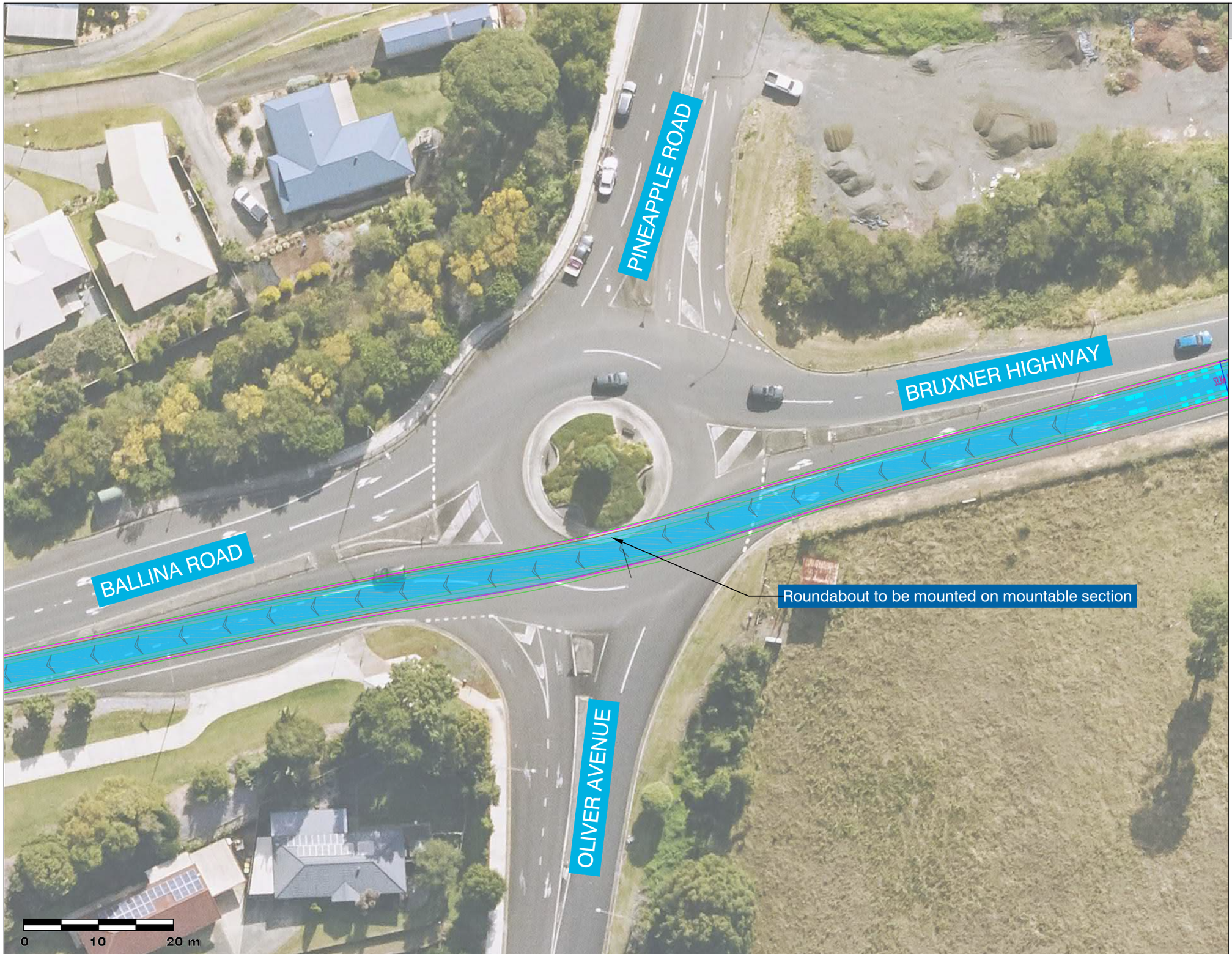
REV	DATE	COMMENT	DRAWN	REVIEWED

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Pacific Motorway/Bruxner Highway, West Ballina, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-006
PROJECT #:	E240318
SCALE:	1:1000

REV: 2



COMMENTS

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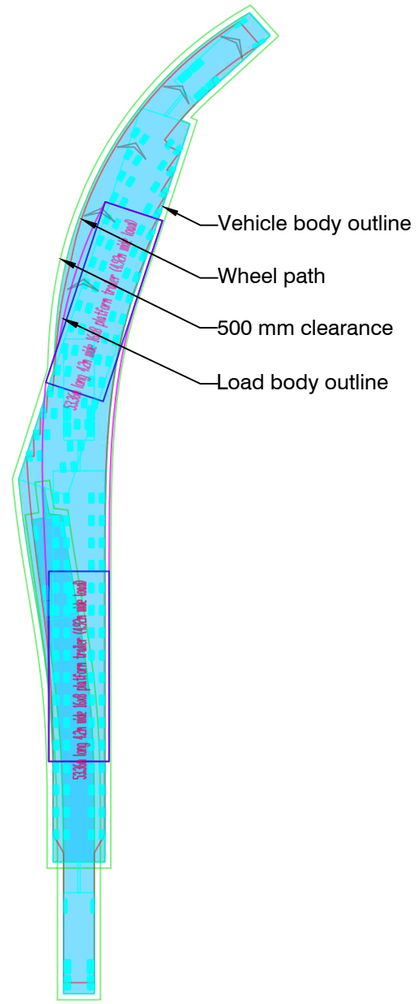

Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

REV	DATE	COMMENT	DRAWN	REVIEWED

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

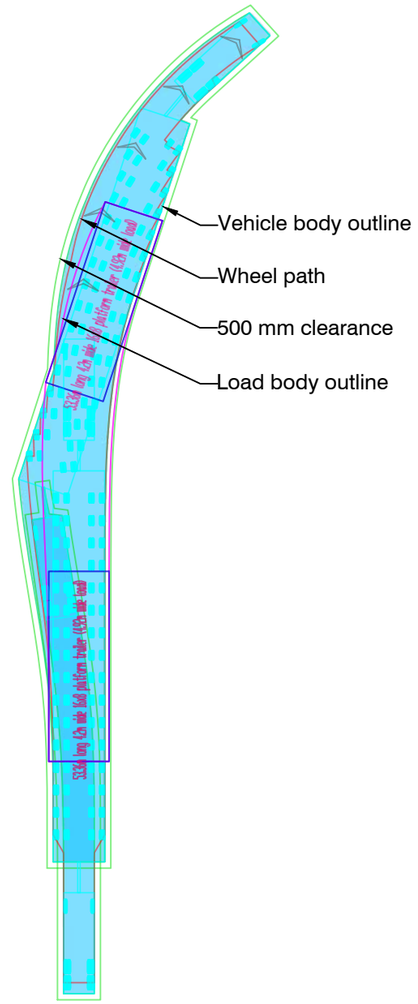
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Bruxner Hwy/Ballina Road/Pineapple Road/Oliver Avenue, Goonellabah, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-007
PROJECT #:	E240318
SCALE:	1:500

REV: 2

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

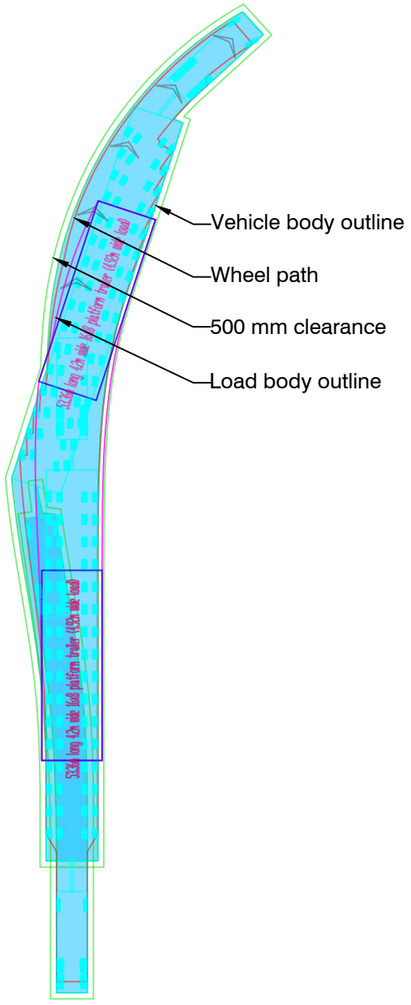
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Ballina Road/Holland Street, Goonellabah, NSW

CLIENT: Ark Energy
DRG. #: EMM-008
PROJECT #: E240318
SCALE: 1:500

REV: 2

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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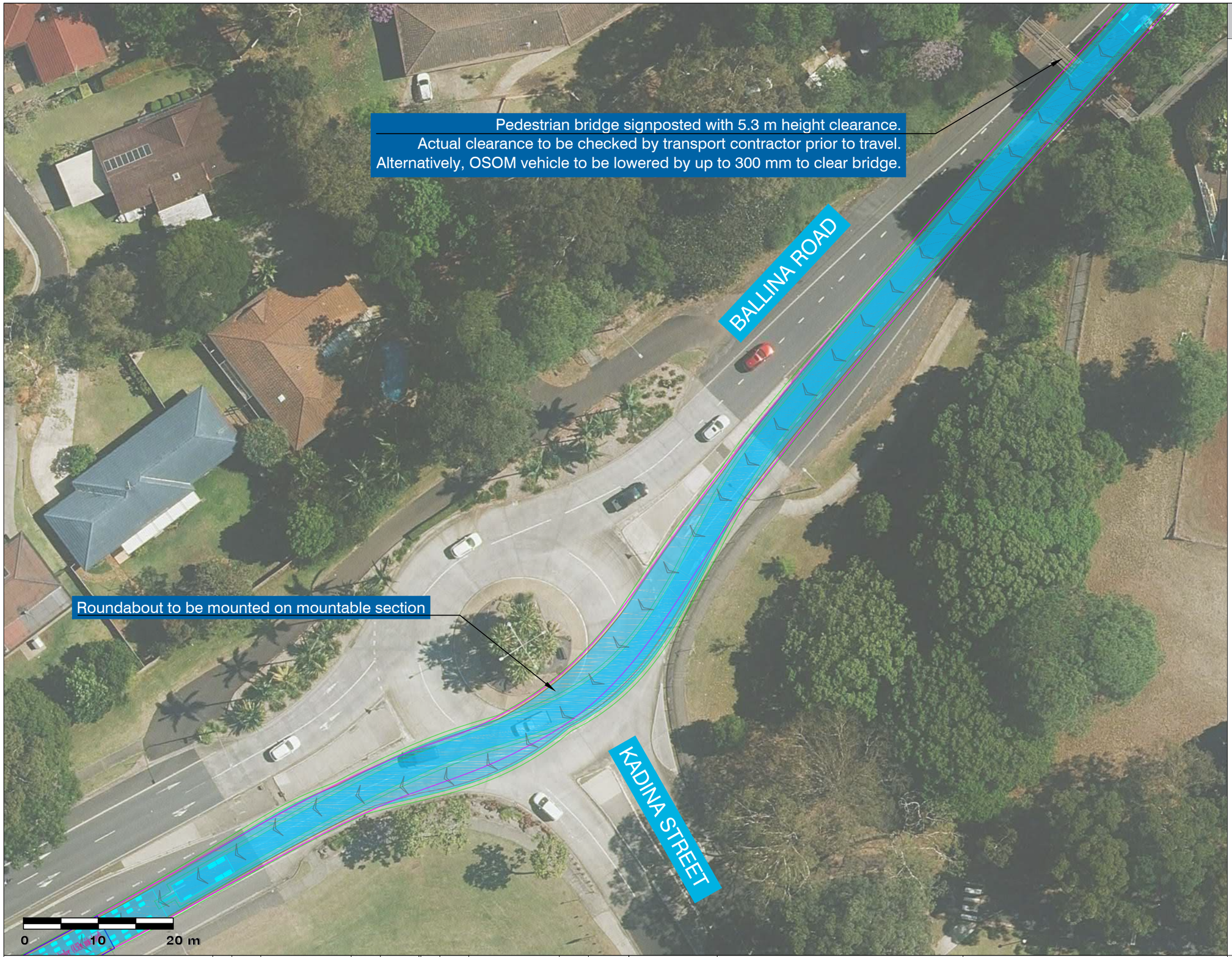
2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Ballina Road/Sunrise Court, Goonellabah, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-009
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS

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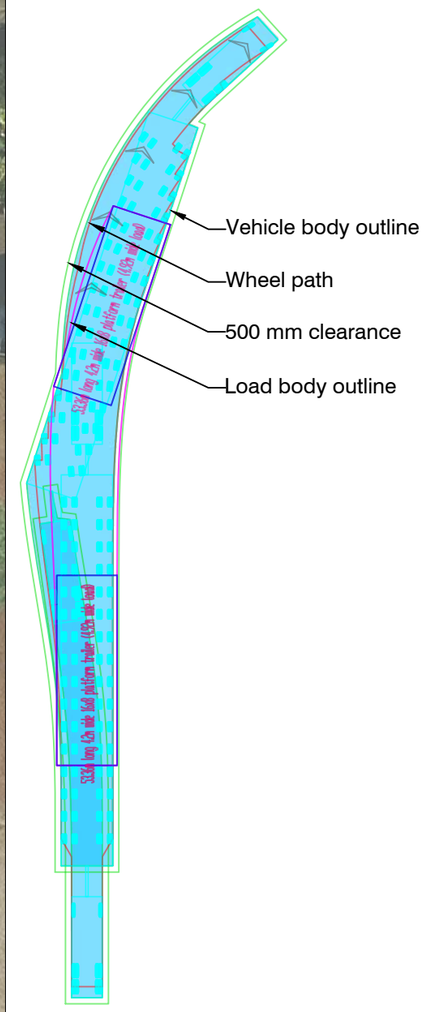

Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

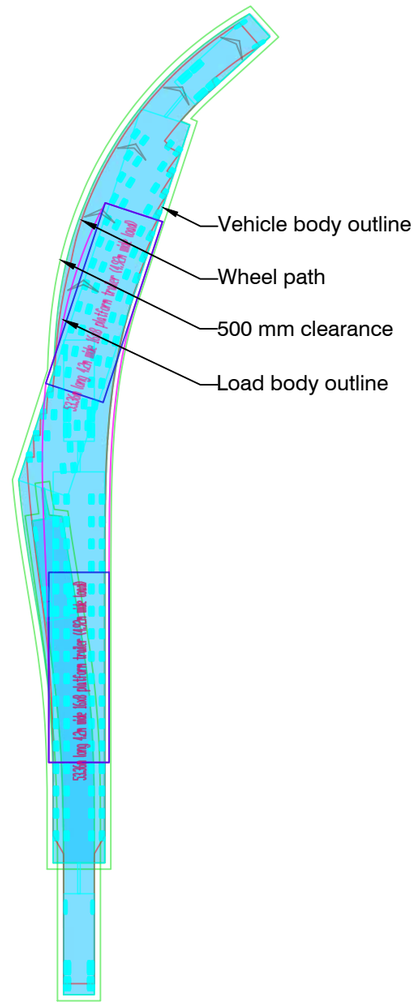
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Ballina Road/Kadina Street, Goonellabah, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-010
PROJECT #:	E240318
SCALE:	1:500

REV: 2

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

REV	DATE	COMMENT	DRAWN	REVIEWED

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

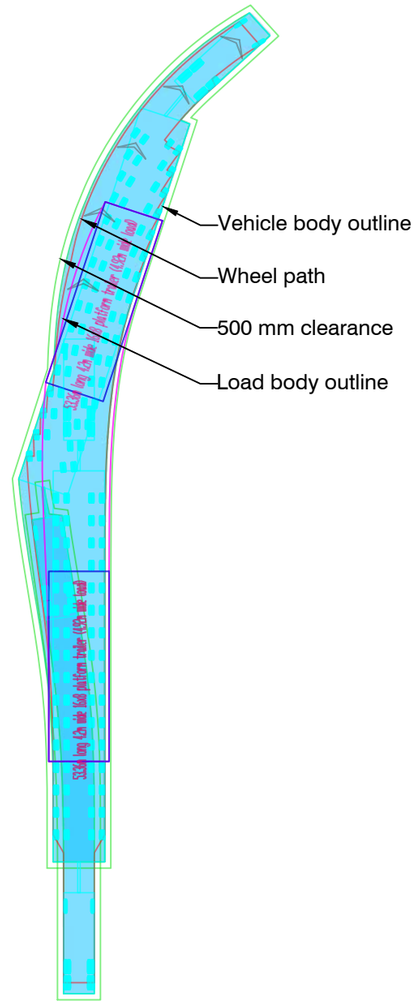
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Ballina Road/Gordon Blair Drive, Goonellabah, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-011
PROJECT #:	E240318
SCALE:	1:500

REV: 2

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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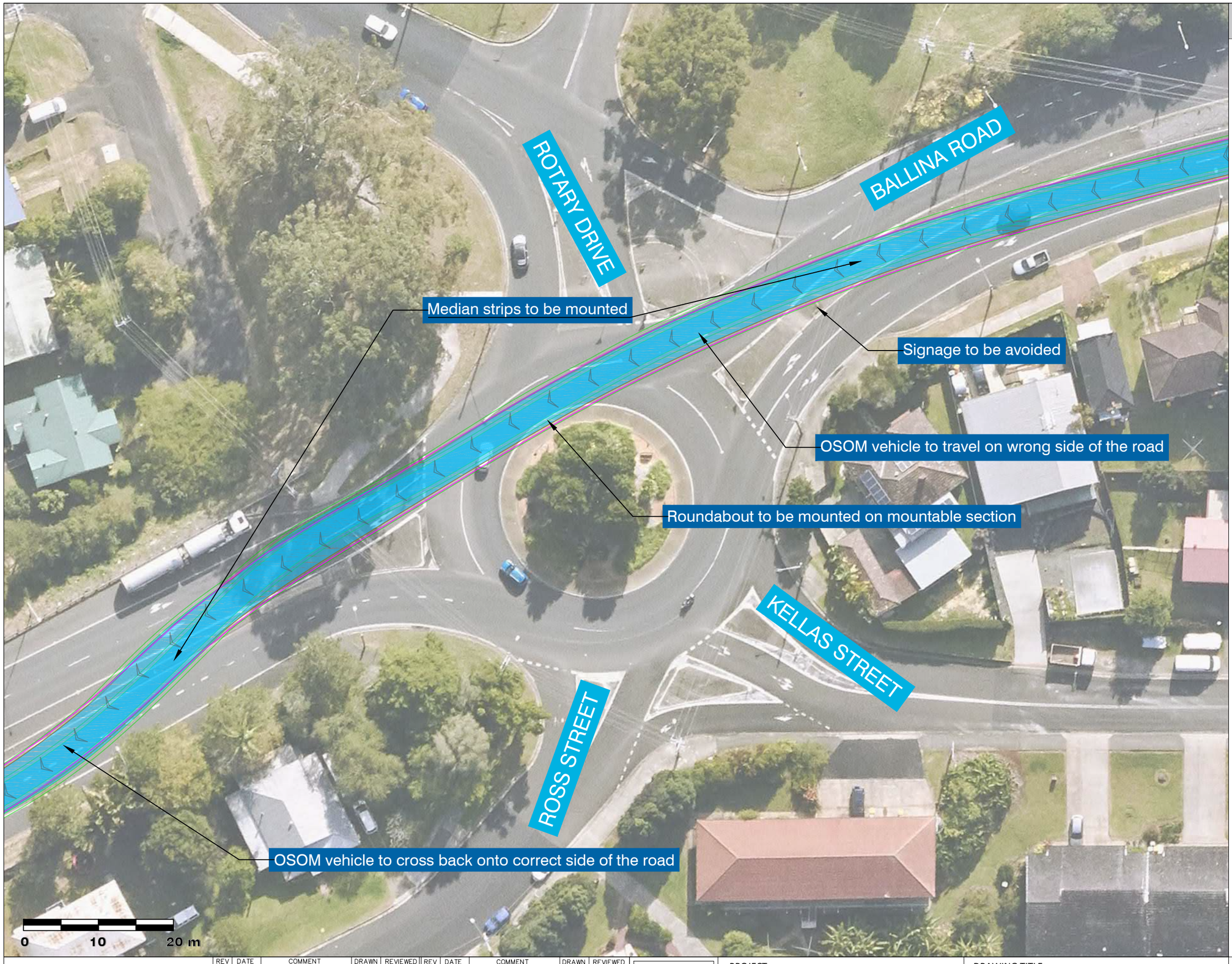
2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Ballina Road/Rous Road, Goonellabah, NSW

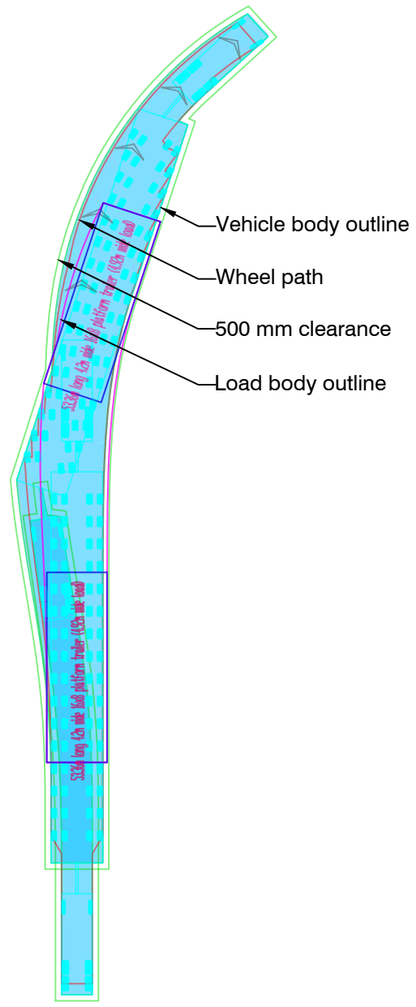
CLIENT:	Ark Energy
DRG. #:	EMM-012
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

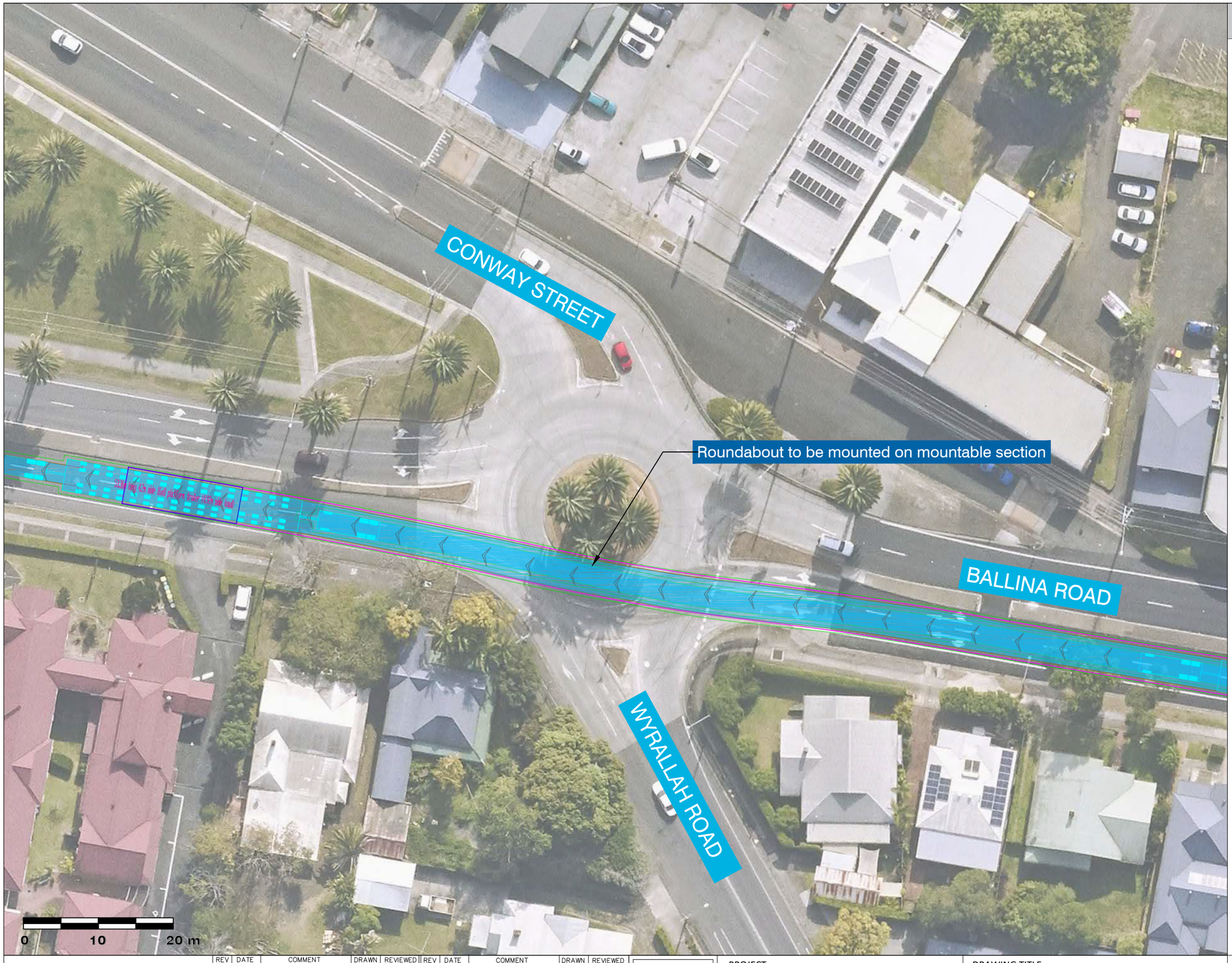
REV	DATE	COMMENT	DRAWN	REVIEWED

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site
Ballina Road/Rotary Drive/Ross Street/ Kellas Street, Lismore, NSW

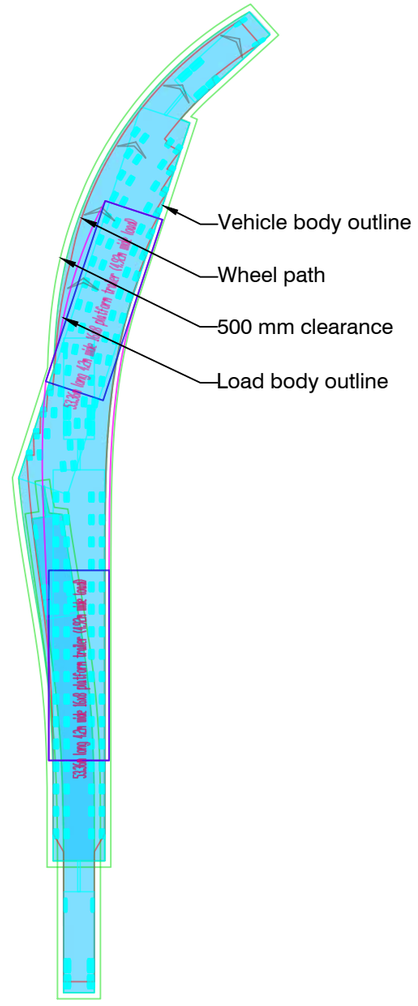
CLIENT:	Ark Energy
DRG. #:	EMM-013
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS

A3



- Vehicle body outline
- Wheel path
- 500 mm clearance
- Load body outline

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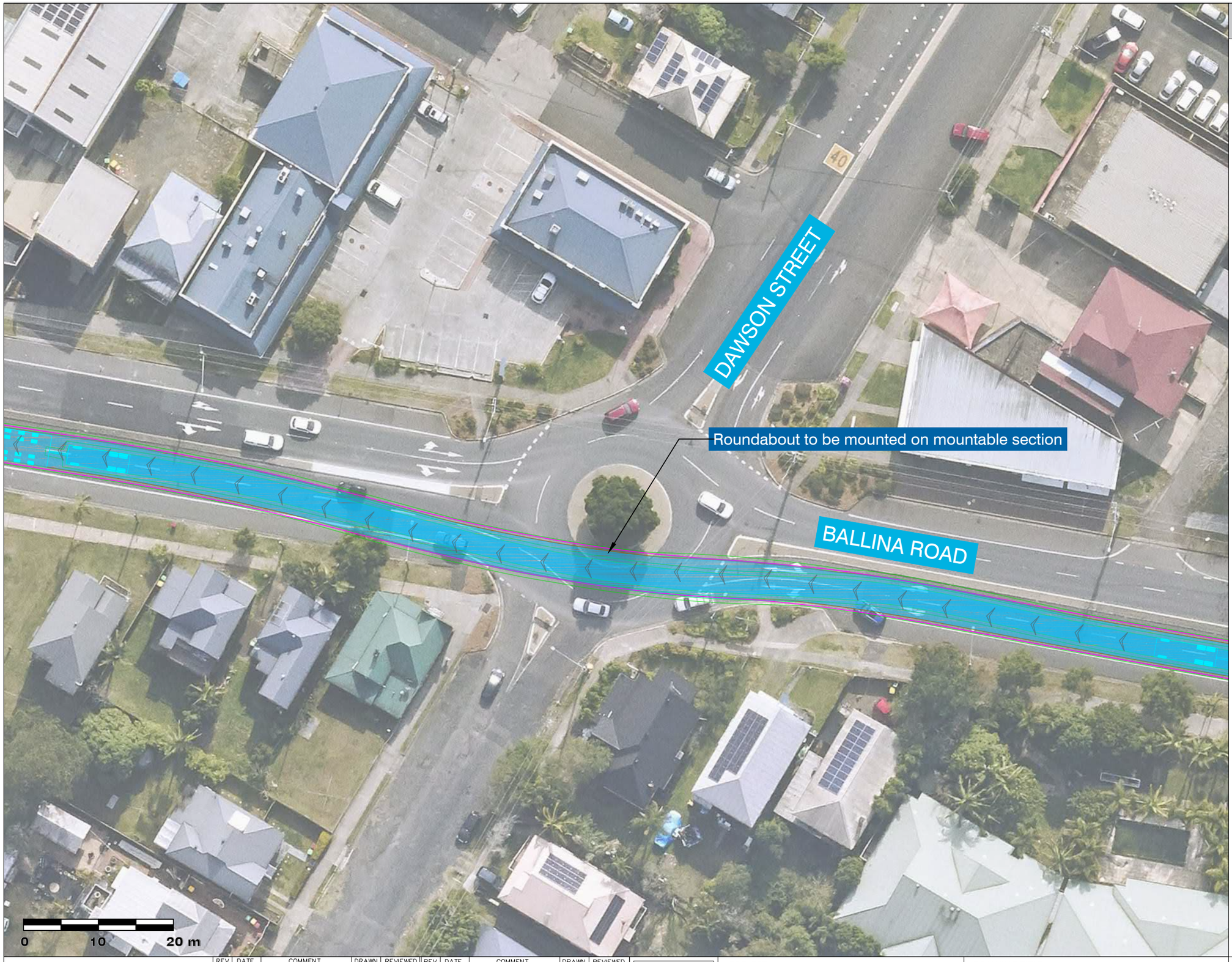
2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

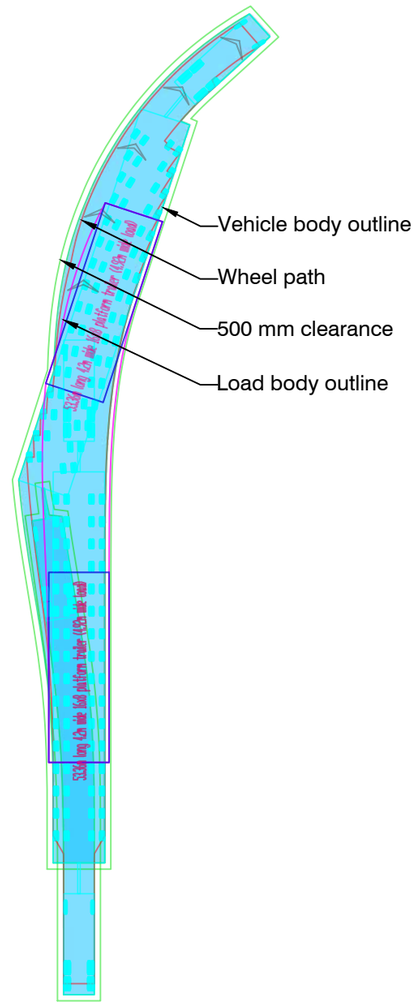
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Ballina Road/Conway Street/ Wyrallah Road, Lismore, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-014
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS | A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

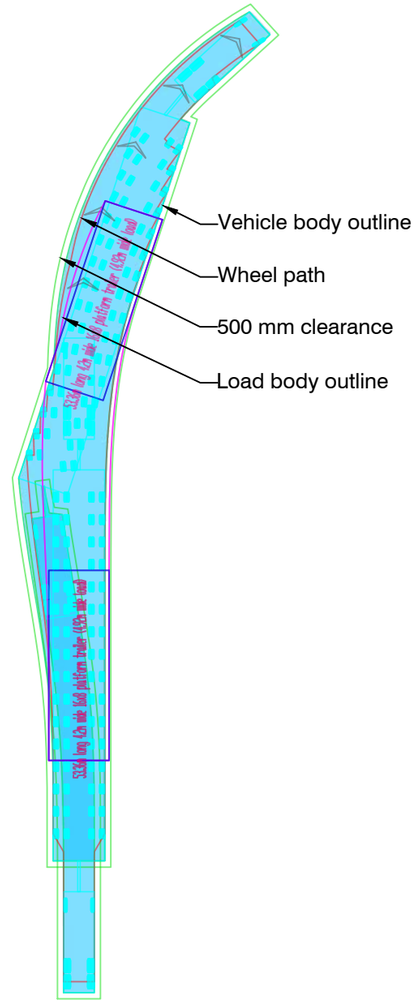
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Ballina Road/Dawson Street, Lismore, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-015
PROJECT #:	E240318
SCALE:	1:500

REV: 2

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

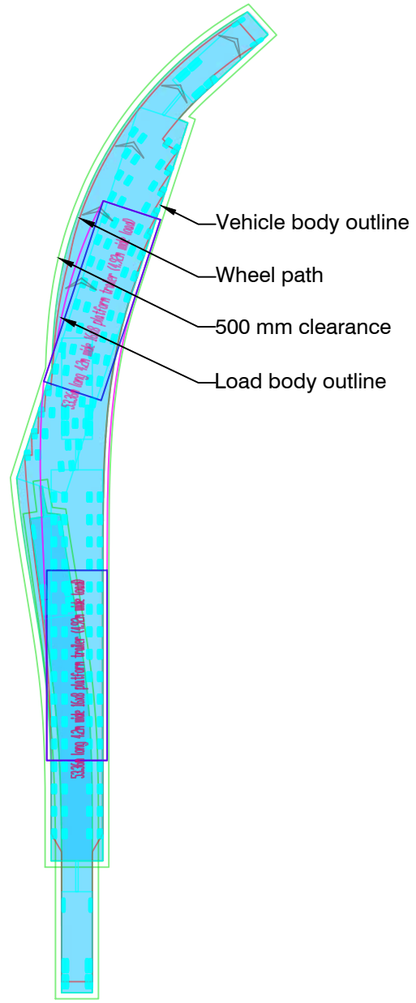
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Ballina Road/Molesworth Street, Lismore, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-016
PROJECT #:	E240318
SCALE:	1:500

REV: 2

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

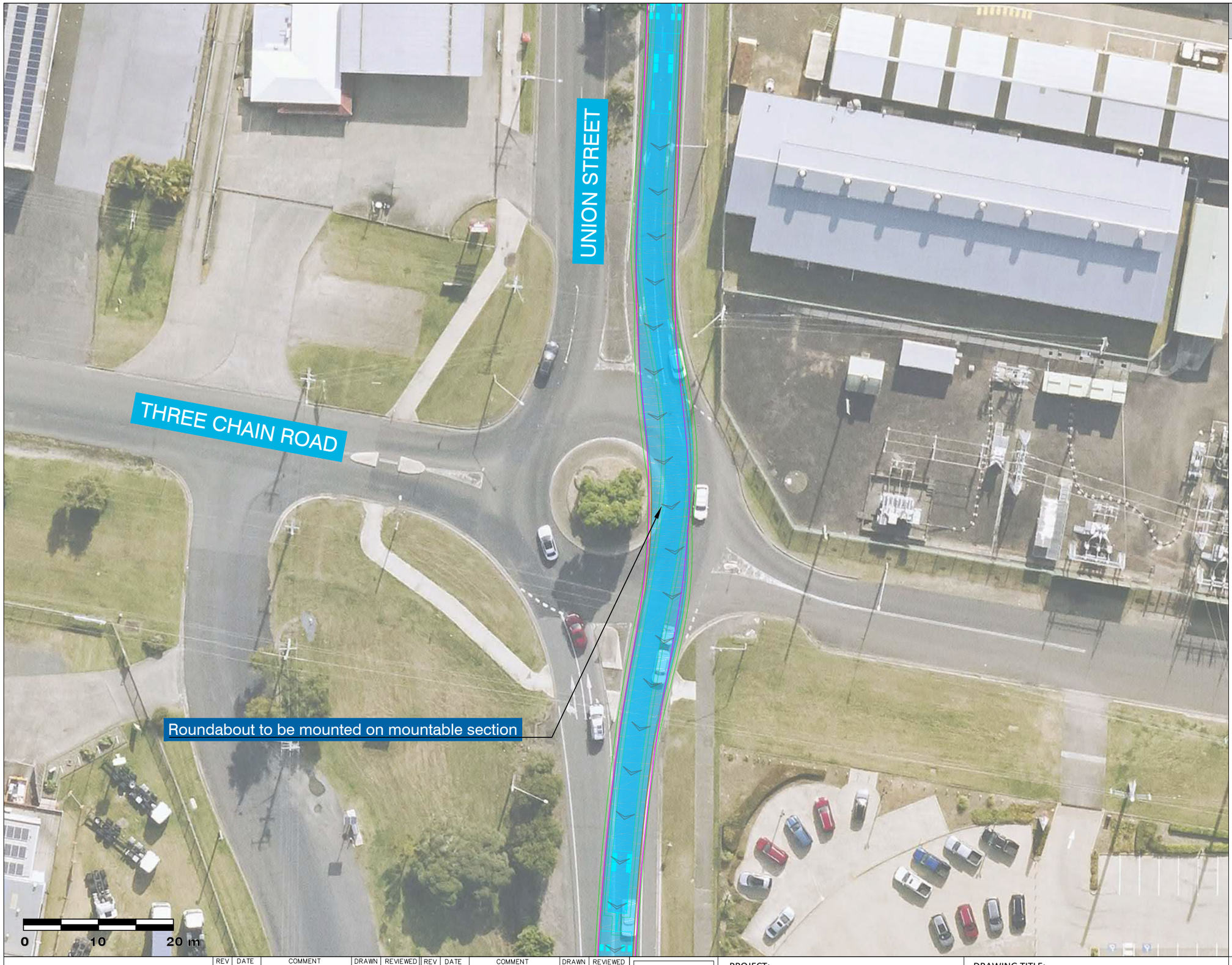
REV	DATE	COMMENT	DRAWN	REVIEWED

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

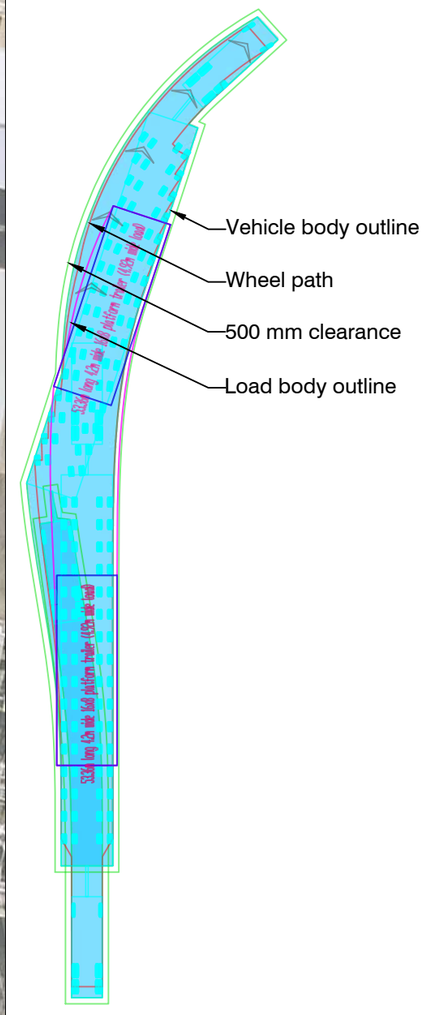
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Union Street/Elliott Road, South Lismore, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-017
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS | A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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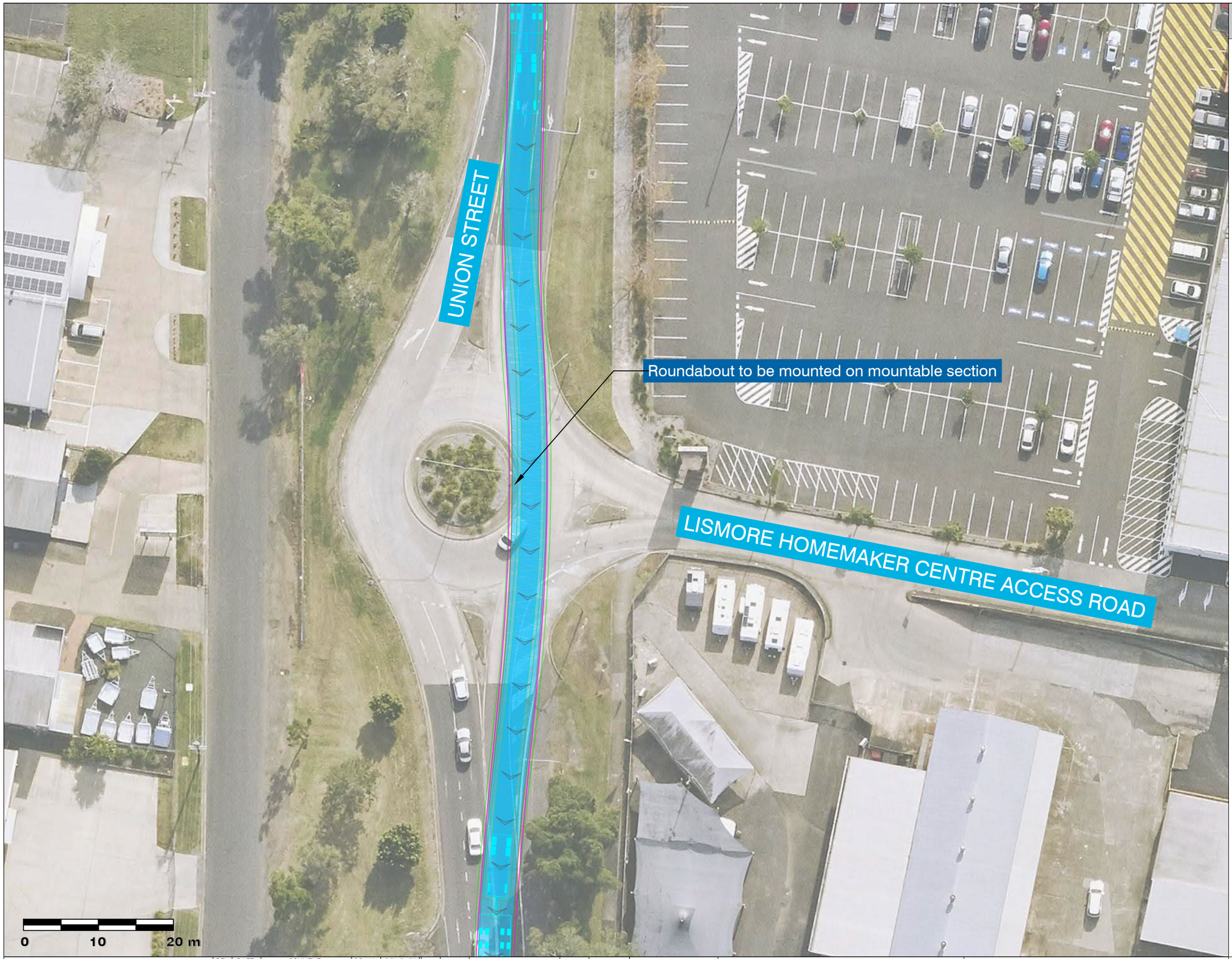
2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

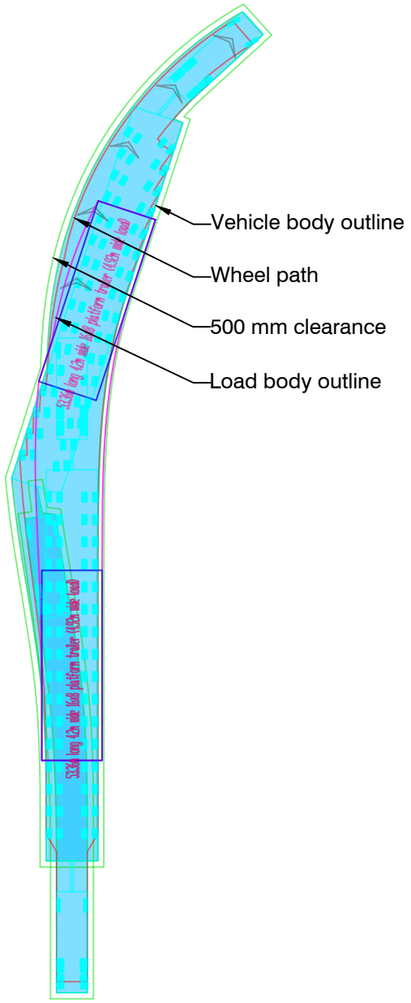
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Union Street/Three Chain Road, South Lismore, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-018
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS | A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Union Street/Lismore Homemaker Centre Access Rd, South Lismore, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-019
PROJECT #:	E240318
SCALE:	1:500

REV: 2

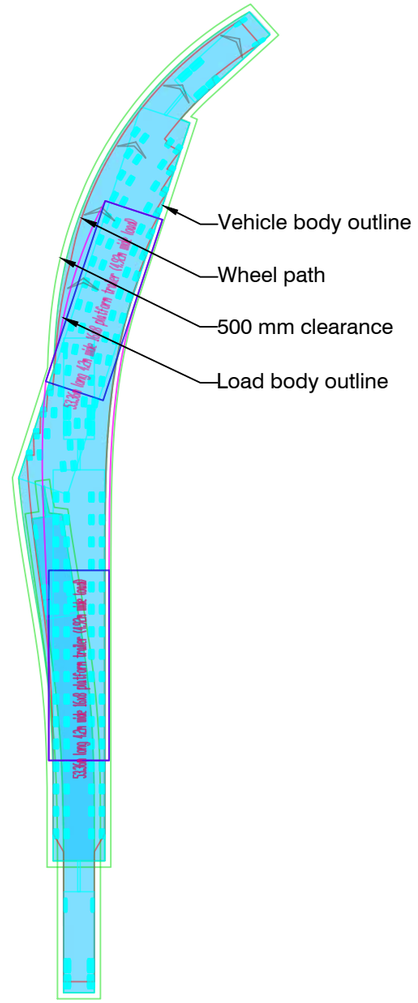
JOHNSTON STREET

CENTRE STREET

Signage to be temporarily removed and island to be mounted

0 10 20 m

COMMENTS A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

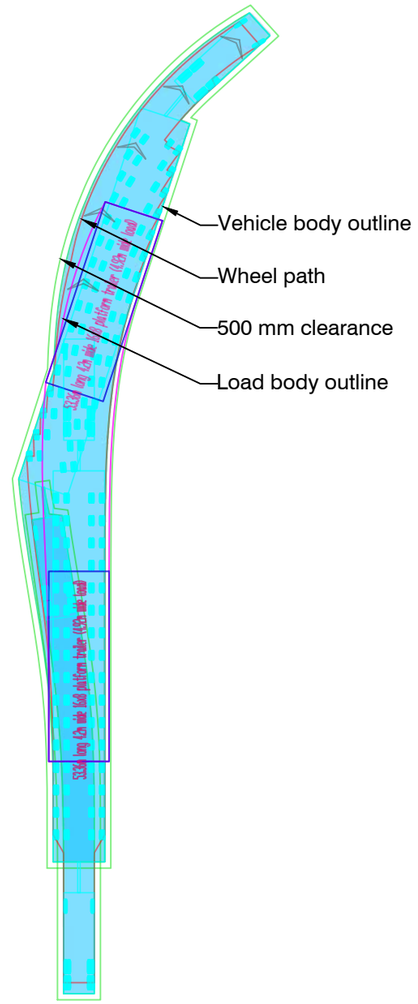
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Johnston Street/Centre Street, Casino, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-020
PROJECT #:	E240318
SCALE:	1:500

REV: 2

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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Ground Floor
20 Chandos Street,
St Leonards NSW 2065

Phone # 02 9493 9500

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REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

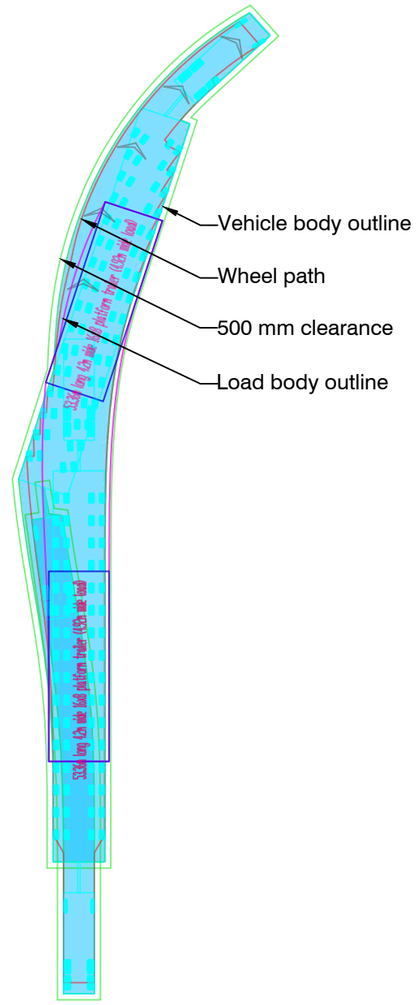
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Centre Street/Barker Street, Casino, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-021
PROJECT #:	E240318
SCALE:	1:500

REV: 2

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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Ground Floor
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St Leonards NSW 2065

Phone # 02 9493 9500

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REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Centre Street/Hare Street, Casino, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-022
PROJECT #:	E240318
SCALE:	1:500

REV: 2

SUMMERLAND WAY

Additional temporary hardstand required for OSOM vehicle

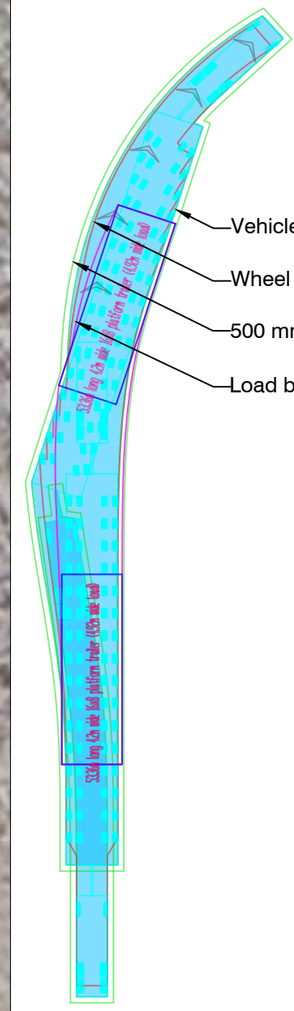
Three mailboxes to be relocated

Proposed upgraded edge of road

MAIN CAMP ROAD

0 10 20 m

COMMENTS A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

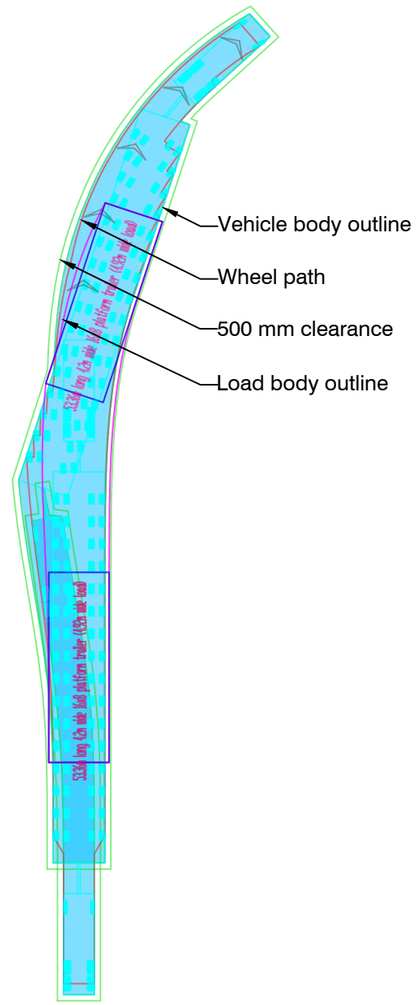
DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Summerland Way/Main Camp Road, Myrtle Creek, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-023
PROJECT #:	E240318
SCALE:	1:500

REV: 2

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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St Leonards NSW 2065

Phone # 02 9493 9500

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REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

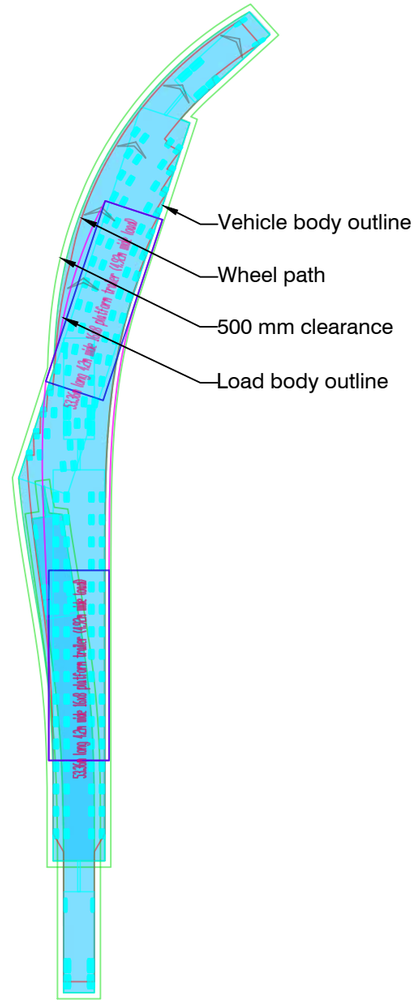
PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site Main Camp Road/Avenue Road, Myrtle Creek, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-024
PROJECT #:	E240318
SCALE:	1:500

REV: 2

COMMENTS | A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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Phone # 02 9493 9500
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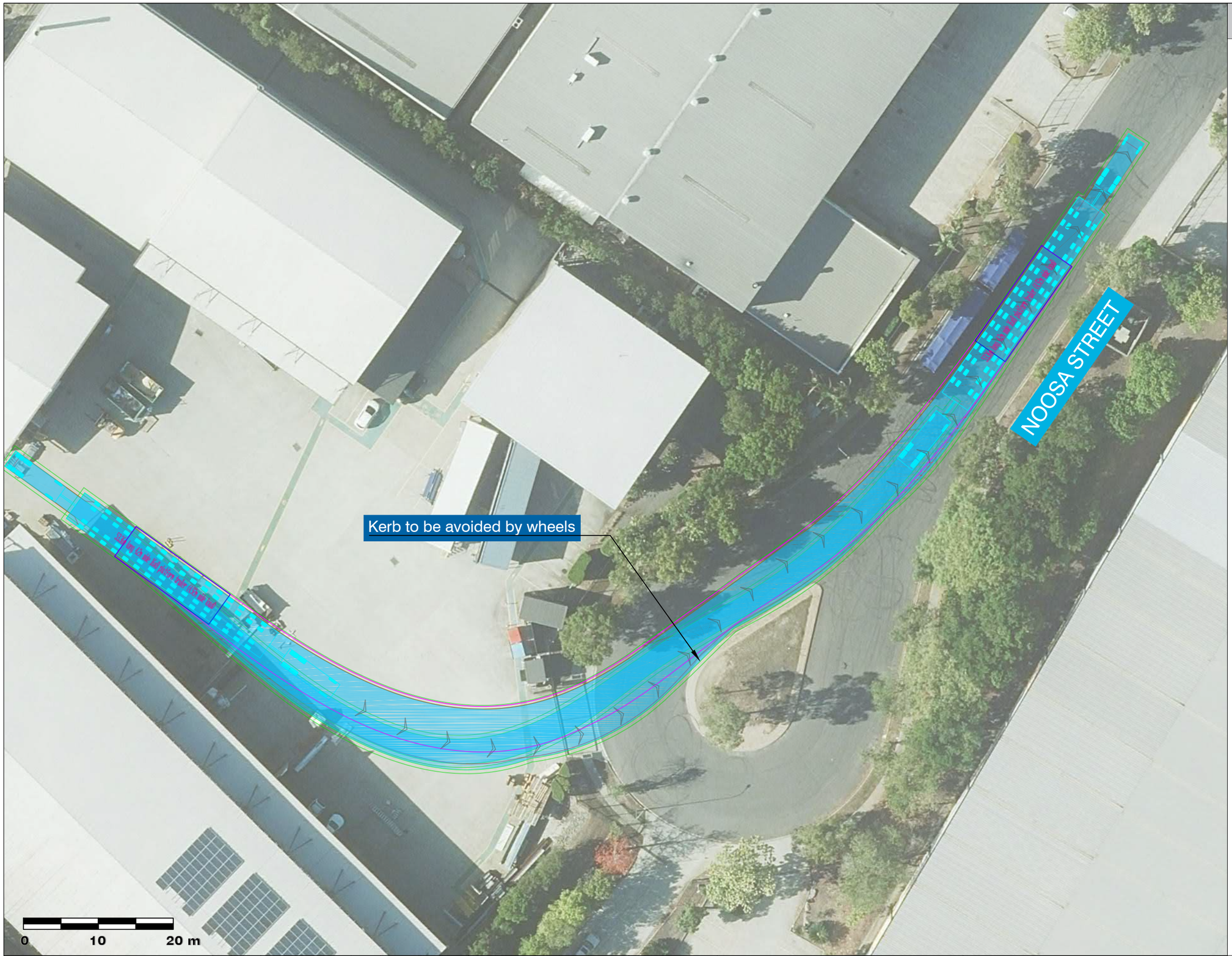
REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from Port of Brisbane to the site
Site Access to 255 Avenue Road, Myrtle Creek, NSW

CLIENT:	Ark Energy
DRG. #:	EMM-025
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS

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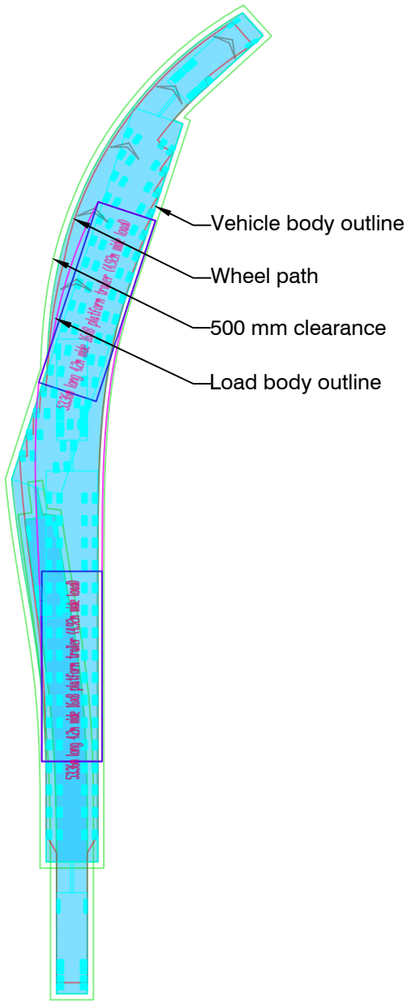

Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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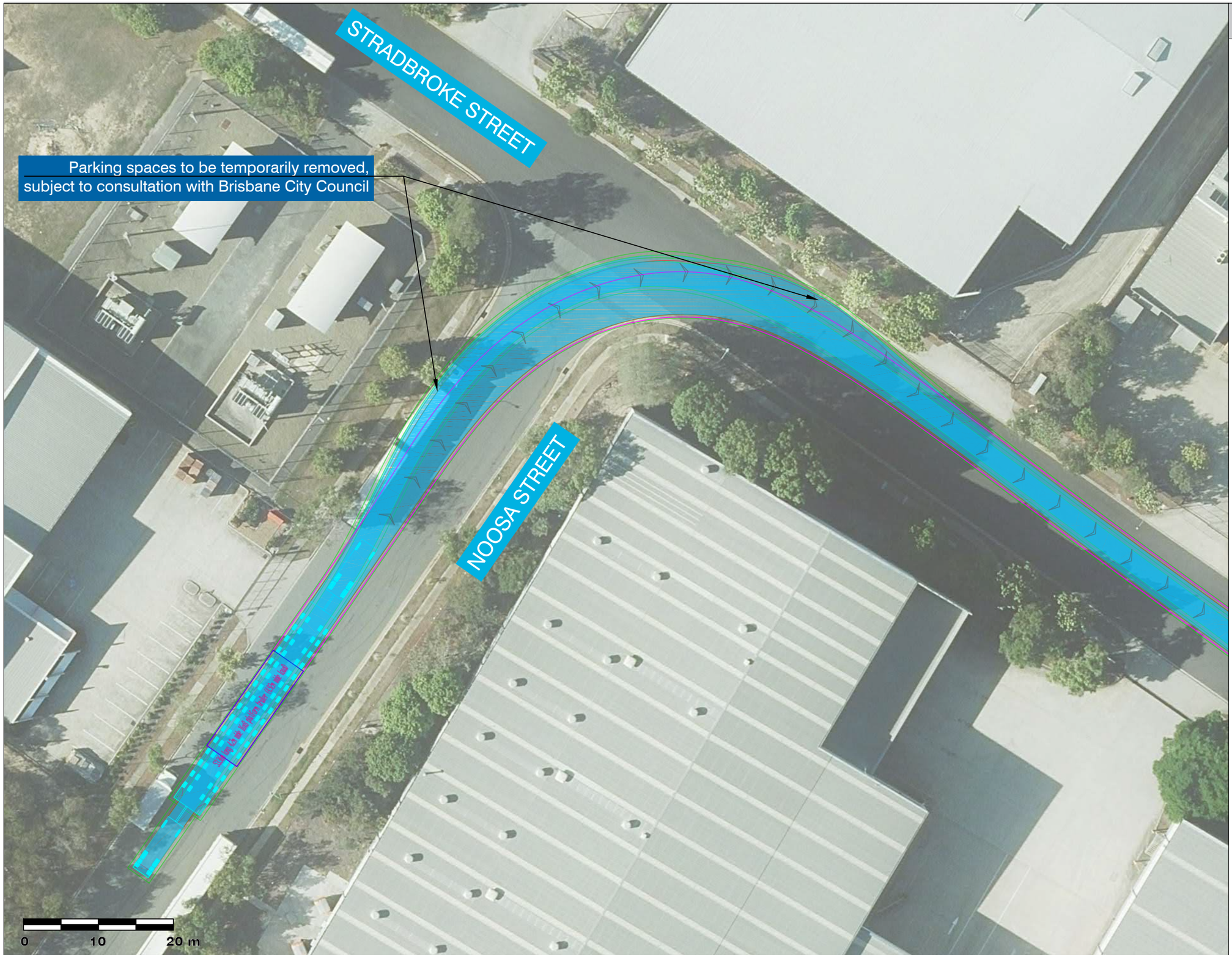
REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from James Eng
67 Noosa Street,
Heathwood, Queensland

CLIENT:	Ark Energy
DRG. #:	EMM-101
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS

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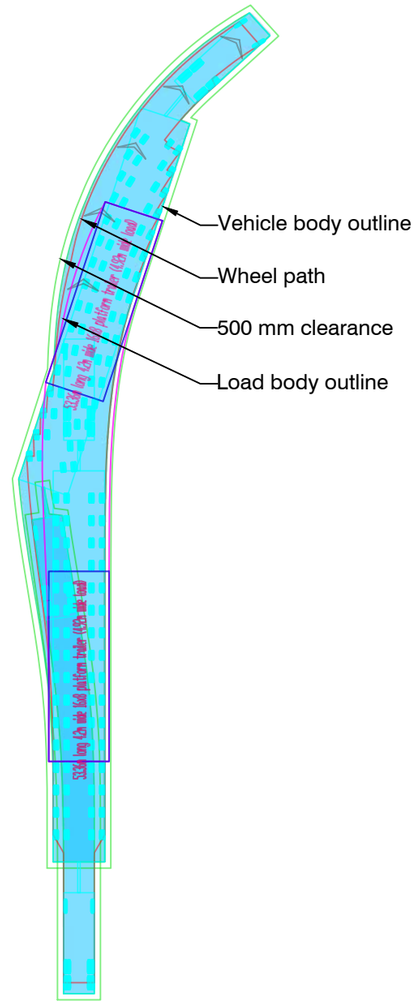

Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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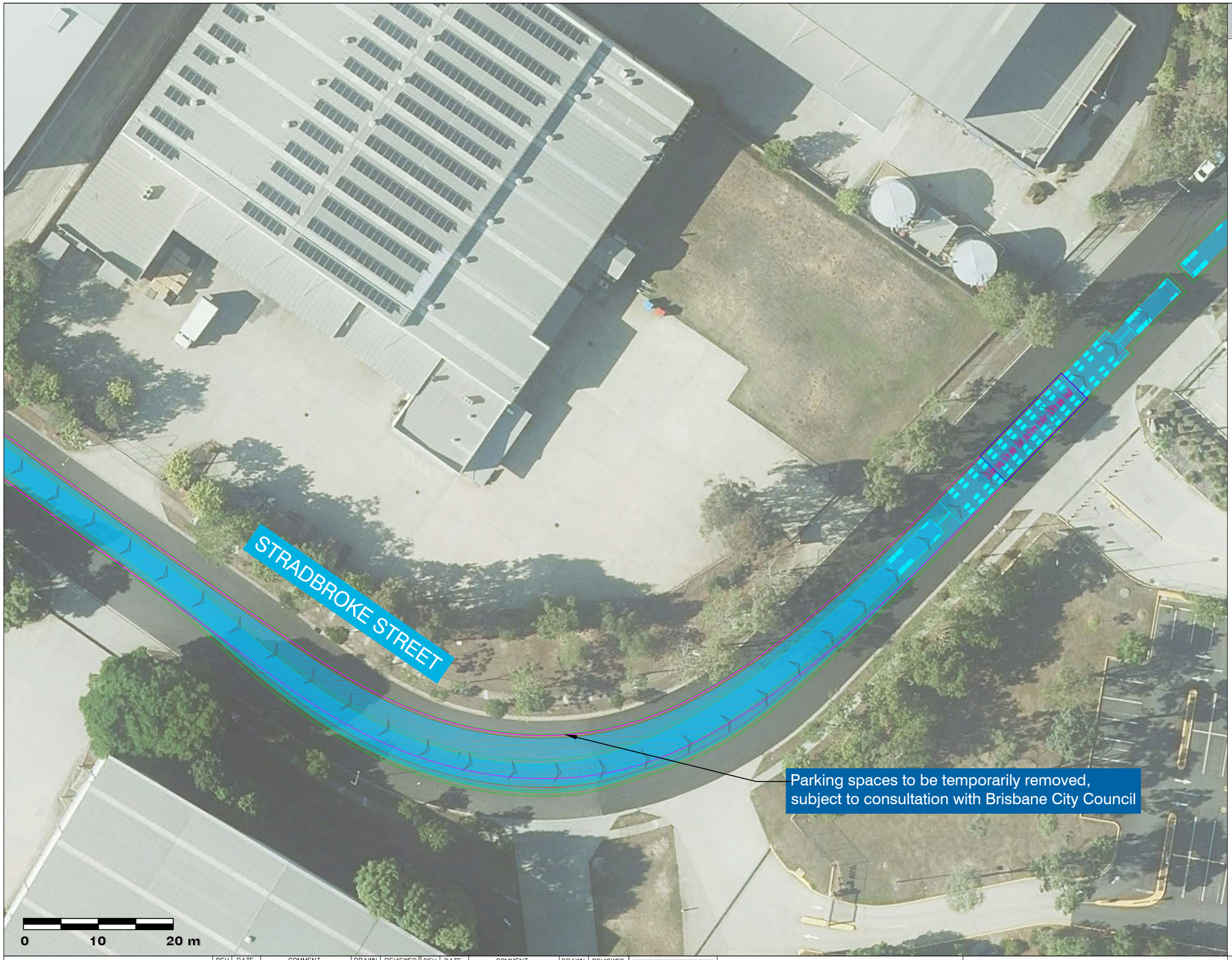
REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from James Eng Stradbroke Street/Noosa Street, Heathwood, Queensland

CLIENT:	Ark Energy
DRG. #:	EMM-102
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS

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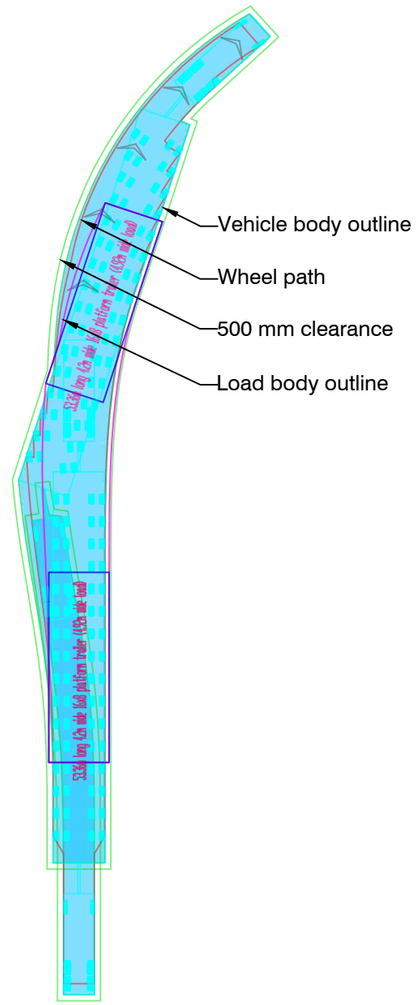

Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

PROJECT:
Richmond Valley Solar Farm - OSOM
swept path assessment

DRAWING TITLE:
53 m vehicle swept path from James Eng
Stradbroke Street,
Heathwood, Queensland

CLIENT:	Ark Energy
DRG. #:	EMM-103
PROJECT #:	E240318
SCALE:	1:500

REV: 2

LOGAN MOTORWAY
WESTBOUND ON-RAMP

Signage to be temporarily removed
and islands to be mounted

STRADBROKE STREET

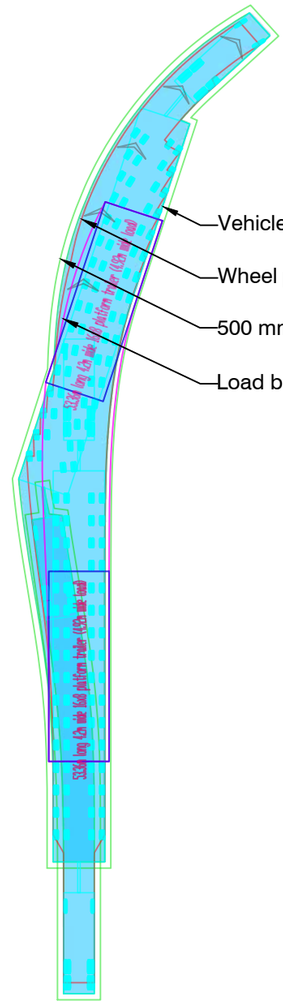
Parking spaces to be temporarily removed,
subject to consultation with Brisbane City Council

STRADBROKE STREET

0 10 20 m

COMMENTS

A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

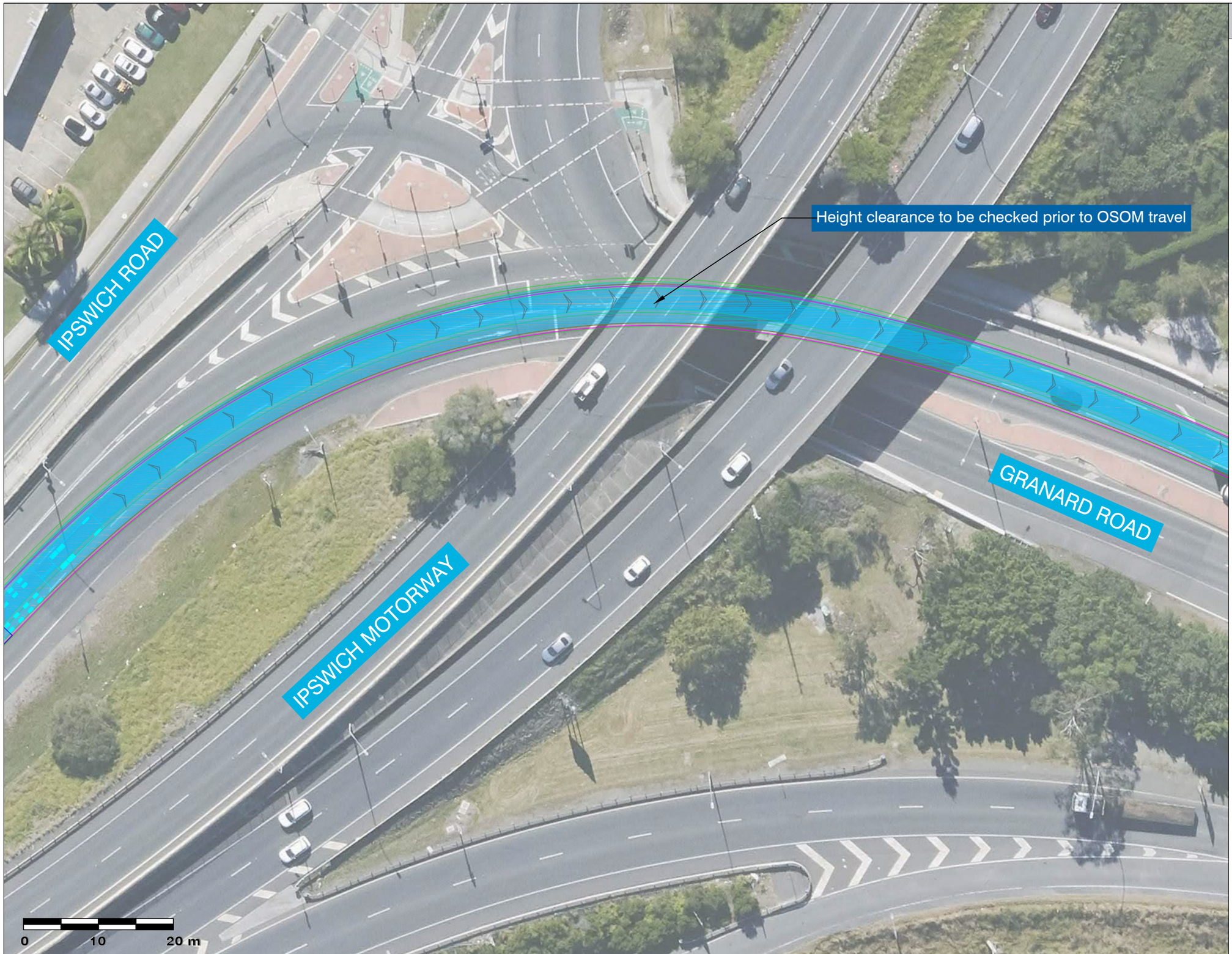
REV	DATE	COMMENT	DRAWN	REVIEWED

PROJECT:
Richmond Valley Solar Farm - OSOM
swept path assessment

DRAWING TITLE:
53 m vehicle swept path from James Eng Stradbroke Street/Logan Motorway westbound on-ramp, Heathwood, Queensland

CLIENT:	Ark Energy
DRG. #:	EMM-104
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS

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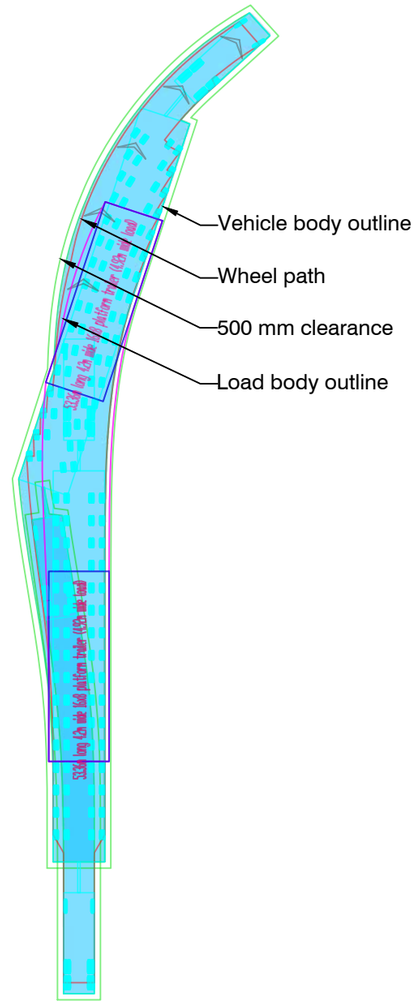

Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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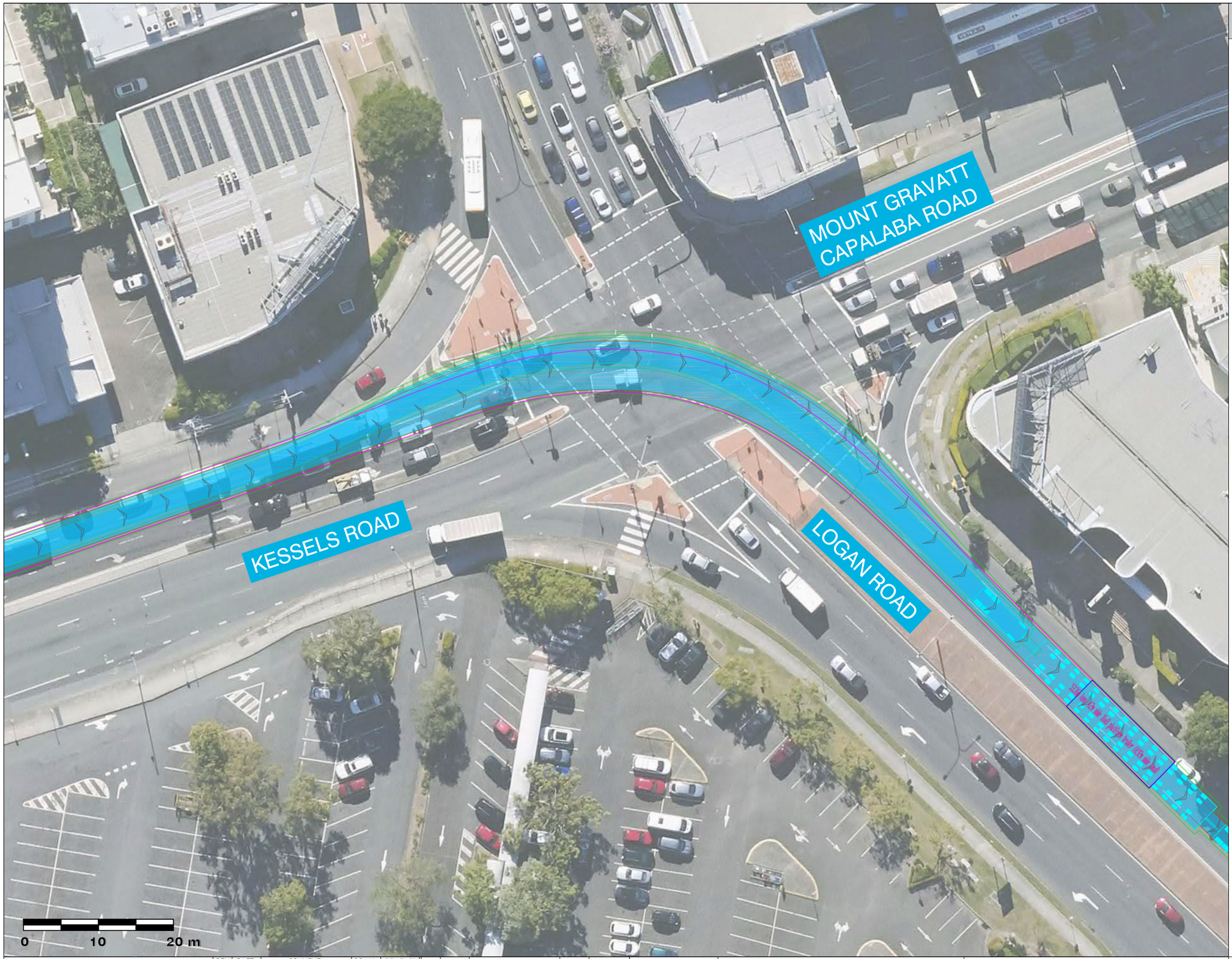
2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

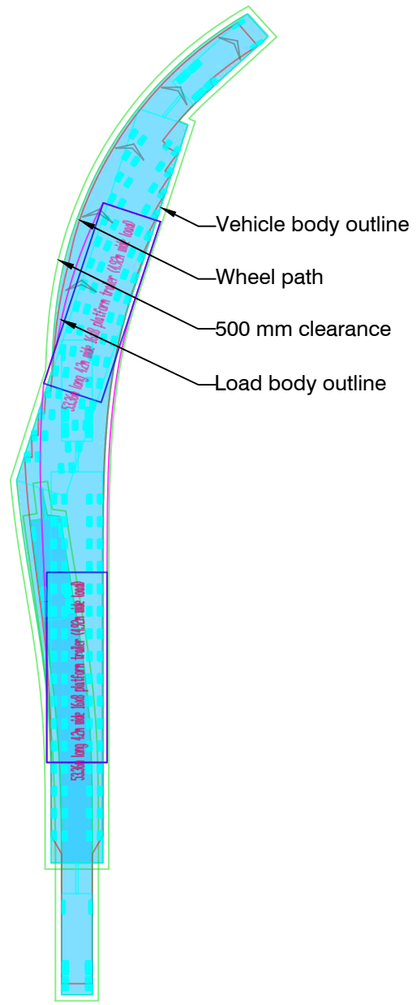
DRAWING TITLE:
53 m vehicle swept path from James Eng Ipswich Motorway/Granard Road, Rocklea, Queensland

CLIENT:	Ark Energy
DRG. #:	EMM-105
PROJECT #:	E240318
SCALE:	1:500

REV: 2



COMMENTS | A3



Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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REV	DATE	COMMENT	DRAWN	REVIEWED
2	12/04/24	FOR INFORMATION	JM	AU
1	08/04/24	FOR INFORMATION	JM	AU

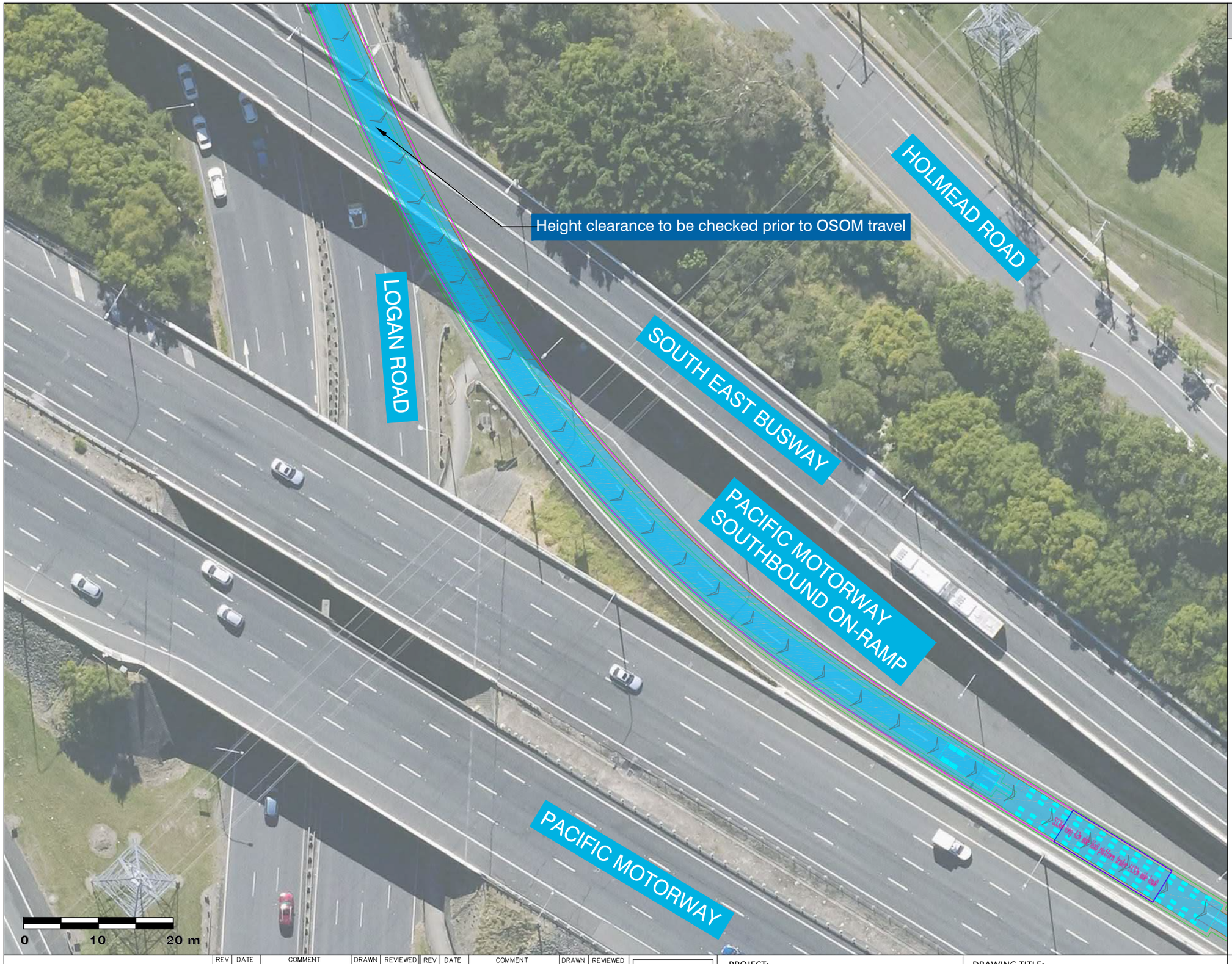
REV	DATE	COMMENT	DRAWN	REVIEWED

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from James Eng Logan Road/Kessels Road/ Mount Gravatt Capalaba Road, Upper Mount Gravatt, Queensland

CLIENT:	Ark Energy
DRG. #:	EMM-106
PROJECT #:	E240318
SCALE:	1:500

REV: 2



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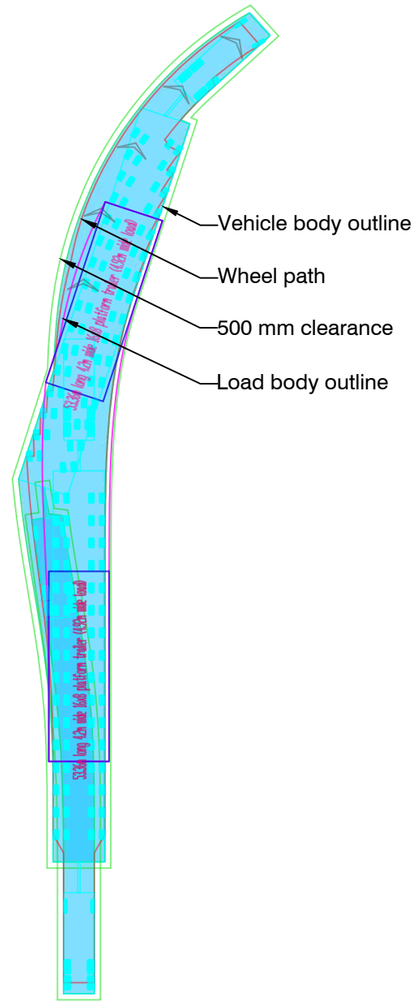

Vehicle body outline
Wheel path
500 mm clearance
Load body outline

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2	12/04/24	FOR INFORMATION	JM	AU					
1	08/04/24	FOR INFORMATION	JM	AU					

PROJECT:
Richmond Valley Solar Farm - OSOM swept path assessment

DRAWING TITLE:
53 m vehicle swept path from James Eng Logan Road/Pacific Motorway Southbound On-ramp, Eight Mile Plains, Queensland

CLIENT:	Ark Energy
DRG. #:	EMM-107
PROJECT #:	E240318
SCALE:	1:500

REV: 2

Australia

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Newcastle NSW 2300
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Spring Hill QLD 4000
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15 London Circuit
Canberra City ACT 2601

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Adelaide SA 5000
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454 Collins Street
Melbourne VIC 3000
T 03 9993 1900

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Perth WA 6000
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T 604 999 8297

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Appendix E – Concept Intersection Upgrade Plans

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

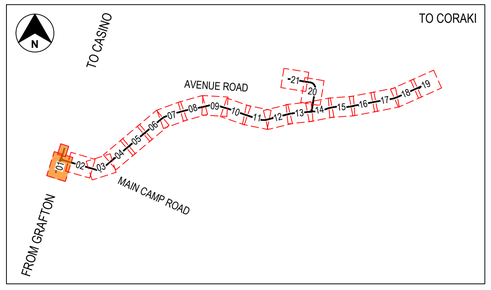
- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- 38 — MAJOR CONTOUR
- MINOR CONTOUR
- 38 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) C(D) C(D) — EXISTING COMMUNICATIONS
- E(D) E(D) E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
3. EXISTING CULVERTS TO BE RETAINED BY LOCALLY ADJUSTING THE ROAD FORMATION.
4. TABLE DRAINS ARE INDICATIVE BASED ON LIDAR AND DASH CAM FOOTAGE. LOCATION OF TABLE DRAINS TO BE VERIFIED THROUGH DETAILED SURVEY AND SITE INSPECTION IN SUBSEQUENT DESIGN STAGES.
5. REQUIREMENT FOR CULVERT UNDERNEATH PROPERTY ACCESS IN ACCORDANCE WITH NORTHERN RIVERS LOCAL GOVERNMENT STANDARD DRAWING R-14 REV D TO BE CONFIRMED IN SUBSEQUENT DESIGN STAGES.



KEY PLAN

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
C:\12dSldata\TE-Cloud\0426 RVSF_178\4. CAD\Drawings\0426-CV-0101-0121.dwg

EXTERNAL REFERENCE FILES
X-0426-00-RW-PLAN
X-0426-00-SK-TE-A1-SHT
X-0426-00-SK-TE-BDRS
X-0426-00-SK-ANNO
X-0426-00-SK-WET-PLAN
X-0426-00-SK-WET-LINE
X-0426-SU-CADASTRAL
X-0426-00-SU-PLAN
X-0426-00-RW-ALIGN-CONTOURS-wg
X-0426-00-SU-CONTOURS
X-0426-00-RW-ALIGN-360
X-0426-00-SU-EXISTING-CULVERTS
X-0426-00-SU-IT-EXISTING-UTILITIES
X-0426-00-RW-ANNO
X-0426-00-RW-ARRAY
X-0426-00-SU-AERIAL-FADED

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW
B	03.05.24	CONCEPT DESIGN		WW
C	10.05.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
0 5 10 15 20 25
SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 10 May 2024 01:36:10 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	10.05.24
DRG CHECK	B.EVANS	10.05.24
DESIGN	M.GAPPER	10.05.24
DESIGN CHECK	R.POTTS	10.05.24
DESIGN MNGR	W.WEBB	10.05.24
PROJECT MNGR	W.WEBB	10.05.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

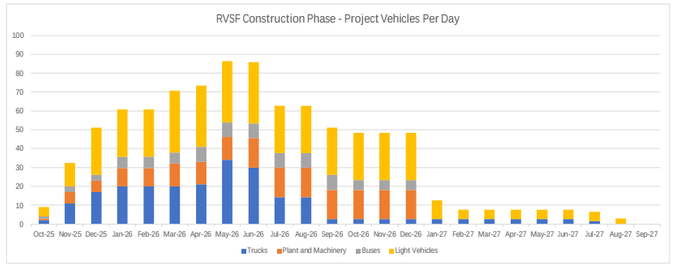
A1
SHEET 1 OF 21

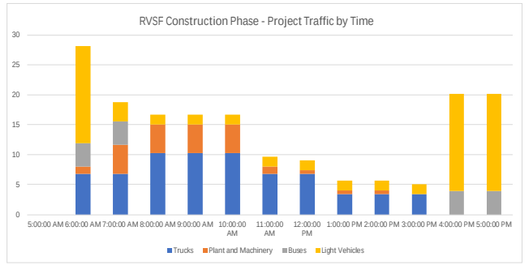
DRAWING NUMBER: 0426-CV-0101

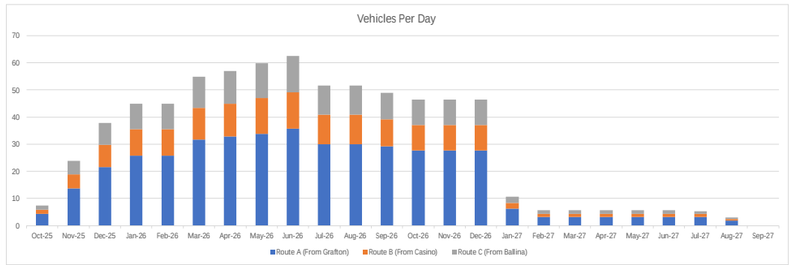
ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0101
ISSUE: C

Appendix F – Project Traffic Impact Calculations

Item Description	Classification	Units	Equipment Quantity	Qty / Vehicle	Total Vehicle Arrivals	First Delivery	Month Start	Last Delivery	Month Finish	Working Period (Deliveries 5 days)	Vehicles Per Day	Vehicle Type	Comment
PV Panels	Equipment Deliveries	No.	764,556	593	1,289	21-Nov-25	2.00	17-Sep-26	12.00	214	6	Common 4 Axle Twin Steer	Supplier provided information including ancilliaries.
Piles	Equipment Deliveries	No.	140,468	144	975	30-Oct-25	1.00	1-Jun-26	9.00	153	6	Common 4 Axle Twin Steer	
Tracker	Equipment Deliveries	No.	10,003	16	625	6-Dec-25	3.00	4-Sep-26	12.00	194	3	Common 4 Axle Twin Steer	Supplier provided information including trackers, piers and ancilliary items (i.e. dampers)
Inverter (SF)	Equipment Deliveries	No.	118	1	118	2-Apr-26	7.00	22-Jun-26	9.00	58	2	Common 4 Axle Twin Steer	Assume 1 per truck based on datasheet.
Inverter (BESS)	Equipment Deliveries	No.	106	1	106	2-Mar-26	6.00	15-Jul-26	10.00	96	1	Common 4 Axle Twin Steer	Assume 1 per truck based on datasheet.
Battery Storage (BESS)	Equipment Deliveries	No.	873	1	873	1-Apr-26	7.00	20-Jul-26	10.00	79	11	Common 4 Axle Twin Steer	Nominated by Energy Vault (8/day, Total 873 Nos). Need to check dates as currently circa 11 per day.
Cables Drums	Equipment Deliveries	No.	4508	8	564	10-Oct-25	1.00	23-Jun-26	9.00	183	3	Common 4 Axle Twin Steer	Assume 8 drums per truck as per breakdown on input tab.
Small tools, equipment and ancilliary items (conduits, combiner boxes, etc)	Equipment Deliveries	N/A	-	-	1029	10-Oct-25	1.00	30-Sep-27	23.00	514	2	Common 4 Axle Twin Steer	Conduits, combiner boxers, glands, lugs, ferrules, nuts, bolts, etc. Estimate at 2 per day.
Plant and machinery	Plant and Machinery	N/A	-	-	1044	1-Oct-25	1.00	31-Jan-27	16.00	348	3	Various plant and machinery	Floating on/off of plant. Concrete as required. Bedding sand import. Compound setup etc.
Workers - bussing	Commuter Vehicles	N/A	-	-	2087	1-Oct-25	1.00	31-Jan-27	16.00	348	6	50 seat bus	Assume 6 x 50 seater buses for 300 person workforce
Workers - light vehicles	Commuter Vehicles	N/A	-	-	8696	1-Oct-25	1.00	31-Jan-27	16.00	348	25	Light Vehicles	Assume 25 LV's per day for supervison/management not utilising buses
Site maintenance (fuel, waste, water, etc)	Plant and Machinery	N/A	-	-	1044	1-Oct-25	1.00	31-Jan-27	16.00	348	3	Various plant and machinery	Fuel trucks, water carts, waste removal etc to be steady throughout project duration.
Dust Suppression	Plant and Machinery	N/A	-	-	2087	1-Oct-25	1.00	31-Jan-27	16.00	348	6	Various plant and machinery	Assume 6 cycles per day as per CEP and water requirements provided previously. If water abvailble on site then less traffic on roads for water truck
Substation Main Transformer 230MVA	Equipment Deliveries	No.	3	1	3					1	1	16 axle Goldhoffer THP-SL Goose Neck trailer with a 8x8 Prime Mover	
Substation Switchrooms	Equipment Deliveries	No.	3	1	3					1	1	16 axle Goldhoffer THP-SL Goose Neck trailer with a 8x8 Prime Mover	







	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Table Qtys	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	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
Trucks	2	11	17	20	20	20	21	34	23	11	11	2	2	2	2	2	2	2	2	2	2	2	0	0
Plant and Machinery	2	12	12	12	12	12	12	12	12	12	12	12	12	12	12	0	0	0	0	0	0	0	0	0
Buses	2	6	6	6	6	6	6	6	6	6	6	4	4	4	4	0	0	0	0	0	0	0	0	0
Light Vehicles	10	25	25	25	25	25	25	25	25	25	25	25	25	25	25	10	5	5	5	5	5	5	3	0
Factors																								
Trucks	1	1	1	1	1	1	1	1	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1	1	1
Plant and Machinery	0.5	0.5	0.5	0.8	0.8	1	1	1	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1	1	1
Buses	0.5	0.5	0.5	1	1	1	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1	1	1	1	1	1	1
Light Vehicles	0.5	0.5	1	1	1	1.3	1.3	1.3	1.3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Daily																								
Trucks	2	11	17	20	20	20	21	34	30	14	14	3	3	3	3	3	3	3	3	3	3	2	0	0
Plant and Machinery	1	6	6	10	10	12	12	12	16	16	16	16	16	16	16	0	0	0	0	0	0	0	0	0
Buses	1	3	3	6	6	6	8	8	8	8	8	8	5	5	5	0	0	0	0	0	0	0	0	0
Light Vehicles	5	13	25	25	25	33	33	33	33	25	25	25	25	25	25	10	5	5	5	5	5	5	3	0
Overall Heavy Vehicles	4	20	26	36	36	38	41	54	53	38	38	26	23	23	23	3	3	3	3	3	3	2	0	0
Overall Light Vehicles	5	13	25	25	25	33	33	33	33	25	25	25	25	25	25	10	5	5	5	5	5	5	3	0
Overall Vehicles	9	33	51	61	61	71	73	87	86	63	63	51	48	48	48	13	8	8	8	8	8	7	3	0

Peak Construction (May 2026) Hourly	5:00:00 AM	6:00:00 AM	7:00:00 AM	8:00:00 AM	9:00:00 AM	10:00:00 AM	11:00:00 AM	12:00:00 PM	1:00:00 PM	2:00:00 PM	3:00:00 PM	4:00:00 PM	5:00:00 PM
Trucks	0	7	7	10	10	10	7	7	3	3	3	0	0
Plant and Machinery	0	1	5	5	5	5	1	1	1	1	0	0	0
Buses	0	4	4	0	0	0	0	0	0	0	0	4	4
Light Vehicles	0	16	3	2	2	2	2	2	2	2	2	16	16
Overall Heavy Vehicles	0	12	16	15	15	15	8	7	4	4	3	4	4
Overall Light Vehicles	0	16	3	2	2	2	2	2	2	2	2	16	16
Overall Vehicles	0	28	19	17	17	17	10	9	6	6	5	20	20

Route	Route A Grafton	Route B Casino	Route C Ballina	Port of Brisbane
Trucks	7%	8%	7%	78%
Plant and Machinery	60%	20%	20%	0%
Buses	60%	20%	20%	0%
Light Vehicles	60%	20%	20%	0%

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Route	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26	Jul-26	Aug-26	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
Route A (From Grafton)	4	14	22	26	26	32	33	34	36	30	30	29	28	28	28	6	3	3	3	3	3	3	2	0
Route B (From Casino)	2	5	8	10	10	12	12	13	14	11	11	10	9	9	9	2	1	1	1	1	1	1	1	0
Route C (From Ballina)	2	5	8	10	10	12	12	13	13	11	11	10	9	9	9	2	1	1	1	1	1	1	1	0
Route D (Port of Brisbane)	2	9	13	16	16	16	16	27	23	11	11	2	2	2	2	2	2	2	2	2	2	1	0	0

Hourly	5:00:00 AM	6:00:00 AM	7:00:00 AM	8:00:00 AM	9:00:00 AM	10:00:00 AM	11:00:00 AM	12:00:00 PM	1:00:00 PM	2:00:00 PM	3:00:00 PM	4:00:00 PM	5:00:00 PM
Trucks - Grafton	0	1	1	1	1	1	1	1	1	1	1	0	0
Trucks - Casino	0	1	1	1	1	1	1	1	0	0	0	0	0
Trucks - Ballina	0	0	0	1	1	1	0	0	0	0	0	0	0
Trucks - Port of Brisbane	0	5	5	8	8	8	5	5	3	3	3	0	0
Plant and Machinery - Grafton	0	1	3	3	3	3	1	0	0	0	0	0	0
Plant and Machinery - Casino	0	0	1	1	1	1	0	0	0	0	0	0	0
Plant and Machinery - Ballina	0	0	1	1	1	1	0	0	0	0	0	0	0
Buses - Grafton	0	2	2	0	0	0	0	0	0	0	0	2	2
Buses - Casino	0	1	1	0	0	0	0	0	0	0	0	1	1
Buses - Ballina	0	1	1	0	0	0	0	0	0	0	0	1	1
Light Vehicles - Grafton	0	10	2	1	1	1	1	1	1	1	1	10	10
Light Vehicles - Casino	0	3	1	0	0	0	1	1	1	1	1	3	3
Light Vehicles - Ballina	0	3	0	0	0	0	0	0	0	0	0	3	3
Overall Heavy Vehicles - Grafton	0	4	6	4	4	4	2	1	1	1	1	2	2
Overall Heavy Vehicles - Casino	0	2	3	2	2	2	1	1	0	0	0	1	1
Overall Heavy Vehicles - Ballina	0	1	2	2	2	2	0	0	0	0	0	1	1
Overall Heavy Vehicles - Port Brisbane	0	5	5	8	8	8	5	5	3	3	3	0	0
Overall Light Vehicles - Grafton	0	10	2	1	1	1	1	1	1	1	1	10	10
Overall Light Vehicles - Casino	0	3	1	0	0	0	1	1	1	1	1	3	3
Overall Light Vehicles - Ballina	0	3	0	0	0	0	0	0	0	0	0	3	3
Overall Vehicles	0	28	19	17	17	17	10	9	6	6	6	20	20

UMW0123-007 | Richmond Valley Solar Farm
Summerland Way / Main Camp Road Intersection
Peak Hour Intersection Volume Forecasts - Project Peak Hours

Project AM PEAK (6:00 - 7:00AM)

GR %	3.00%	3.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	3.00%	3.00%
YEAR	Summerland Way (South)				Main Camp Road (East)				Summerland Way (North)			
	T		R		L		R		L		T	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2023	19	5	1	0	1	0	1	0	1	0	21	4
2024	20	5	1	0	1	0	1	0	1	0	22	4
2025	20	5	1	0	1	0	1	0	1	0	22	4
2026	21	5	1	0	1	0	1	0	1	0	23	4
2027	21	6	1	0	1	0	1	0	1	0	24	5
2028	22	6	1	0	1	0	1	0	1	0	24	5
2029	23	6	1	0	1	0	1	0	1	0	25	5
2030	23	6	1	0	1	0	1	0	1	0	26	5
2031	24	6	1	0	1	0	1	0	1	0	27	5
2032	25	7	1	0	1	0	1	0	1	0	27	5
2033	26	7	1	0	1	0	1	0	1	0	28	5
2034	26	7	1	0	1	0	1	0	1	0	29	6
2035	27	7	1	0	1	0	1	0	1	0	30	6
2036	28	7	1	0	1	0	1	0	1	0	31	6
2037	29	8	1	0	1	0	1	0	1	0	32	6
2038	30	8	1	0	1	0	1	0	1	0	33	6
2039	30	8	1	0	1	0	1	0	1	0	34	6
2040	31	8	1	0	1	0	1	0	1	0	35	7
2041	32	9	1	0	1	0	1	0	1	0	36	7
2042	33	9	1	0	1	0	1	0	1	0	37	7
2043	34	9	1	0	1	0	1	0	1	0	38	7
2044	35	9	1	0	1	0	1	0	1	0	39	7
2045	36	10	1	0	1	0	1	0	1	0	40	8
2046	37	10	1	0	1	0	1	0	1	0	41	8
2047	39	10	1	0	1	0	1	0	1	0	43	8
2048	40	10	1	0	1	0	1	0	1	0	44	8
2049	41	11	1	0	1	0	1	0	1	0	45	9
2050	42	11	1	0	1	0	1	0	1	0	47	9
2051	43	11	1	0	1	0	1	0	1	0	48	9
2052	45	12	1	0	1	0	1	0	1	0	49	9
2053	46	12	1	0	1	0	1	0	1	0	51	10
2054	48	13	1	0	1	0	1	0	1	0	53	10
2055	49	13	1	0	1	0	1	0	1	0	54	10
2056	50	13	1	0	1	0	1	0	1	0	56	11
2057	52	14	1	0	1	0	1	0	1	0	57	11
PROJECT TRAFFIC (CONSTRUCTION)	0	0	10	4	0	4	0	8	6	8	0	0
EXTERNAL SSD PROJECT TRAFFIC	4	9	4	9	0	3	0	4	6	14	0	3
PROJECT TRAFFIC (CUMM. CONSTRUCTION)	4	9	14	13	0	7	0	12	12	22	0	3
PROJECT TRAFFIC (OPERATIONS)	0	0	9	1	0	1	0	1	6	1	0	0
PROJECT TRAFFIC (DECOMMISSIONING)	0	0	7	3	0	3	0	6	4	6	0	0
2026 IN CONSTRUCTION	21	5	11	4	1	4	1	8	7	8	23	4
2026 IN CONSTRUCTION CUMMULATIVE	25	14	15	13	1	7	1	12	13	22	23	7
2037 OPERATIONS	29	8	10	1	1	1	1	1	7	1	32	6
2057 DECOMMISSIONING	52	14	8	3	1	3	1	6	6	6	57	11

Project PM PEAK (5:00 - 6:00pm)

GR %	3.00%	3.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	3.00%	3.00%
YEAR	Summerland Way (South)				Main Camp Road (East)				Summerland Way (North)			
	T		R		L		R		L		T	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2023	32	3	2	0	1	0	1	0	2	0	39	6
2024	33	3	2	0	1	0	1	0	2	0	40	6
2025	34	3	2	0	1	0	1	0	2	0	41	6
2026	35	3	2	0	1	0	1	0	2	0	43	7
2027	36	3	2	0	1	0	1	0	2	0	44	7
2028	37	3	2	0	1	0	1	0	2	0	45	7
2029	38	4	2	0	1	0	1	0	2	0	47	7
2030	39	4	2	0	1	0	1	0	2	0	48	7
2031	41	4	2	0	1	0	1	0	2	0	49	8
2032	42	4	2	0	1	0	1	0	2	0	51	8
2033	43	4	2	0	1	0	1	0	2	0	52	8
2034	44	4	2	0	1	0	1	0	2	0	54	8
2035	46	4	2	0	1	0	1	0	2	0	56	9
2036	47	4	2	0	1	0	1	0	2	0	57	9
2037	48	5	2	0	1	0	1	0	2	0	59	9
2038	50	5	2	0	1	0	1	0	2	0	61	9
2039	51	5	2	0	1	0	1	0	2	0	63	10
2040	53	5	2	0	1	0	1	0	2	0	64	10
2041	54	5	2	0	1	0	1	0	2	0	66	10
2042	56	5	2	0	1	0	1	0	2	0	68	11
2043	58	5	2	0	1	0	1	0	2	0	70	11
2044	60	6	2	0	1	0	1	0	2	0	73	11
2045	61	6	2	0	1	0	1	0	2	0	75	11
2046	63	6	3	0	1	0	1	0	3	0	77	12
2047	65	6	3	0	1	0	1	0	3	0	79	12
2048	67	6	3	0	1	0	1	0	3	0	82	13
2049	69	6	3	0	1	0	1	0	3	0	84	13
2050	71	7	3	0	1	0	1	0	3	0	87	13
2051	73	7	3	0	1	0	1	0	3	0	89	14
2052	75	7	3	0	1	0	1	0	3	0	92	14
2053	78	7	3	0	1	0	1	0	3	0	95	15
2054	80	8	3	0	1	0	1	0	3	0	98	15
2055	82	8	3	0	1	0	1	0	3	0	100	15
2056	85	8	3	0	1	0	1	0	3	0	103	16
2057	87	8	3	0	1	0	1	0	3	0	107	16
PROJECT TRAFFIC (CONSTRUCTION)	0	0	0	2	10	2	6	2	0	2	0	0
EXTERNAL SSD PROJECT TRAFFIC	0	3	0	3	4	9	6	14	0	4	4	9
PROJECT TRAFFIC (CUMM. CONSTRUCTION)	0	3	0	5	14	11	12	16	0	6	4	9
PROJECT TRAFFIC (OPERATIONS)	0	0	0	1	9	1	6	1	0	1	0	0
PROJECT TRAFFIC (DECOMMISSIONING)	0	0	0	1	7	1	4	1	0	1	0	0
2026 IN CONSTRUCTION	35	3	2	2	11	2	7	2	2	2	43	7
2026 IN CONSTRUCTION CUMMULATIVE	35	6	2	5	15	11	13	16	2	6	47	16
2037 OPERATIONS	48	5	2	1	10	1	7	1	2	1	59	9
2057 DECOMMISSIONING	87	8	3	1	8	1	6	1	3	1	107	16

ACCESS TRAFFIC CONSULTING

UMW0123-007 | Richmond Valley Solar Farm
Summerland Way / Main Camp Road Intersection
Peak Hour Intersection Volume Forecasts - Adjacent Road Network Peak Hours

Project AM PEAK (8:00 - 9:00AM)

GR %	3.00%	3.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	3.00%	3.00%
YEAR	Summerland Way (South)				Main Camp Road (East)				Summerland Way (North)			
	T		R		L		R		L		T	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2023	34	9	2	0	2	1	6	1	5	1	39	11
2024	35	9	2	0	2	1	6	1	5	1	40	11
2025	36	10	2	0	2	1	6	1	5	1	41	12
2026	37	10	2	0	2	1	6	1	5	1	43	12
2027	38	10	2	0	2	1	6	1	5	1	44	12
2028	39	10	2	0	2	1	6	1	5	1	45	13
2029	41	11	2	0	2	1	6	1	5	1	47	13
2030	42	11	2	0	2	1	6	1	5	1	48	14
2031	43	11	2	0	2	1	6	1	5	1	49	14
2032	44	12	2	0	2	1	7	1	5	1	51	14
2033	46	12	2	0	2	1	7	1	6	1	52	15
2034	47	12	2	0	2	1	7	1	6	1	54	15
2035	48	13	2	0	2	1	7	1	6	1	56	16
2036	50	13	2	0	2	1	7	1	6	1	57	16
2037	51	14	2	0	2	1	7	1	6	1	59	17
2038	53	14	2	0	2	1	7	1	6	1	61	17
2039	55	14	2	0	2	1	7	1	6	1	63	18
2040	56	15	2	0	2	1	7	1	6	1	64	18
2041	58	15	2	0	2	1	7	1	6	1	66	19
2042	60	16	2	0	2	1	7	1	6	1	68	19
2043	61	16	2	0	2	1	7	1	6	1	70	20
2044	63	17	2	0	2	1	7	1	6	1	73	20
2045	65	17	2	0	2	1	7	1	6	1	75	21
2046	67	18	3	0	3	1	8	1	6	1	77	22
2047	69	18	3	0	3	1	8	1	6	1	79	22
2048	71	19	3	0	3	1	8	1	6	1	82	23
2049	73	19	3	0	3	1	8	1	6	1	84	24
2050	76	20	3	0	3	1	8	1	7	1	87	24
2051	78	21	3	0	3	1	8	1	7	1	89	25
2052	80	21	3	0	3	1	8	1	7	1	92	26
2053	83	22	3	0	3	1	8	1	7	1	95	27
2054	85	23	3	0	3	1	8	1	7	1	98	28
2055	88	23	3	0	3	1	8	1	7	1	100	28
2056	90	24	3	0	3	1	8	1	7	1	103	29
2057	93	25	3	0	3	1	8	1	7	1	107	30
PROJECT TRAFFIC (CONSTRUCTION)	0	0	1	4	0	4	0	12	0	12	0	0
EXTERNAL SSD PROJECT TRAFFIC	4	9	4	9	0	3	0	4	6	14	0	3
PROJECT TRAFFIC (CUMM. CONSTRUCTION)	4	9	5	13	0	7	0	16	6	26	0	3
PROJECT TRAFFIC (OPERATIONS)	0	0	0	1	0	1	0	1	0	1	0	0
PROJECT TRAFFIC (DECOMMISSIONING)	0	0	1	3	0	3	0	8	0	8	0	0
2026 IN CONSTRUCTION	37	10	3	4	2	5	6	13	5	13	43	12
2026 IN CONSTRUCTION CUMMULATIVE	41	19	7	13	2	8	6	17	11	27	43	15
2037 OPERATIONS	51	14	2	1	2	2	7	2	6	2	59	17
2057 DECOMMISSIONING	93	25	4	3	3	4	8	10	7	10	107	30

Project PM PEAK (3:00 - 4:00pm)

GR %	3.00%	3.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	3.00%	3.00%
YEAR	Summerland Way (South)				Main Camp Road (East)				Summerland Way (North)			
	T		R		L		R		L		T	
	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV	LV	HV
2023	42	7	1	0	2	0	5	1	5	0	45	6
2024	43	7	1	0	2	0	5	1	5	0	46	6
2025	45	7	1	0	2	0	5	1	5	0	48	6
2026	46	8	1	0	2	0	5	1	5	0	49	7
2027	47	8	1	0	2	0	5	1	5	0	51	7
2028	49	8	1	0	2	0	5	1	5	0	52	7
2029	50	8	1	0	2	0	5	1	5	0	54	7
2030	52	9	1	0	2	0	5	1	5	0	55	7
2031	53	9	1	0	2	0	5	1	5	0	57	8
2032	55	9	1	0	2	0	5	1	5	0	59	8
2033	56	9	1	0	2	0	6	1	6	0	60	8
2034	58	10	1	0	2	0	6	1	6	0	62	8
2035	60	10	1	0	2	0	6	1	6	0	64	9
2036	62	10	1	0	2	0	6	1	6	0	66	9
2037	64	11	1	0	2	0	6	1	6	0	68	9
2038	65	11	1	0	2	0	6	1	6	0	70	9
2039	67	11	1	0	2	0	6	1	6	0	72	10
2040	69	12	1	0	2	0	6	1	6	0	74	10
2041	72	12	1	0	2	0	6	1	6	0	77	10
2042	74	12	1	0	2	0	6	1	6	0	79	11
2043	76	13	1	0	2	0	6	1	6	0	81	11
2044	78	13	1	0	2	0	6	1	6	0	84	11
2045	80	13	1	0	2	0	6	1	6	0	86	11
2046	83	14	1	0	3	0	6	1	6	0	89	12
2047	85	14	1	0	3	0	6	1	6	0	91	12
2048	88	15	1	0	3	0	6	1	6	0	94	13
2049	91	15	1	0	3	0	6	1	6	0	97	13
2050	93	16	1	0	3	0	7	1	7	0	100	13
2051	96	16	1	0	3	0	7	1	7	0	103	14
2052	99	16	1	0	3	0	7	1	7	0	106	14
2053	102	17	1	0	3	0	7	1	7	0	109	15
2054	105	18	1	0	3	0	7	1	7	0	113	15
2055	108	18	1	0	3	0	7	1	7	0	116	15
2056	111	19	1	0	3	0	7	1	7	0	119	16
2057	115	19	1	0	3	0	7	1	7	0	123	16
PROJECT TRAFFIC (CONSTRUCTION)	0	0	0	1	1	1	1	3	0	3	0	0
EXTERNAL SSD PROJECT TRAFFIC	0	3	0	3	4	9	6	14	0	4	4	9
PROJECT TRAFFIC (CUMM. CONSTRUCTION)	0	3	0	4	5	10	7	17	0	7	4	9
PROJECT TRAFFIC (OPERATIONS)	0	0	0	1	0	1	0	1	0	1	0	0
PROJECT TRAFFIC (DECOMMISSIONING)	0	0	0	1	1	1	1	2	0	2	0	0
2026 IN CONSTRUCTION	46	8	1	1	3	1	6	4	5	3	49	7
2026 IN CONSTRUCTION CUMMULATIVE	46	11	1	4	7	10	12	18	5	7	53	16
2037 OPERATIONS	64	11	1	1	2	1	6	2	6	1	68	9
2057 DECOMMISSIONING	115	19	1	1	4	1	8	4	7	2	123	16

ACCESS TRAFFIC CONSULTING

ENG0122-005 | Elliott Heads Relocatable Home Park Development
Project Traffic Impact % Calculations

Background

Road ID	Road Description	Segment	AADT Segment		Base Data Year	Base Year AADT			Base Year HV%		Base Year HV		10 Yr GR%	2024 AADT			2024 HV	
			Start (km)	End (km)		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz
B91	Summerland Way	Casino to South Casino	-	-	2019	1,891	1,910	3,801	18.20%	17.60%	344	336	3.00%	2,192	2,214	4,406	399	390
		South Casino to Main Camp Road	-	-	2008	632	648	1,280	18.80%	17.00%	119	110	3.00%	1,014	1,040	2,054	191	177
		Main Camp Road to Whiporie	-	-	2008	632	648	1,280	18.80%	17.00%	119	110	3.00%	1,014	1,040	2,054	191	177
		Whiporie to Warragai Creek	-	-	2007	1,201	1,263	2,464	18.80%	17.00%	226	215	3.00%	1,985	2,088	4,073	373	355
		Warragai Creek to Grafton North	-	-	2011	3,196	3,209	6,405	7.60%	8.10%	243	260	3.00%	4,693	4,713	9,406	357	382
		Grafton North to Grafton	-	-	2019	12,390	12,527	24,917	2.00%	2.10%	248	263	3.00%	14,363	14,522	28,886	287	305
RVC	Main Camp Road	Summerland Way to Avenue Road	0.000	0.515	2023	80	80	160	12.50%	12.50%	10	10	1.00%	81	81	162	10	10
RVC	Avenue Road	Main Camp Road to Site Access 1	0.000	2.618	2023	40	40	80	10.00%	10.00%	4	4	1.00%	40	40	81	4	4
		Site Access 1 to Site Access 2	2.618	3.051	2023	40	40	80	10.00%	10.00%	4	4	1.00%	40	40	81	4	4
		Site Access 2 to Site Access 3	3.051	4.443	2023	40	40	80	10.00%	10.00%	4	4	1.00%	40	40	81	4	4

RVSF Project Construction Phase

Road ID	Road Description	Segment	AADT Segment		Base Data Year	Base Year AADT			Base Year HV%		Base Year HV		10 Yr GR%	2026 AADT			2026 HV	
			Start (km)	End (km)		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz
B91	Summerland Way	Casino to South Casino	-	-	2019	1,891	1,910	3,801	18.20%	17.60%	344	336	3.00%	2,326	2,349	4,675	423	413
		South Casino to Main Camp Road	-	-	2008	632	648	1,280	18.80%	17.00%	119	110	3.00%	1,076	1,103	2,179	202	188
		Main Camp Road to Whiporie	-	-	2008	632	648	1,280	18.80%	17.00%	119	110	3.00%	1,076	1,103	2,179	202	188
		Whiporie to Warragai Creek	-	-	2007	1,201	1,263	2,464	18.80%	17.00%	226	215	3.00%	2,106	2,215	4,321	396	376
		Warragai Creek to Grafton North	-	-	2011	3,196	3,209	6,405	7.60%	8.10%	243	260	3.00%	4,979	5,000	9,979	378	405
		Grafton North to Grafton	-	-	2019	12,390	12,527	24,917	2.00%	2.10%	248	263	3.00%	15,238	15,407	30,645	305	324
RVC	Main Camp Road	Summerland Way to Avenue Road	0.000	0.515	2023	80	80	160	12.50%	12.50%	10	10	1.00%	82	82	165	10	10
RVC	Avenue Road	Main Camp Road to Site Access 1	0.000	2.618	2023	40	40	80	10.00%	10.00%	4	4	1.00%	41	41	82	4	4
		Site Access 1 to Site Access 2	2.618	3.051	2023	40	40	80	10.00%	10.00%	4	4	1.00%	41	41	82	4	4
		Site Access 2 to Site Access 3	3.051	4.443	2023	40	40	80	10.00%	10.00%	4	4	1.00%	41	41	82	4	4

RVSF Project Construction		
Gaz	A-Gaz	Bi-Dir
53	53	105
53	53	105
34	34	68
34	34	68
34	34	68
34	34	68
86	86	173
86	86	173
86	86	173
86	86	173

2026 Peak Construction		
Gaz	A-Gaz	Bi-Dir
2,378	2,402	4,780
1,128	1,156	2,284
1,110	1,137	2,247
2,140	2,248	4,388
5,013	5,033	10,046
15,272	15,440	30,712
169	169	337
128	128	255
128	128	255
128	128	255

% Increase RVSF Construct		
Gaz	A-Gaz	Bi-Dir
2.26%	2.24%	2.25%
4.88%	4.76%	4.82%
3.14%	3.06%	3.10%
1.60%	1.52%	1.56%
0.68%	0.68%	0.68%
0.22%	0.22%	0.22%
104.70%	104.70%	104.70%
209.40%	209.40%	209.40%
209.40%	209.40%	209.40%
209.40%	209.40%	209.40%

External Project Volumes		
Gaz	A-Gaz	Bi-Dir
240	240	480
240	240	480
160	160	320
160	160	320
160	160	320
160	160	320
200	200	400
0	0	0
0	0	0
0	0	0

2026 Cum. Construction		
Gaz	A-Gaz	Bi-Dir
2,618	2,642	5,260
1,368	1,396	2,764
1,270	1,297	2,567
2,300	2,408	4,708
5,173	5,193	10,366
15,432	15,600	31,032
369	369	737
128	128	255
128	128	255
128	128	255

% Increase Cum. Construction		
Gaz	A-Gaz	Bi-Dir
12.58%	12.45%	12.52%
27.19%	26.52%	26.85%
18.01%	17.56%	17.78%
9.20%	8.75%	8.97%
3.89%	3.88%	3.88%
1.27%	1.26%	1.26%
347.35%	347.35%	347.35%
209.40%	209.40%	209.40%
209.40%	209.40%	209.40%
209.40%	209.40%	209.40%

RVSF Project Operations Phase

Road ID	Road Description	Segment	AADT Segment		Base Data Year	Base Year AADT			Base Year HV%		Base Year HV		10 Yr GR%	2037 AADT			2037 HV	
			Start (km)	End (km)		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz
B91	Summerland Way	Casino to South Casino	-	-	2019	1,891	1,910	3,801	18.20%	17.60%	344	336	3.00%	3,219	3,252	6,471	586	572
		South Casino to Main Camp Road	-	-	2008	632	648	1,280	18.80%	17.00%	119	110	3.00%	1,489	1,527	3,016	280	260
		Main Camp Road to Whiporie	-	-	2008	632	648	1,280	18.80%	17.00%	119	110	3.00%	1,489	1,527	3,016	280	260
		Whiporie to Warragai Creek	-	-	2007	1,201	1,263	2,464	18.80%	17.00%	226	215	3.00%	2,915	3,066	5,981	548	521
		Warragai Creek to Grafton North	-	-	2011	3,196	3,209	6,405	7.60%	8.10%	243	260	3.00%	6,892	6,921	13,813	524	561
		Grafton North to Grafton	-	-	2019	12,390	12,527	24,917	2.00%	2.10%	248	263	3.00%	21,093	21,326	42,420	422	448
RVC	Main Camp Road	Summerland Way to Avenue Road	0.000	0.515	2023	80	80	160	12.50%	12.50%	10	10	1.00%	92	92	184	11	11
RVC	Avenue Road	Main Camp Road to Site Access 1	0.000	2.618	2023	40	40	80	10.00%	10.00%	4	4	1.00%	46	46	92	5	5
		Site Access 1 to Site Access 2	2.618	3.051	2023	40	40	80	10.00%	10.00%	4	4	1.00%	46	46	92	5	5
		Site Access 2 to Site Access 3	3.051	4.443	2023	40	40	80	10.00%	10.00%	4	4	1.00%	46	46	92	5	5

RVSF Project Operations		
Gaz	A-Gaz	Bi-Dir
7	7	14
7	7	14
10	10	20
10	10	20
10	10	20
10	10	20
16	16	32
16	16	32
16	16	32
1	1	2

2037 Project Operations		
Gaz	A-Gaz	Bi-Dir
3,226	3,259	6,485
1,496	1,534	3,030
1,499	1,537	3,036
2,925	3,076	6,001
6,902	6,931	13,833
21,103	21,336	42,440
108	108	216
62	62	124
62	62	124
47	47	94

% Increase RVSF Operations		
Gaz	A-Gaz	Bi-Dir
0.22%	0.22%	0.22%
0.47%	0.46%	0.46%
0.67%	0.65%	0.66%
0.34%	0.33%	0.33%
0.15%	0.14%	0.14%
0.05%	0.05%	0.05%
17.40%	17.40%	17.40%
34.80%	34.80%	34.80%
34.80%	34.80%	34.80%
2.17%	2.17%	2.17%

RVSF Project Decommissioning Phase

Road ID	Road Description	Segment	AADT Segment		Base Data Year	Base Year AADT			Base Year HV%		Base Year HV		10 Yr GR%	2057 AADT			2057 HV	
			Start (km)	End (km)		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz	Gaz	A-Gaz		Gaz	A-Gaz	Bi-Dir	Gaz	A-Gaz
B91	Summerland Way	Casino to South Casino	-	-	2019	1,891	1,910	3,801	18.20%	17.60%	344	336	3.00%	5,814	5,873	11,687	1,058	1,034
		South Casino to Main Camp Road	-	-	2008	632	648	1,280	18.80%	17.00%	119	110	3.00%	2,690	2,758	5,448	506	469
		Main Camp Road to Whiporie	-	-	2008	632	648	1,280	18.80%	17.00%	119	110	3.00%	2,690	2,758	5,448	506	469
		Whiporie to Warragai Creek	-	-	2007	1,201	1,263	2,464	18.80%	17.00%	226	215	3.00%	5,265	5,537	10,802	990	941
		Warragai Creek to Grafton North	-	-	2011	3,196	3,209	6,405	7.60%	8.10%	243	260	3.00%	12,449	12,499	24,948	946	1,012
		Grafton North to Grafton	-	-	2019	12,390	12,527	24,917	2.00%	2.10%	248	263	3.00%	38,097	38,518	76,614	762	809
RVC	Main Camp Road	Summerland Way to Avenue Road	0.000	0.515	2023	80	80	160	12.50%	12.50%	10	10	1.00%	112	112	224	14	14
RVC	Avenue Road	Main Camp Road to Site Access 1	0.000	2.618	2023	40	40	80	10.00%	10.00%	4	4	1.00%	56	56	112	6	6
		Site Access 1 to Site Access 2	2.618	3.051	2023	40	40	80	10.00%	10.00%	4	4	1.00%	56	56	112	6	6
		Site Access 2 to Site Access 3	3.051	4.443	2023	40	40	80	10.00%	10.00%	4	4	1.00%	56	56	112	6	6

RVSF Project Decomm.		
Gaz	A-Gaz	Bi-Dir
37	37	74
37	37	74
24	24	47
24	24	47
24	24	47
24	24	47
60	60	121
60	60	121
60	60	121
60	60	121

2057 Project Decomm.		
Gaz	A-Gaz	Bi-Dir
5,851	5,910	11,761
2,727	2,795	5,522
2,714	2,782	5,495
5,289	5,561	10,849
12,472	12,523	24,995
38,120	38,541	76,662
173	173	345
117	117	233
117	117	233
117	117	233

% Increase RVSF Decomm.		
Gaz	A-Gaz	Bi-Dir
0.63%	0.63%	0.63%
1.37%	1.33%	1.35%
0.88%	0.86%	0.87%
0.45%	0.43%	0.44%
0.19%	0.19%	0.19%
0.06%	0.06%	0.06%
53.84%	53.84%	53.84%
107.68%	107.68%	107.68%
107.68%	107.68%	107.68%
107.68%	107.68%	107.68%

Appendix G – Turn Warrants Assessment

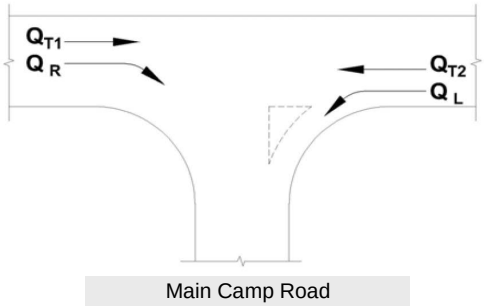
Intersection:	**Summerland Way / Main Camp Road**	
Year / Peak:	**2026 AM & PM Peak (Project)**	Scenario: **Construction**

Assessment based on Austroads Guide to Traffic Management Part 6. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	*PM Peak*
Q_{T1} =	26	38
Q_R =	15	4

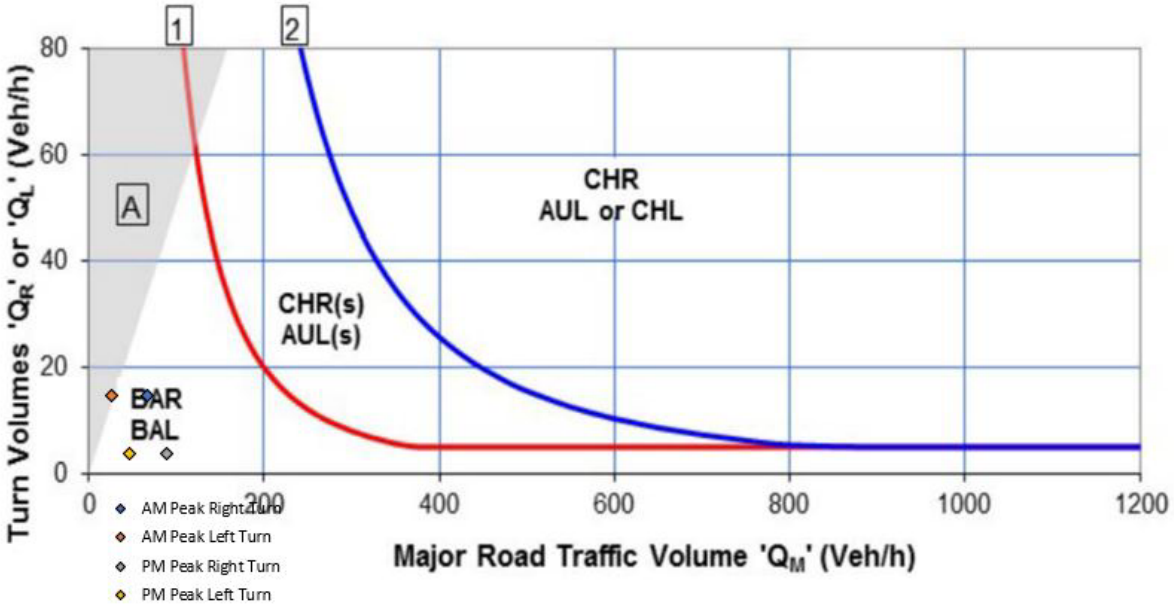
Splitter Island? No

Design speed (km/h) 110



	AM Peak	*PM Peak*
Q_{T2} =	27	49
Q_L =	15	4

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	69	15
Left	27	15
PM Peak		
Right	91	4
Left	49	4



Recommended treatments:

Right Turn	BAR
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:

Prepared by:	A. Barrie
Reviewed by:	A. Barrie
Date:	18/03/2024

ACCESS TRAFFIC CONSULTING

Turn Warrant Assessment

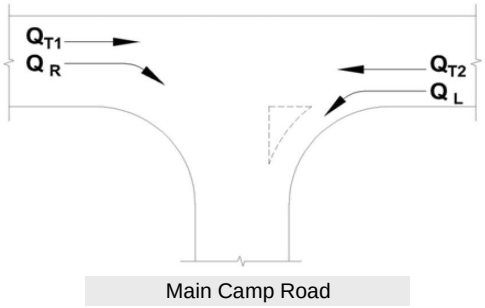
Intersection:	**Summerland Way / Main Camp Road**
Year / Peak:	**2026 AM & PM Peak (Network)** Scenario: **Construction**

Assessment based on Austroads Guide to Traffic Management Part 6. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	*PM Peak*
Q_{T1} =	47	54
Q_R =	7	2

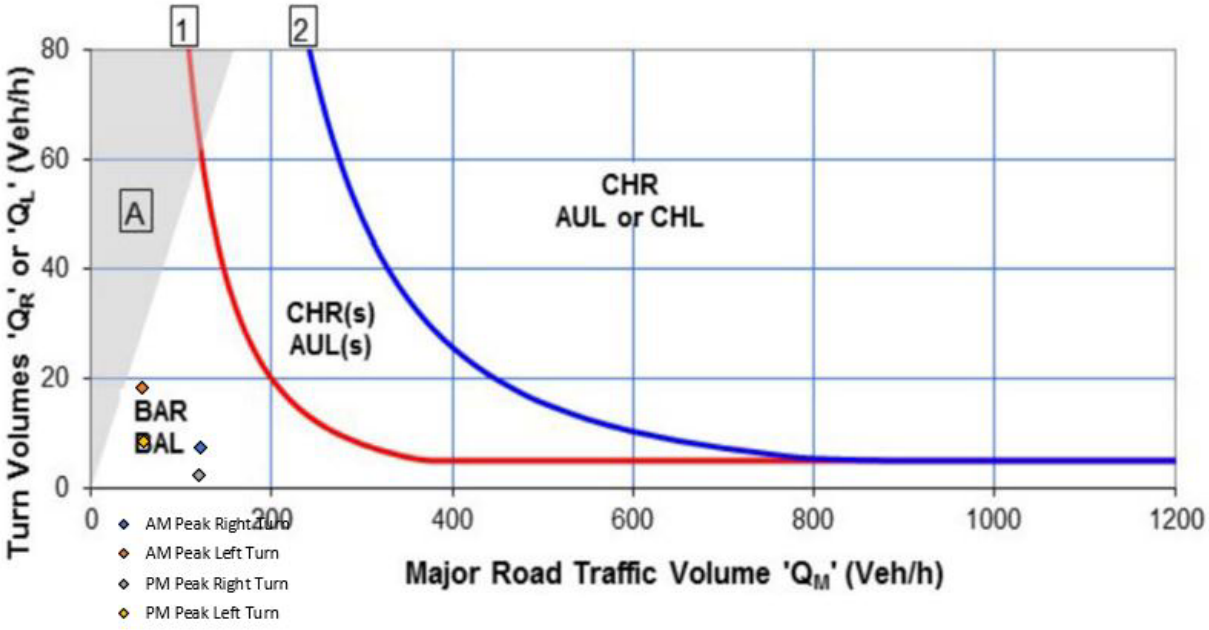
Splitter Island? No

Design speed (km/h) 110



	AM Peak	*PM Peak*
Q_{T2} =	55	56
Q_L =	18	8

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	120	7
Left	55	18
PM Peak		
Right	117	2
Left	56	8



Recommended treatments:

Right Turn	BAR
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:

Prepared by:	A. Barrie
Reviewed by:	A. Barrie
Date:	18/03/2024

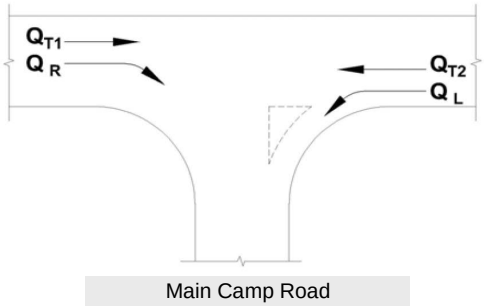
Intersection:	**Summerland Way / Main Camp Road**
Year / Peak:	**2026 AM & PM Peak (Project)**
Scenario:	**Cumulative Construction**

Assessment based on Austroads Guide to Traffic Management Part 6. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	*PM Peak*
Q_{T1} =	39	41
Q_R =	28	7

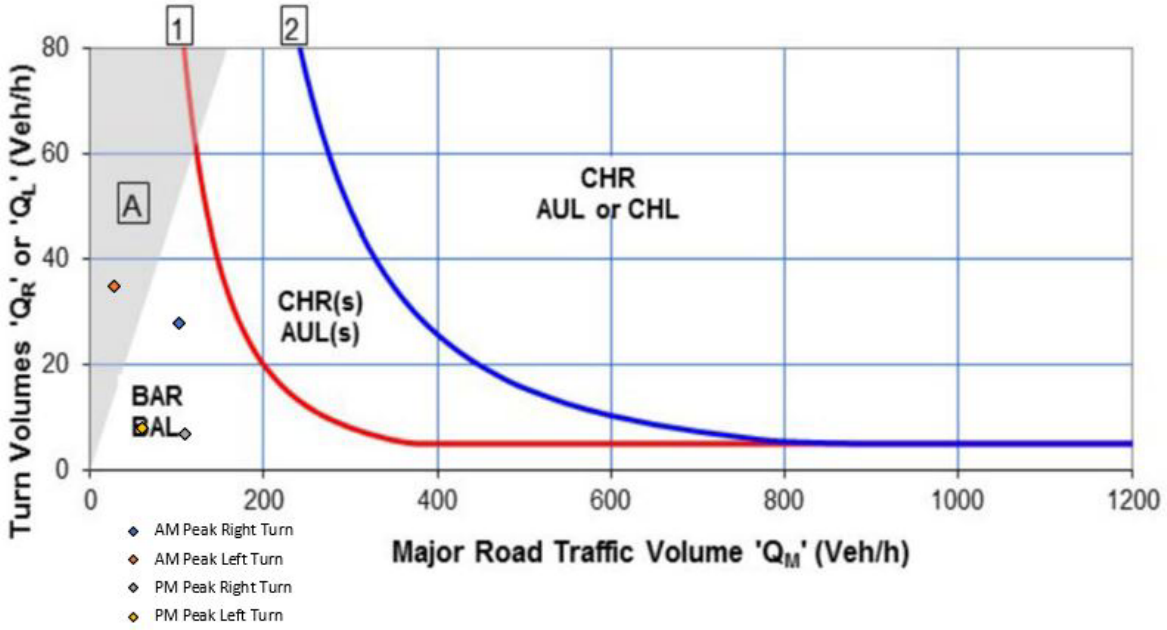
Splitter Island? No

Design speed (km/h) 110



	AM Peak	*PM Peak*
Q_{T2} =	30	62
Q_L =	35	8

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	105	28
Left	30	35
PM Peak		
Right	111	7
Left	62	8



Recommended treatments:

Right Turn	BAR
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:

Prepared by:	A. Barrie
Reviewed by:	A. Barrie
Date:	18/03/2024

ACCESS TRAFFIC CONSULTING

Turn Warrant Assessment

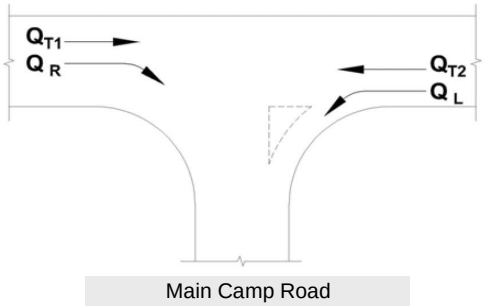
Intersection:	**Summerland Way / Main Camp Road**
Year / Peak:	**2026 AM & PM Peak (Network)**
Scenario:	**Cumulative Construction**

Assessment based on Austroads Guide to Traffic Management Part 6. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	*PM Peak*
Q_{T1} =	60	57
Q_R =	20	5

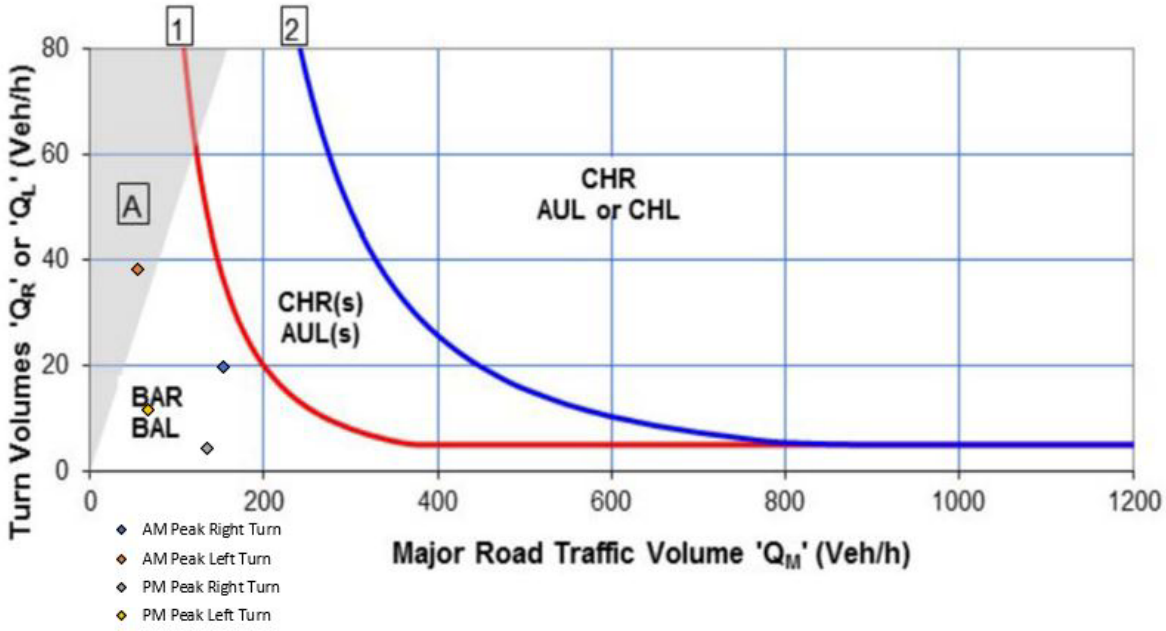
Splitter Island? No

Design speed (km/h) 110



	AM Peak	*PM Peak*
Q_{T2} =	58	69
Q_L =	38	12

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	156	20
Left	58	38
PM Peak		
Right	137	5
Left	69	12



Recommended treatments:

Right Turn	BAR
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:

Prepared by:	A. Barrie
Reviewed by:	A. Barrie
Date:	18/03/2024

Intersection:	**Summerland Way / Main Camp Road**
Year / Peak:	**2037 AM & PM Peak (Project)**

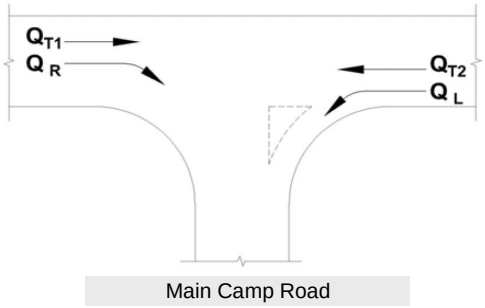
Scenario: **Operations**

Assessment based on Austroads Guide to Traffic Management Part 6. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	*PM Peak*
Q_{T1} =	36	53
Q_R =	11	3

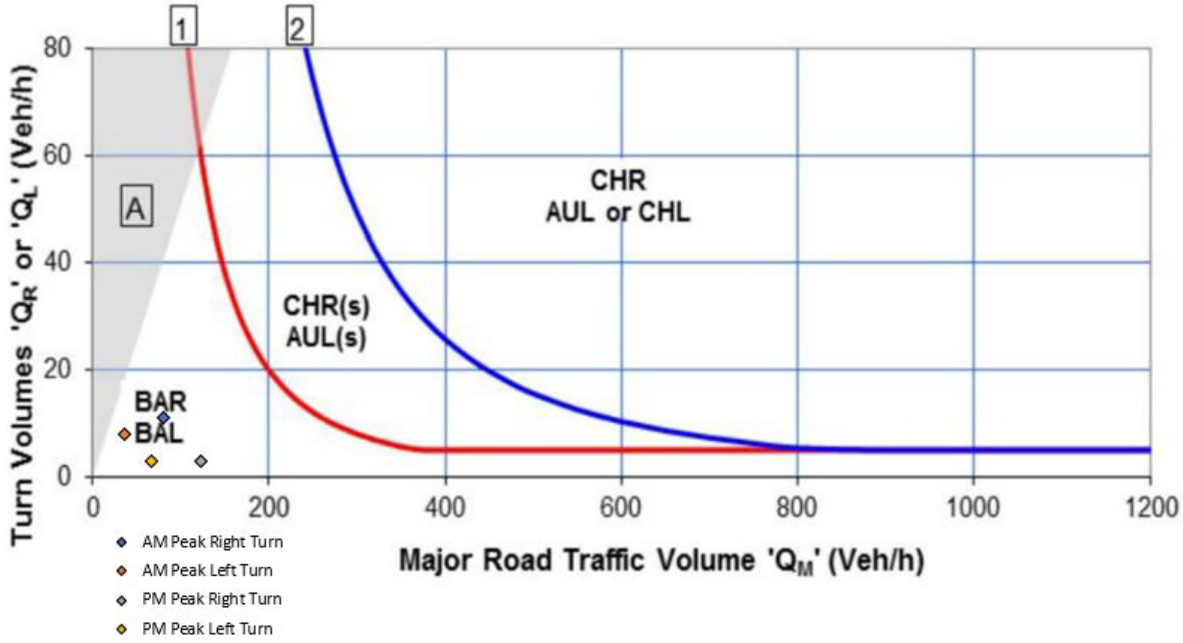
Splitter Island? No

Design speed (km/h) 110



	AM Peak	*PM Peak*
Q_{T2} =	38	68
Q_L =	8	3

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	82	11
Left	38	8
PM Peak		
Right	124	3
Left	68	3



Recommended treatments:

Right Turn	BAR
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:

Prepared by:	A. Barrie
Reviewed by:	A. Barrie
Date:	18/03/2024

ACCESS TRAFFIC CONSULTING

Turn Warrant Assessment

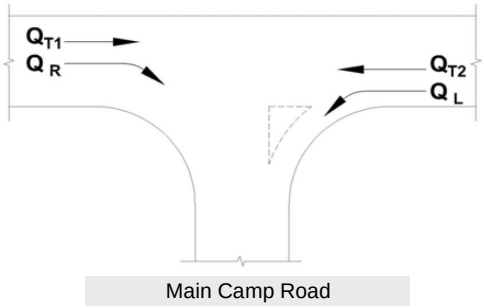
Intersection:	**Summerland Way / Main Camp Road**
Year / Peak:	**2037 AM & PM Peak (Network)** Scenario: **Operations**

Assessment based on Austroads Guide to Traffic Management Part 6. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	*PM Peak*
Q_{T1} =	65	74
Q_R =	3	2

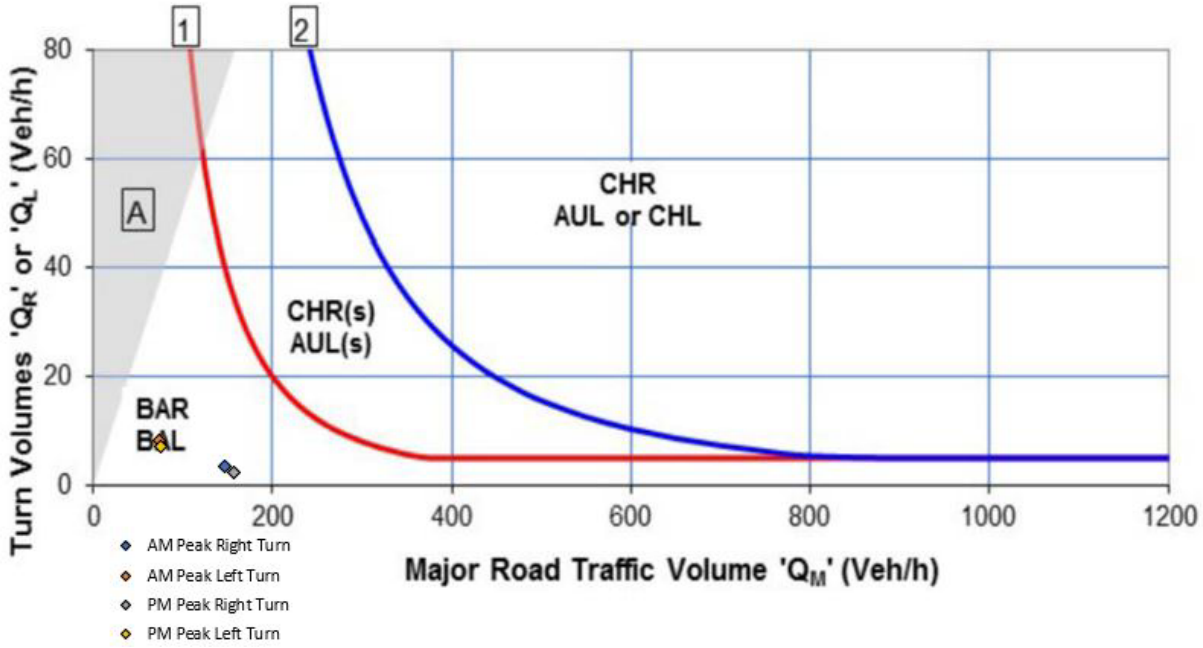
Splitter Island? No

Design speed (km/h) 110



	AM Peak	*PM Peak*
Q_{T2} =	76	77
Q_L =	8	7

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	149	3
Left	76	8
PM Peak		
Right	158	2
Left	77	7



Recommended treatments:

Right Turn	BAR
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:

Prepared by:	A. Barrie
Reviewed by:	A. Barrie
Date:	18/03/2024

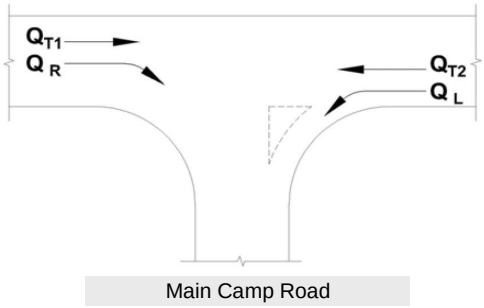
Intersection:	**Summerland Way / Main Camp Road**	
Year / Peak:	**2057 AM & PM Peak (Project)**	Scenario: **Decommissioning**

Assessment based on Austroads Guide to Traffic Management Part 6. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	*PM Peak*
Q_{T1} =	66	96
Q_R =	11	4

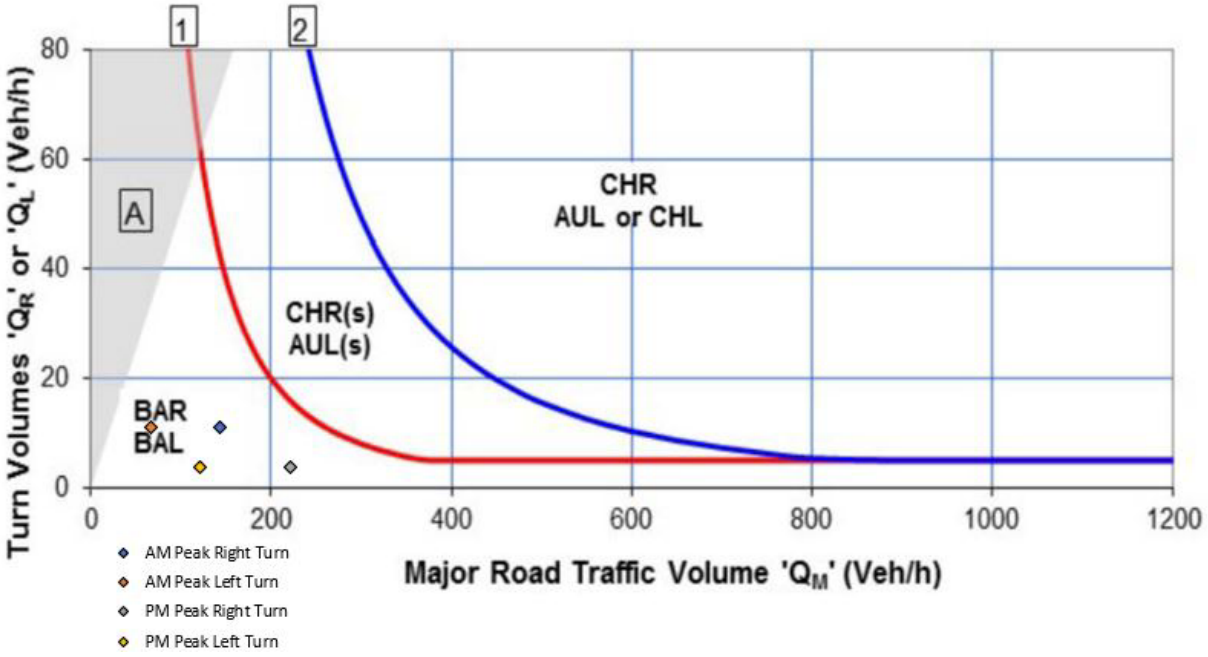
Splitter Island? No

Design speed (km/h) 110



	AM Peak	*PM Peak*
Q_{T2} =	68	123
Q_L =	11	4

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	145	11
Left	68	11
PM Peak		
Right	223	4
Left	123	4



Recommended treatments:

Right Turn	BAR
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:

Prepared by:	A. Barrie
Reviewed by:	A. Barrie
Date:	18/03/2024

ACCESS TRAFFIC CONSULTING

Turn Warrant Assessment

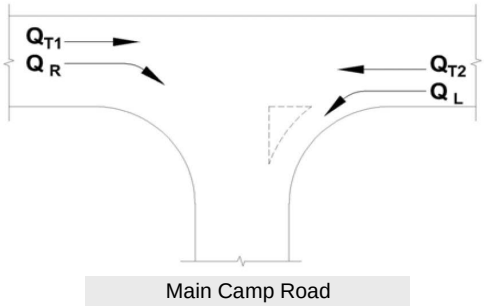
Intersection:	**Summerland Way / Main Camp Road**
Year / Peak:	**2057 AM & PM Peak (Network)** Scenario: **Decommissioning**

Assessment based on Austroads Guide to Traffic Management Part 6. This warrant assessment applies only to turning movements from the major road only.

	AM Peak	*PM Peak*
Q_{T1} =	117	134
Q_R =	6	2

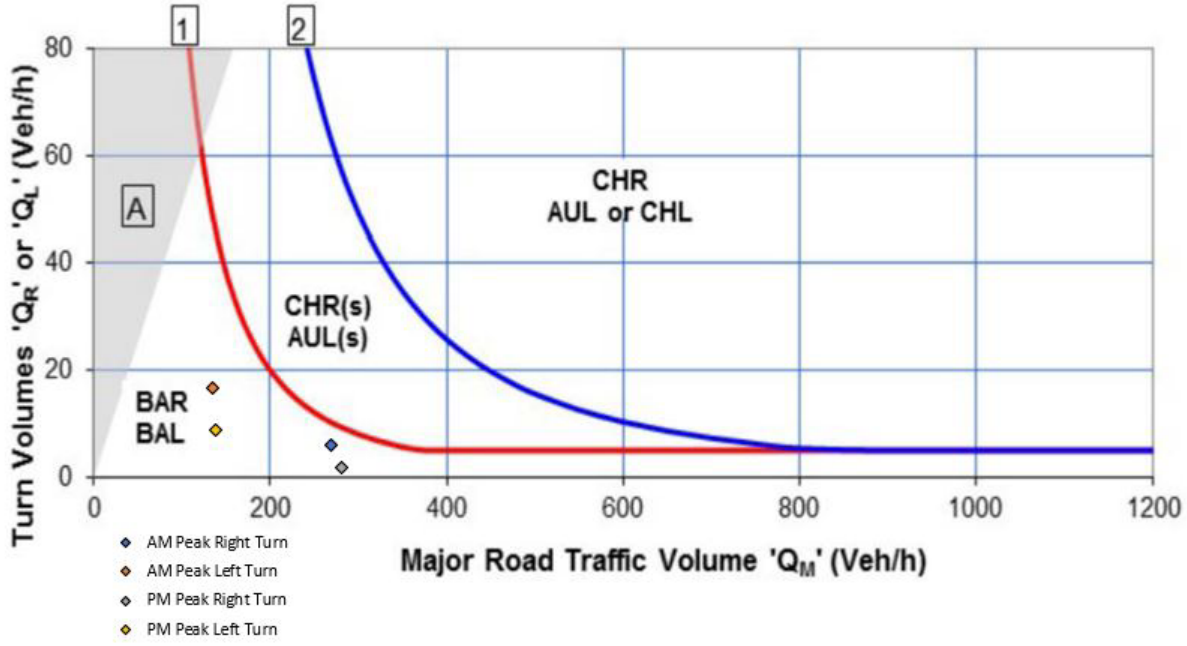
Splitter Island? No

Design speed (km/h) 110



	AM Peak	*PM Peak*
Q_{T2} =	137	139
Q_L =	17	9

Graph	Q_M	Q_R/Q_L
AM Peak		
Right	271	6
Left	137	17
PM Peak		
Right	282	2
Left	139	9



Recommended treatments:

Right Turn	BAR
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:

Prepared by:	A. Barrie
Reviewed by:	A. Barrie
Date:	18/03/2024

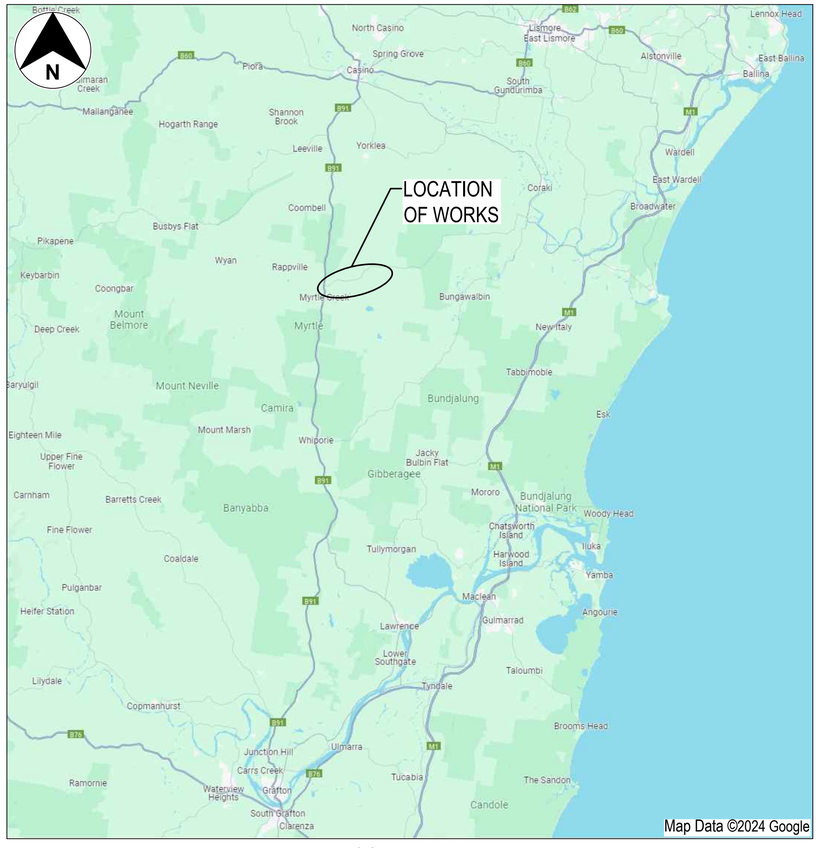
Appendix H – Civil Preliminary Design Drawings

RICHMOND VALLEY SOLAR FARM

CONCEPT DESIGN

ARK ENERGY

CIVIL WORKS



LOCALITY PLAN

NOT TO SCALE

NOT FOR CONSTRUCTION

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EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL	SCALES ON A1 SIZE DRAWING	TITLE	NAME	DATE			
X:\0426-00-GN-TE-A1-SHT	A	12.04.24	CONCEPT DESIGN		WW	NOT TO SCALE	DRAWN	S.THORNE	12.04.24			
							DRG CHECK	B.EVANS	12.04.24			
							DESIGN	M.GAPPER	12.04.24			
							DESIGN CHECK	R.POTTS	12.04.24			
						CO-ORDINATE SYSTEM / HEIGHT DATUM MGA ZONE 56 (GDA2020) AHD	DESIGN MNGR	W.WEBB	12.04.24			
							PROJECT MNGR	W.WEBB	12.04.24		DRAWING NUMBER 0426-CV-0001 ISSUE STATUS CONCEPT DESIGN SHEET No. CV-0001 ISSUE A	

DRAWING INDEX

SHEET No.	SHEET TYPE	SHEET DETAILS	No. OF SHEETS	ISSUE
GN-0001	CIVIL WORKS	COVER SHEET	1 OF 1	A
GN-0002	CIVIL WORKS	DRAWING INDEX	1 OF 1	B
GN-0011	CIVIL WORKS	NOTES	1 OF 1	A
CV-0051	CIVIL WORKS	TYPICAL SECTIONS	1 OF 2	B
CV-0052	CIVIL WORKS	TYPICAL SECTIONS	2 OF 2	B
CV-0061	CIVIL WORKS	PAVEMENT PROFILES	1 OF 1	A
CV-0101	CIVIL WORKS	GENERAL ARRANGEMENT	1 OF 21	C
CV-0102	CIVIL WORKS	GENERAL ARRANGEMENT	2 OF 21	B
CV-0103	CIVIL WORKS	GENERAL ARRANGEMENT	3 OF 21	A
CV-0104	CIVIL WORKS	GENERAL ARRANGEMENT	4 OF 21	A
CV-0105	CIVIL WORKS	GENERAL ARRANGEMENT	5 OF 21	A
CV-0106	CIVIL WORKS	GENERAL ARRANGEMENT	6 OF 21	A
CV-0107	CIVIL WORKS	GENERAL ARRANGEMENT	7 OF 21	A
CV-0108	CIVIL WORKS	GENERAL ARRANGEMENT	8 OF 21	A
CV-0109	CIVIL WORKS	GENERAL ARRANGEMENT	9 OF 21	A
CV-0110	CIVIL WORKS	GENERAL ARRANGEMENT	10 OF 21	A
CV-0111	CIVIL WORKS	GENERAL ARRANGEMENT	11 OF 21	A
CV-0112	CIVIL WORKS	GENERAL ARRANGEMENT	12 OF 21	A
CV-0113	CIVIL WORKS	GENERAL ARRANGEMENT	13 OF 21	A
CV-0114	CIVIL WORKS	GENERAL ARRANGEMENT	14 OF 21	B
CV-0115	CIVIL WORKS	GENERAL ARRANGEMENT	15 OF 21	A
CV-0116	CIVIL WORKS	GENERAL ARRANGEMENT	16 OF 21	A
CV-0117	CIVIL WORKS	GENERAL ARRANGEMENT	17 OF 21	A
CV-0118	CIVIL WORKS	GENERAL ARRANGEMENT	18 OF 21	A
CV-0119	CIVIL WORKS	GENERAL ARRANGEMENT	19 OF 21	A
CV-0120	CIVIL WORKS	GENERAL ARRANGEMENT	20 OF 21	A
CV-0121	CIVIL WORKS	GENERAL ARRANGEMENT	21 OF 21	A

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
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EXTERNAL REFERENCE FILES
X-0426-00-GN-TEA1.SHT
X-0426-00-GN-INDEX

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW
B	10.05.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 10 May 2024 01:35:41 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	10.05.24
DRG CHECK	B.EVANS	10.05.24
DESIGN	M.GAPPER	10.05.24
DESIGN CHECK	R.POTTS	10.05.24
DESIGN MNGR	W.WEBB	10.05.24
PROJECT MNGR	W.WEBB	10.05.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
A1
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
GENERAL
DRAWING INDEX
SHEET 1 OF 1

DRAWING NUMBER: 0426-CV-0002

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0002
ISSUE: B

GENERAL

1. REDUCED LEVELS ARE TO AUSTRALIAN HEIGHT DATUM (AHD).
2. COORDINATE CONTROL IS ON MAP GRID OF AUSTRALIA (MGA ZONE 56 GDA 2020).
3. ALL DIMENSIONS ARE IN METRES (m) UNLESS NOTED OTHERWISE. ALL LEVELS, COORDINATES AND CHAINAGES ARE EXPRESSED IN METRES (m).
4. DO NOT OBTAIN DIMENSIONS BY SCALING FROM THE DRAWINGS.
5. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, EXISTING LEVELS AND PROPOSED SETTING OUT INFORMATION ON SITE PRIOR TO COMMENCEMENT OF WORKS. ANY DISCREPANCIES OR OMISSIONS ON THIS PACKAGE SHALL BE REFERRED TO THE PRINCIPAL FOR RESOLUTION.
6. NO SURVEY CONTROL OR CADASTRAL MARKS INCLUDING PERMANENT SURVEY MARKS, BOUNDARY MARKS, REFERENCE MARKS AND BENCH MARKS AS DEFINED BY THE SURVEYING AND SPATIAL INFORMATION ACT 2020 (NSW) AND SURVEYING AND SPATIAL INFORMATION REGULATION 2012 (NSW) ARE TO BE DAMAGED, DISTURBED OR DESTROYED WITHOUT PRIOR AUTHORISATION FROM THE NSW SURVEYOR GENERAL. COMPLY WITH TRANSPORT FOR NSW D&C SPECIFICATIONS G71 FOR CARE, PROTECTION AND PRESERVATION OF SURVEY CONTROL AND CADASTRAL MARKS.
7. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH CONCEPT DESIGN REPORT [REF: RVSF-BULL-MYC-CV-RPT-0004_Concept Design Report(B)].

EARTHWORKS

1. THE ROAD ALIGNMENT AND EARTHWORKS SHALL BE SETOUT FROM THE 3D MODEL.
2. CUT BATTERS SHALL BE MADE SMOOTH AND FREE FROM OBSTACLES FROM THE BASE OF THE CUT TO 1.0 m ABOVE EDGE OF PAVEMENT.

STORMWATER DRAINAGE

1. CONCRETE DRAINAGE STRUCTURES TO BE INSTALLED IN ACCORDANCE WITH TfNSW SPECIFICATION R53 UNLESS NOTIFIED OTHERWISE.
2. FOUNDATION SUPPORT FOR DRAINAGE STRUCTURES MUST BE PROVIDED IN ACCORDANCE TO TfNSW SPECIFICATION R11 AND R44.
3. BOX CULVERTS TO BE INSTALLED IN ACCORDANCE WITH TfNSW QA SPECIFCATION R16.
4. FOR CONSTRUCTION BELOW THE NATURAL SURFACE, UNSUITABLE MATERIALS BELOW DRAINGE STRUCTURES MUST BE REMOVED AND IMPROVED IN ACCORDANCE WITH TfNSW SPECIFICATION R44.
5. TABLE DRAINS TO BE CONSTRUCTED IN ACCORDANCE WITH NORTHERN RIVERS - LOCAL GOVERNMENT DEVELOPENT DESIGN SPECIFICATION D1 - GEOMTRIC ROAD DESIGN (URBAN AND RURAL).
6. PROPOSED TABLE DRAINS SHOWN ON THE DRAWINGS ARE INDICATIVE ONLY AND SUBJECT TO FURTHER DEVELOPMENT AT FUTURE DESIGN CHANGES.
7. EXISTING DRAINAGE CULVERT INFORMATION SHOWN ON THE DRAWINGS WAS SOURCED FROM COUNCIL SUPPLIED GIS. ALL LOCATIONS, ORIENTATION AND LEVELS OF EXISTING DRAINAGE SHALL BE VERIFIED ON SITE BEFORE COMMENCING ANY WORK.
8. FOR EXISTING AND PROPOSED DRAINAGE IMPACTED BY CONSTRUCTION ACTIVITIES, THE CONTRACTOR IS TO DEVELOP AND IMPLEMENT STRATEGIES TO PROTECT THEM FROM DAMAGE DURING CONSTRUCTION.
9. THE EXPOSURE CLASSIFICATION FOR DRAINAGE STRUCTURES AND BOX CULVERTS SHALL BE 'B1' IN ACCORDANCE WITH AS5100.5, U.N.O
10. THE CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION OF TEMPORARY DRAINAGE WORKS AND TEMPORARY EROSION AND SEDIMENTATION CONTROL PLANS.

PAVEMENTS

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. TIE-INS MUST ACHIEVE A SMOOTH TRANSITION WITH EXISTING AT LIMITS OF WORK.
3. TEMPORARY PAVEMENTS TO BE IN ACCORDANCE WITH TfNSW SPECIFICATION G10.
4. EARTHWORKS TO BE CONSTRUCTED IN ACCORDANCE WITH TFNSW SPECIFICATION R44.
5. UNBOUND PAVEMENT COURSE TO BE CONSTRUCTED IN ACCORDANCE WITH TfNSW R71.
6. SPRAYED BITUMINOUS SURFACING WITH CUTBACK BITUMEN TO BE CONSTRUCTED IN ACCORDANCE WITH TfNSW R106.
7. VERGE AND GENERAL FILL TO BE IN ACCORDANCE WITH TfNSW SPECIFICATION R44.
7. DGB MATERIAL TO BE IN ACCORDANCE WITH TfNSW SPECIFICATION 3051.
8. SELECTED MATERIAL TO BE IN ACCORDANCE WITH TfNSW SPECIFICATION 3071.
9. COVER AGGREGATE FOR SPRAYED SEALS TO BE IN ACCORDANCE WITH TfNSW SPECIFICATION 3151.
10. BITUMEN BINDER TO BE IN ACCORDANCE WITH TfNSW SPECIFICATION 3253.

UTILITIES

1. THE PURPOSE OF PRESENTING EXISTING PUBLIC UTILITIES IS TO FACILITATE THE IDENTIFICATION AND DOCUMENTATION OF IMPACTS FROM PROPOSED PROJECT WORKS.
2. THE LOCATIONS OF EXISTING PUBLIC UTILITIES HAS BEEN COMPILED FROM BYDA ENQUIRY.
3. UTILITY INFORMATION SHOWN ON THE DRAWINGS DOES NOT DEPICT ANY MORE THAN THE PRESENCE OF A SERVICE
4. BASED ON AVAILABLE DOCUMENTARY EVIDENCE. THE POSITION (LOCATION, ALIGNMENT AND DEPTH) OF UTILITIES SHOWN ON THE DRAWINGS ARE INDICATIVE ONLY AND NO RESPONSIBILITY IS TAKEN FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SUPPLIED. THE PRESENCE OF A UTILITY SERVICE, ITS SIZE AND LOCATION SHOULD BE CONFIRMED BY FIELD INSPECTION AND POTHOLING PRIOR TO THE COMMENCEMENT OF ROADWORKS, AND RELEVANT UTILITY PLANS OBTAINED FROM THE BEFORE YOU DIG AUSTRALIA (BYDA) WEBSITE. CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.
5. THE CONTRACTOR SHALL, PRIOR TO THE COMMENCEMENT OF WORK:
   a. REVIEW THE EXTENT OF EXISTING UTILITY SURVEY AND INFORMATION REFERENCED IN THESE DRAWINGS.
   b. OBTAIN CURRENT BYDA PLANS AND INFORMATION.
   c. MAKE ANY OTHER ENQUIRIES OR INVESTIGATIONS NECESSARY TO DETERMINE THE EXACT LOCATION OF UTILITY SERVICES.
   d. DEVELOP WORK METHODS TO AVOID DAMAGE TO ALL UTILITIES.
6. THE CONTRACTOR MUST VERIFY ALL EXISTING AND REDUNDANT SERVICES POTENTIALLY AFFECTED BY BOTH TEMPORARY AND PERMANENT PROJECT WORKS TO DETERMINE REQUIREMENTS FOR ADJUSTMENT, RELOCATION, PROTECTION, SUPPORT, ENHANCEMENT, DISCONNECTION OR REMOVAL OF THESE SERVICES. THIS MUST BE UNDERTAKEN IN CONSULTATION WITH THE RELEVANT SERVICE OWNER OR AUTHORITY.
7. THE CONTRACTOR MUST PROTECT AND MAINTAIN ALL EXISTING SERVICES DURING ALL STAGES OF THE PROJECT. ALL DAMAGE TO THESE SERVICES AS A RESULT OF THESE WORKS MUST BE REPAIRED BY THE CONTRACTOR UNDER THE DIRECTION OF THE RELEVANT SERVICE OWNER OR AUTHORITY, AND AT NO EXTRA COST.
8. CONSTRUCTION CONTROL MEASURES FOR BUILDING OVER OR ADJACENT TO EXISTING UTILITIES WILL INCLUDE THE FOLLOWING:
   a. LOCATION OF SERVICES USING NON-DESTRUCTIVE DIGGING (NDD) PRIOR TO CONSTRUCTION.
   b. PROTECTION OF UTILITIES IN ACCORDANCE WITH APPROVED DETAILS FROM THE RELEVANT UTILITY AUTHORITY.
   c. ESTABLISHMENT OF EXCLUSION ZONES USING CLEAR DELINEATION.
   d. COMMUNICATING EXCLUSION ZONE AND PROTECTION REQUIREMENTS TO THE WORK CREW DURING TOOLBOX SESSIONS.
   e. REDUCING THE SIZE OF CONSTRUCTION PLANT FOR COMPACTION OF PAVEMENT LAYERS OR ALTERNATIVELY, USE OF HAND OPERATED EQUIPMENT.
   f. USE OF STATIC ROLLING WITHIN THE ZONE OF INFLUENCE OF THE ASSET.
   g. ENFORCING COMPACTION CONTROLS ON SITE.
9. ALL WORKING NEAR OR AROUND UNDERGROUND CABLES MUST BE IN ACCORDANCE WITH THE AUTHORITY REQUIREMENTS.
10. WHERE PAVEMENT CONSTRUCTION IS REQUIRED OVER SHALLOW UTILITIES TO BE RETAINED 8:1 SAND-CEMENT MIX CAN BE USED AS A SUBSTITUTE FOR DGS20 SUBBASE.
11. CONTRACTOR TO CONFIRM AND REMOVE ABANDONED UTILITIES IMPACTING PROPOSED WORKS PRIOR TO CONSTRUCTION COMMENCEMENT.

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
C:\12dS\data\TE-Cloud\0426 RVSF_178\4. CAD\Drawings\0426-CV-0011.dwg

EXTERNAL REFERENCE FILES
X-0426-00-GN-TEA1-SHT
X-0426-00-GN-NOTES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 04:23:16 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

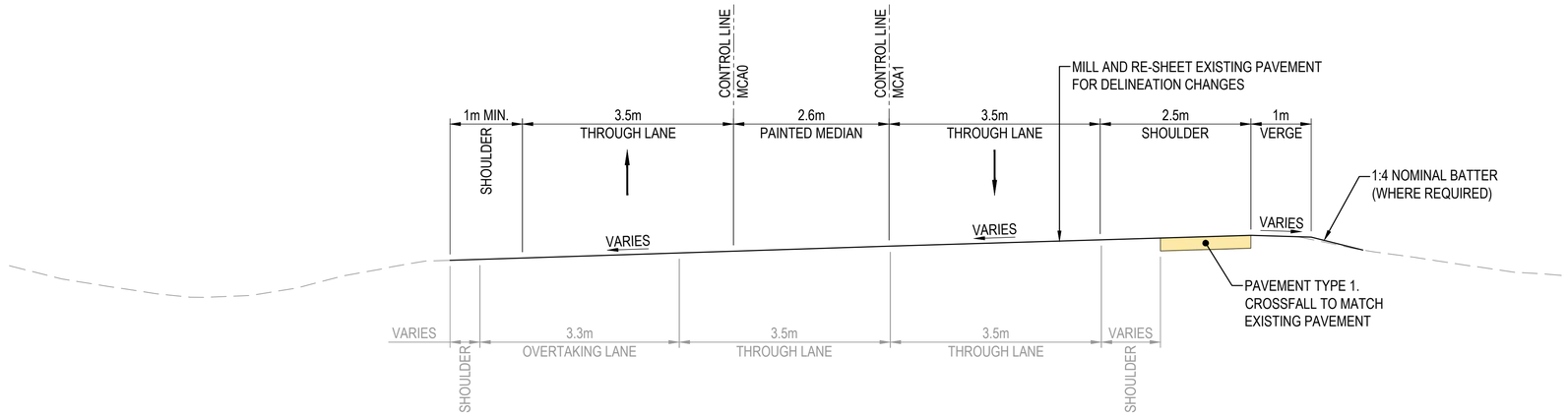
DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
GENERAL NOTES

A1
SHEET 1 OF 1
DRAWING NUMBER 0426-CV-0011
ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0011
ISSUE: A

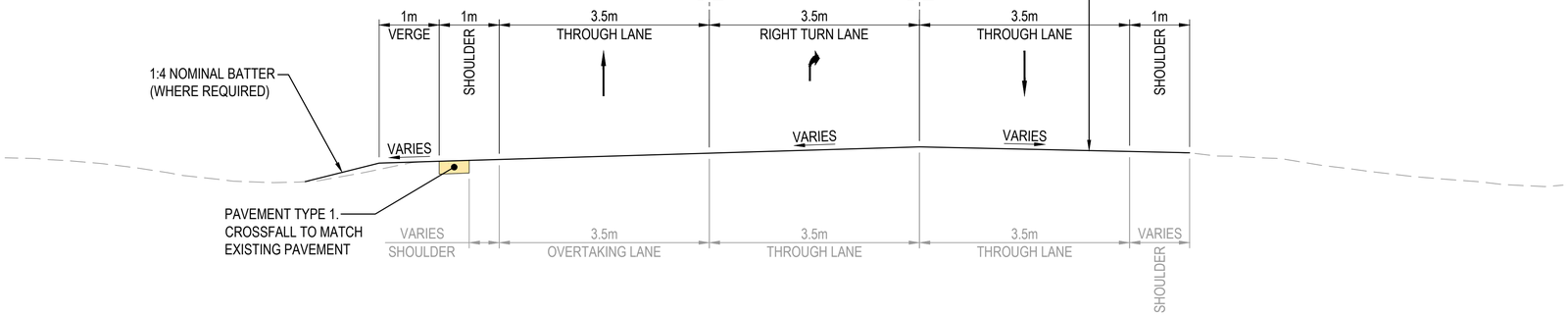
LEGEND

- EXISTING SURFACE
- DESIGN SURFACE
- HYDRAULIC GRADE LINE (HGL)
- PROPOSED CULVERT
- INDICATIVE PROPOSED PAVEMENT TYPE 1
- INDICATIVE PROPOSED PAVEMENT TYPE 2 / TYPE 3
- INDICATIVE PROPOSED PAVEMENT TYPE 4



SECTION 2 CV-0101
SCALE 1:50

SUMMERLAND WAY (MCA1) CH 280
RURAL BASIC LEFT-TURN TREATMENT (BAL)



SECTION 1 CV-0101
SCALE 1:50

SUMMERLAND WAY (MCA1) CH 180
CHANNELISED RIGHT-TURN TREATMENT WITH SHORT TURN SLOT [(CHR(S)]

NOTES
1. FOR GENERAL NOTES REFER SHEET No. CV-0021.
2. FOR PAVEMENT PROFILES REFER SHEET No. CV-0061.

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
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EXTERNAL REFERENCE FILES
X-0426-00-SHTE-A1-SHT
X-0426-00-RW-TYPICAL DETAILS

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW
B	10.05.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
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SCALE 1:50m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 10 May 2024 01:35:41 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	10.05.24
DRG CHECK	B.EVANS	10.05.24
DESIGN	M.GAPPER	10.05.24
DESIGN CHECK	R.POTTS	10.05.24
DESIGN MNGR	W.WEBB	10.05.24
PROJECT MNGR	W.WEBB	10.05.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

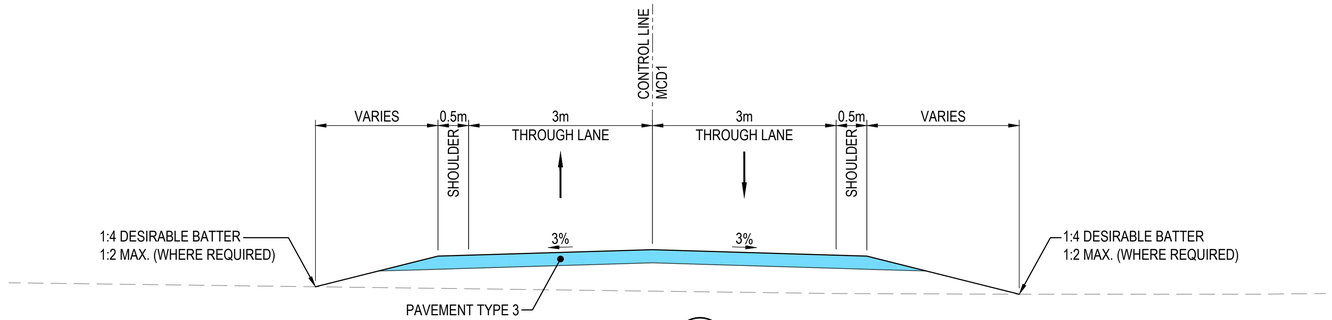
DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
TYPICAL SECTIONS
SHEET 1 OF 2
A1

DRAWING NUMBER: 0426-CV-0051
ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0051
ISSUE: B

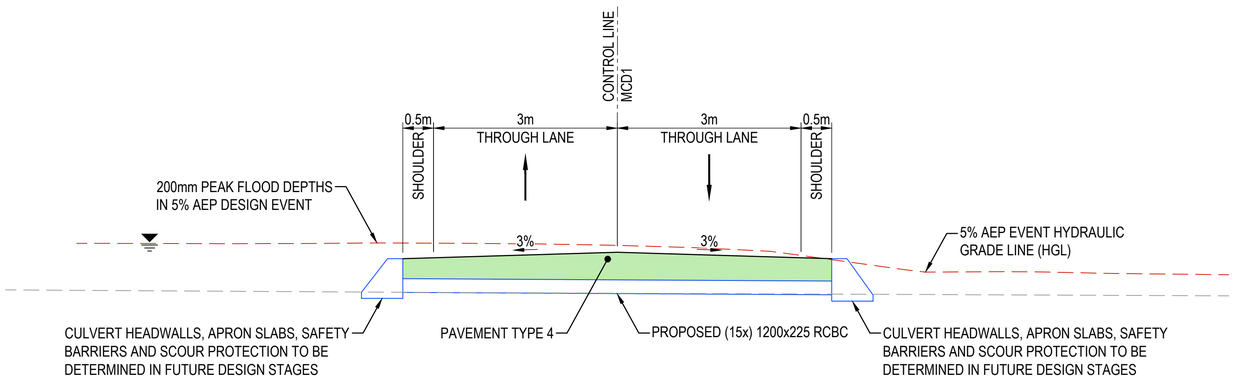
LEGEND

- EXISTING SURFACE
- DESIGN SURFACE
- HYDRAULIC GRADE LINE (HGL)
- PROPOSED CULVERT
- INDICATIVE PROPOSED PAVEMENT TYPE 1
- INDICATIVE PROPOSED PAVEMENT TYPE 2 / TYPE 3
- INDICATIVE PROPOSED PAVEMENT TYPE 4



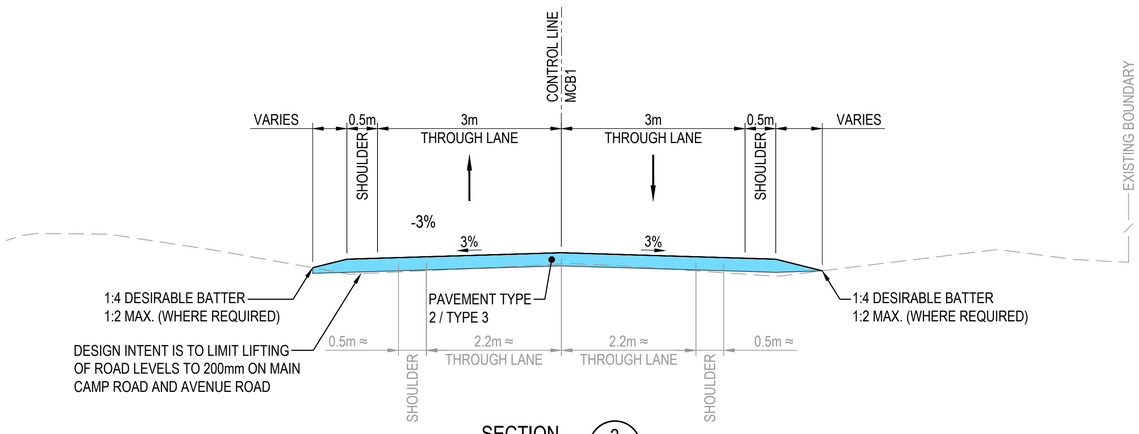
SECTION 5 (CV-0114)
SCALE 1:50

INTERNAL ACCESS ROAD (MCD1) CH 100
RURAL OR RURAL-RESIDENTIAL ROAD (CROWNED)



SECTION 4 (CV-0114)
SCALE 1:50

INTERNAL ACCESS ROAD (MCD1) CH 55
RURAL OR RURAL-RESIDENTIAL ROAD (CROWNED)



SECTION 3 (CV-0102)
SCALE 1:50

MAIN CAMP ROAD (MCB1) CH 190 / AVENUE ROAD
RURAL OR RURAL-RESIDENTIAL ROAD (CROWNED)

NOTES
1. FOR GENERAL NOTES REFER SHEET No. CV-0021.
2. FOR PAVEMENT PROFILES REFER SHEET No. CV-0061.

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
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EXTERNAL REFERENCE FILES
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X:\0426-00-RW-TYPICAL DETAILS

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW
B	10.05.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
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SCALE 1:50m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020) HEIGHT DATUM: AHD

PLOT DATE / TIME: 10 May 2024 01:35:42 PM PLOT BY: SamThorne

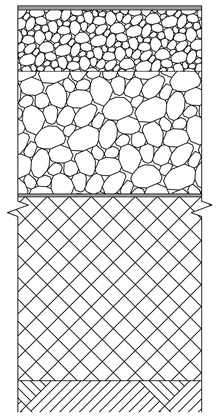
TITLE	NAME	DATE
DRAWN	S.THORNE	10.05.24
DRG CHECK	B.EVANS	10.05.24
DESIGN	M.GAPPER	10.05.24
DESIGN CHECK	R.POTTS	10.05.24
DESIGN MNGR	W.WEBB	10.05.24
PROJECT MNGR	W.WEBB	10.05.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

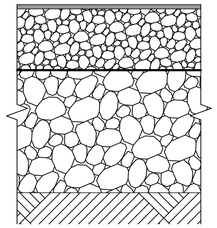
DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
TYPICAL SECTIONS

A1
SHEET 2 OF 2
DRAWING NUMBER 0426-CV-0052
ISSUE STATUS: CONCEPT DESIGN
SHEET No. CV-0052
ISSUE B



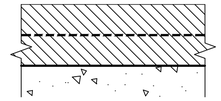
7 / 14 DOUBLE / DOUBLE SPRAYED SEAL
X mm CLASS 2 DENSELY GRADED BASE (CATEGORY C)
Y mm DENSELY GRADED SUBBASE (REFER TO TABLE 1)
7 mm LOW CUTTER SEAL (C170)
300 mm SELECTED MATERIAL ZONE
SUBGRADE (CBR VARIES)

TYPE 1
SEALED PAVEMENT
SCALE 1:10



7 / 14 DOUBLE / DOUBLE SPRAYED SEAL
X mm CLASS 2 DENSELY GRADED BASE (CATEGORY C)
PRIME
Y mm DENSELY GRADED SUBBASE (REFER TO TABLE 2 / TABLE 3)
SUBGRADE (CBR VARIES)

TYPE 2 / TYPE 3
SEALED PAVEMENT
SCALE 1:10



50 mm NOMINAL AC14 (C45) HUESKER HATELIT C
VARIABLE (MIN. 40 mm AC14 (C45)
PRIME OR EMULSION PRIME
CONCRETE CULVERT

TYPE 4
SEALED PAVEMENT
SCALE 1:10

TABLE 1: PAVEMENT TYPE 1 - SUMMERLAND WAY - REQUIRED LAYER THICKNESS OVER VARIOUS INSITU SUBGRADE CBR VALUES

CBR (%)	TOTAL THICKNESS (mm)	DENSELY GRADED BASE (mm) (X)	DENSELY GRADED SUBBASE (mm) (Y)	SELECTED MATERIAL ZONE (mm)
3	675	150	225	300
4	580	150	130	300
5	515	215	0	300
10	450	150	0	300
15	450	150	0	300

TABLE 2: PAVEMENT TYPE 2 - MAIN CAMP ROAD - REQUIRED LAYER THICKNESS OVER VARIOUS INSITU SUBGRADE CBR VALUES

CBR (%)	TOTAL THICKNESS (mm)	DENSELY GRADED BASE (mm) (X)	DENSELY GRADED SUBBASE (mm) (Y)
3	485	125	360
4	420	125	295
5	370	125	245
10	250	125	125
15	195	195	0

TABLE 3: PAVEMENT TYPE 3 - AVENUE ROAD AND INTERNAL ACCESS ROAD - REQUIRED LAYER THICKNESS OVER VARIOUS INSITU SUBGRADE CBR VALUES

CBR (%)	TOTAL THICKNESS (mm)	DENSELY GRADED BASE (mm) (X)	DENSELY GRADED SUBBASE (mm) (Y)
3	445	100	345
4	375	100	275
5	340	100	240
10	230	100	130
15	180	180	0

NOTES
1. FOR GENERAL NOTES REFER SHEET No. CV-0021.

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
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EXTERNAL REFERENCE FILES
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X-0426-00-PI-PAVEMENT-PROFILES

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
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SCALE 1:5m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 04:24:11 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
PAVEMENT PROFILES
SHEET 1 OF 1
A1

DRAWING NUMBER: 0426-CV-0061
ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0061
ISSUE: A

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

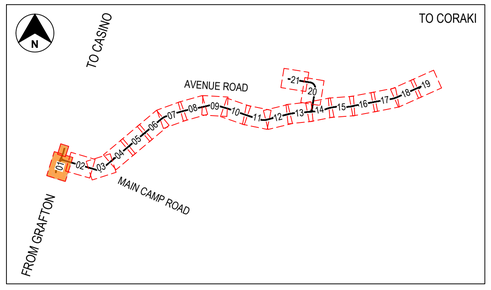
- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- 38 — MAJOR CONTOUR
- MINOR CONTOUR
- 38 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) C(D) C(D) — EXISTING COMMUNICATIONS
- E(D) E(D) E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
3. EXISTING CULVERTS TO BE RETAINED BY LOCALLY ADJUSTING THE ROAD FORMATION.
4. TABLE DRAINS ARE INDICATIVE BASED ON LIDAR AND DASH CAM FOOTAGE. LOCATION OF TABLE DRAINS TO BE VERIFIED THROUGH DETAILED SURVEY AND SITE INSPECTION IN SUBSEQUENT DESIGN STAGES.
5. REQUIREMENT FOR CULVERT UNDERNEATH PROPERTY ACCESS IN ACCORDANCE WITH NORTHERN RIVERS LOCAL GOVERNMENT STANDARD DRAWING R-14 REV D TO BE CONFIRMED IN SUBSEQUENT DESIGN STAGES.



KEY PLAN

NOT FOR CONSTRUCTION

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X-0426-00-SU-AERIAL-FADED

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW
B	03.05.24	CONCEPT DESIGN		WW
C	10.05.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 10 May 2024 01:36:10 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	10.05.24
DRG CHECK	B.EVANS	10.05.24
DESIGN	M.GAPPER	10.05.24
DESIGN CHECK	R.POTTS	10.05.24
DESIGN MNGR	W.WEBB	10.05.24
PROJECT MNGR	W.WEBB	10.05.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 1 OF 21

DRAWING NUMBER: 0426-CV-0101

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0101
ISSUE: C

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

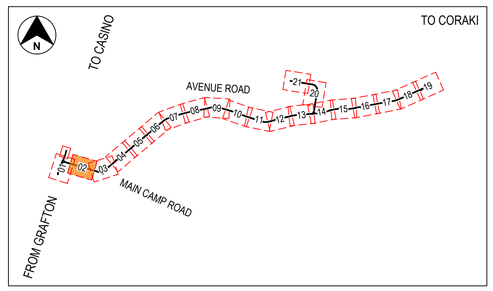
- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- 38 — MAJOR CONTOUR
- MINOR CONTOUR
- 38 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) — EXISTING COMMUNICATIONS
- E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
3. EXISTING CULVERTS TO BE RETAINED BY LOCALLY ADJUSTING THE ROAD FORMATION.
4. TABLE DRAINS ARE INDICATIVE BASED ON LIDAR AND DASH CAM FOOTAGE. LOCATION OF TABLE DRAINS TO BE VERIFIED THROUGH DETAILED SURVEY AND SITE INSPECTION IN SUBSEQUENT DESIGN STAGES.
5. REQUIREMENT FOR CULVERT UNDERNEATH PROPERTY ACCESS IN ACCORDANCE WITH NORTHERN RIVERS LOCAL GOVERNMENT STANDARD DRAWING R-14 REV D TO BE CONFIRMED IN SUBSEQUENT DESIGN STAGES.



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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW
B	10.05.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING

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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020) — HEIGHT DATUM: AHD

	TITLE	NAME	DATE
DRAWN	S.THORNE	10.05.24
DRG CHECK	B.EVANS	10.05.24
DESIGN	M.GAPPER	10.05.24
DESIGN CHECK	R.POTTS	10.05.24
DESIGN MNGR	W.WEBB	10.05.24
PROJECT MNGR	W.WEBB	10.05.24

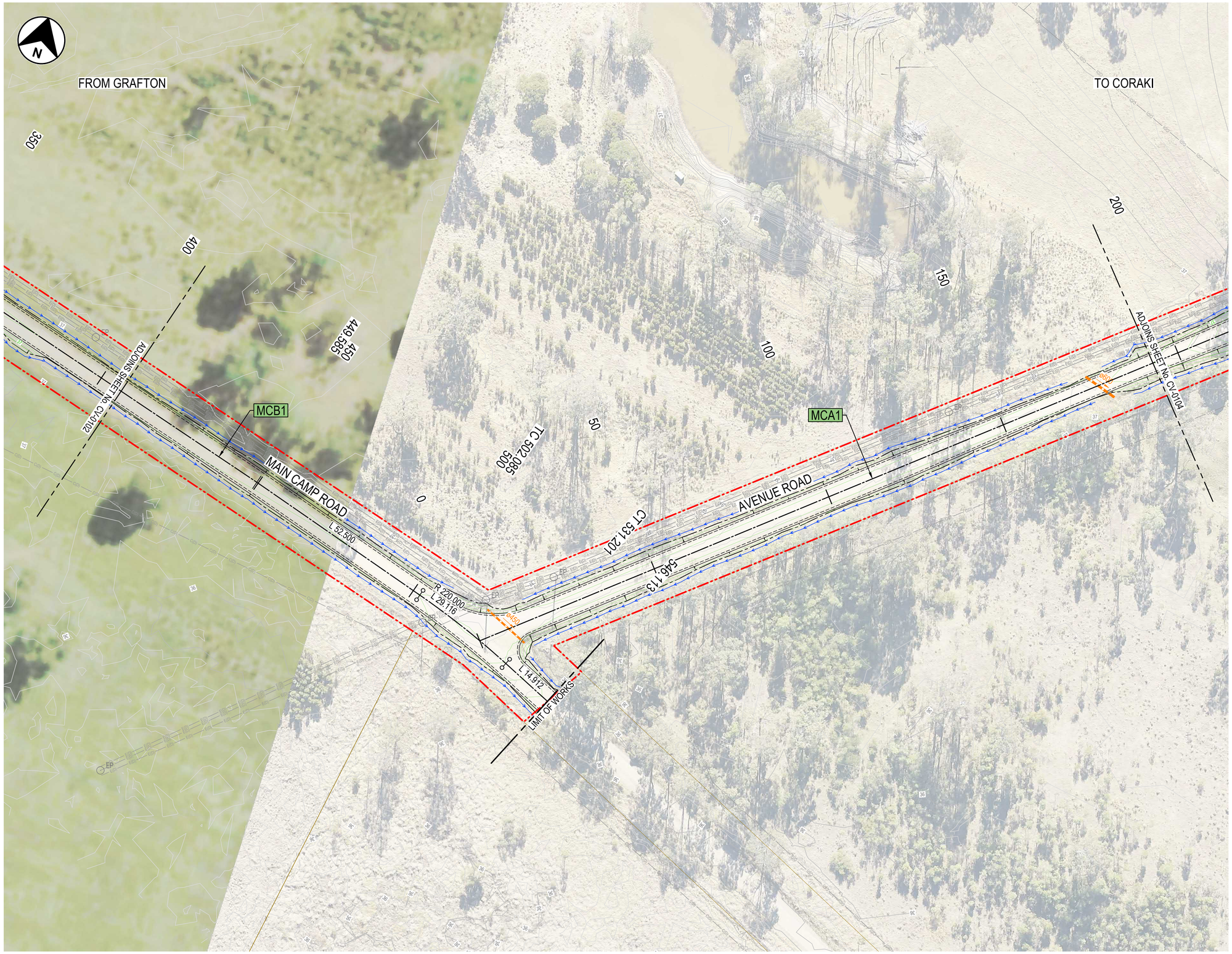
DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
A1
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT
SHEET 2 OF 21

DRAWING NUMBER 0426-CV-0102

ISSUE STATUS	SHEET No.	ISSUE
CONCEPT DESIGN	CV-0102	B



LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

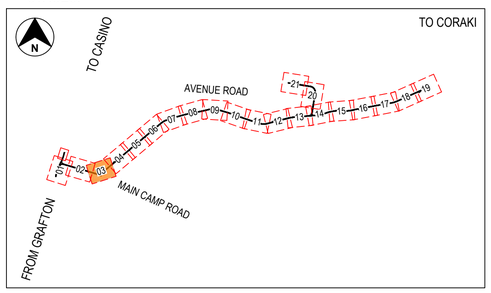
- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- 38 — MAJOR CONTOUR
- MINOR CONTOUR
- 38 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) C(D) C(D) — EXISTING COMMUNICATIONS
- E(D) E(D) E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
3. EXISTING CULVERTS TO BE RETAINED BY LOCALLY ADJUSTING THE ROAD FORMATION.
4. TABLE DRAINS ARE INDICATIVE BASED ON LIDAR AND DASH CAM FOOTAGE. LOCATION OF TABLE DRAINS TO BE VERIFIED THROUGH DETAILED SURVEY AND SITE INSPECTION IN SUBSEQUENT DESIGN STAGES.
5. REQUIREMENT FOR CULVERT UNDERNEATH PROPERTY ACCESS IN ACCORDANCE WITH NORTHERN RIVERS LOCAL GOVERNMENT STANDARD DRAWING R-14 REV D TO BE CONFIRMED IN SUBSEQUENT DESIGN STAGES.



KEY PLAN

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X-0426-00-GN-LEGEND
X-0426-00-SU-CADASTRAL
X-0426-00-SU-T-PLAN
X-0426-00-SU-POWERLOSSes
X-0426-00-SU-CONTOURS
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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020) HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:53:58 PM PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 3 OF 21

DRAWING NUMBER 0426-CV-0103

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0103
ISSUE: A

FROM GRAFTON

TO CORAKI

200 250 300 350 400 450 TC 460.001 CT 470.000

MCB1

REFER NOTE 5

AVENUE ROAD

ADJOINS SHEET No. CV-0103

ADJOINS SHEET No. CV-0105

Ø375

Ø900

L 460.001

R -500.000

L 9.999

L 40.009

REFER NOTE 5

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 CONTROL LINE AND CHAINAGE
- MCXX CONTROL LINE LABEL

STORMWATER MANAGEMENT

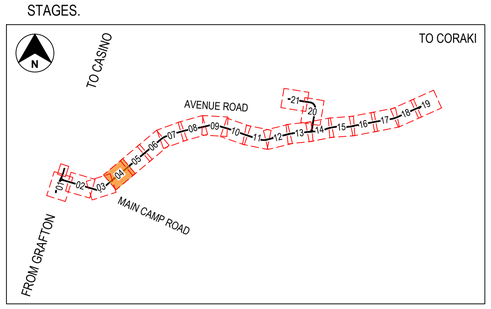
- ø600 EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- 38 MAJOR CONTOUR
- MINOR CONTOUR
- 38 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) EXISTING COMMUNICATIONS
- E(D) EXISTING ELECTRICAL
- EP EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
3. EXISTING CULVERTS TO BE RETAINED BY LOCALLY ADJUSTING THE ROAD FORMATION.
4. TABLE DRAINS ARE INDICATIVE BASED ON LIDAR AND DASH CAM FOOTAGE. LOCATION OF TABLE DRAINS TO BE VERIFIED THROUGH DETAILED SURVEY AND SITE INSPECTION IN SUBSEQUENT DESIGN STAGES.
5. REQUIREMENT FOR CULVERT UNDERNEATH PROPERTY ACCESS IN ACCORDANCE WITH NORTHERN RIVERS LOCAL GOVERNMENT STANDARD DRAWING R-14 REV D TO BE CONFIRMED IN SUBSEQUENT DESIGN STAGES.



KEY PLAN

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
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EXTERNAL REFERENCE FILES
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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:54:20 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 4 OF 21

DRAWING NUMBER: 0426-CV-0104

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0104
ISSUE: A

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

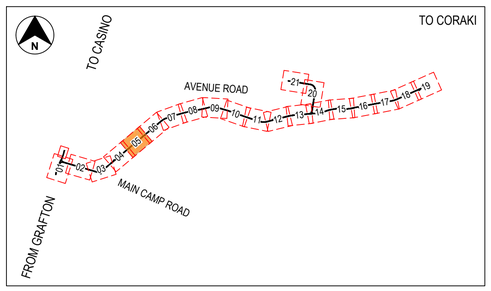
- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- 38 — MAJOR CONTOUR
- MINOR CONTOUR
- 38 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) C(D) C(D) — EXISTING COMMUNICATIONS
- E(D) E(D) E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
3. EXISTING CULVERTS TO BE RETAINED BY LOCALLY ADJUSTING THE ROAD FORMATION.
4. TABLE DRAINS ARE INDICATIVE BASED ON LIDAR AND DASH CAM FOOTAGE. LOCATION OF TABLE DRAINS TO BE VERIFIED THROUGH DETAILED SURVEY AND SITE INSPECTION IN SUBSEQUENT DESIGN STAGES.
5. REQUIREMENT FOR CULVERT UNDERNEATH PROPERTY ACCESS IN ACCORDANCE WITH NORTHERN RIVERS LOCAL GOVERNMENT STANDARD DRAWING R-14 REV D TO BE CONFIRMED IN SUBSEQUENT DESIGN STAGES.



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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:54:40 PM
PLOT BY: SamThorne

	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 5 OF 21

DRAWING NUMBER: 0426-CV-0105

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0105
ISSUE: A

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- CONTROL LINE AND CHAINAGE (50)
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
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- MINOR CONTOUR
- 38 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) — EXISTING COMMUNICATIONS
- E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
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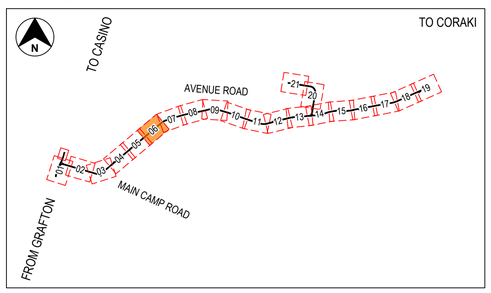

KEY PLAN

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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:55:01 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
A1
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT
SHEET 6 OF 21

DRAWING NUMBER 0426-CV-0106

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0106
ISSUE: A

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
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- MINOR CONTOUR
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- EXISTING MINOR CONTOUR

UTILITIES

- C(D) — EXISTING COMMUNICATIONS
- E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
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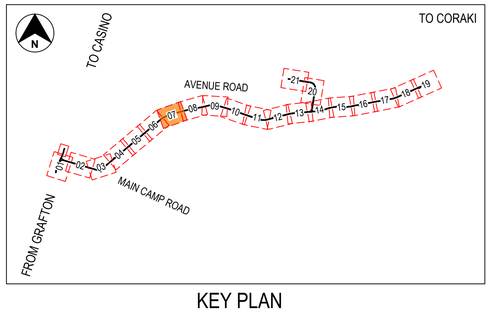

KEY PLAN

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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:55:19 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

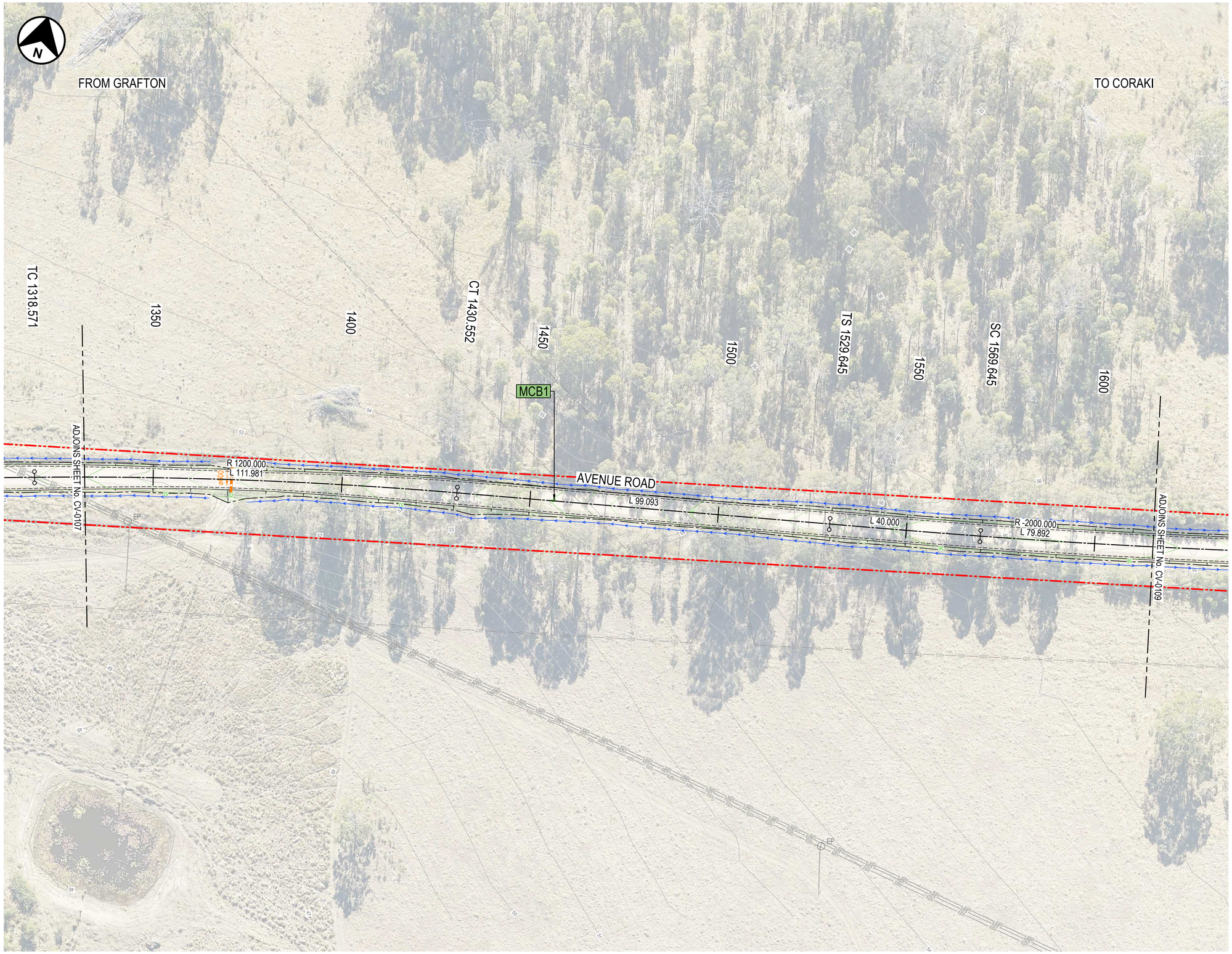
DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 7 OF 21

DRAWING NUMBER: 0426-CV-0107

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0107
ISSUE: A



LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- CONTROL LINE AND CHAINAGE (50)
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- MAJOR CONTOUR
- MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- EXISTING COMMUNICATIONS
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
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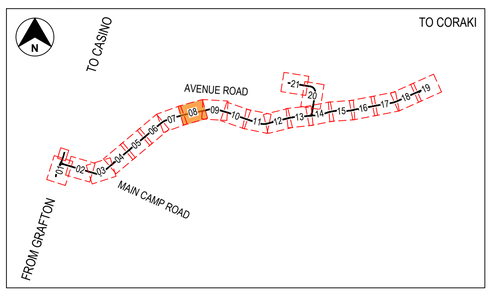

KEY PLAN

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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020) HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:55:36 PM PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

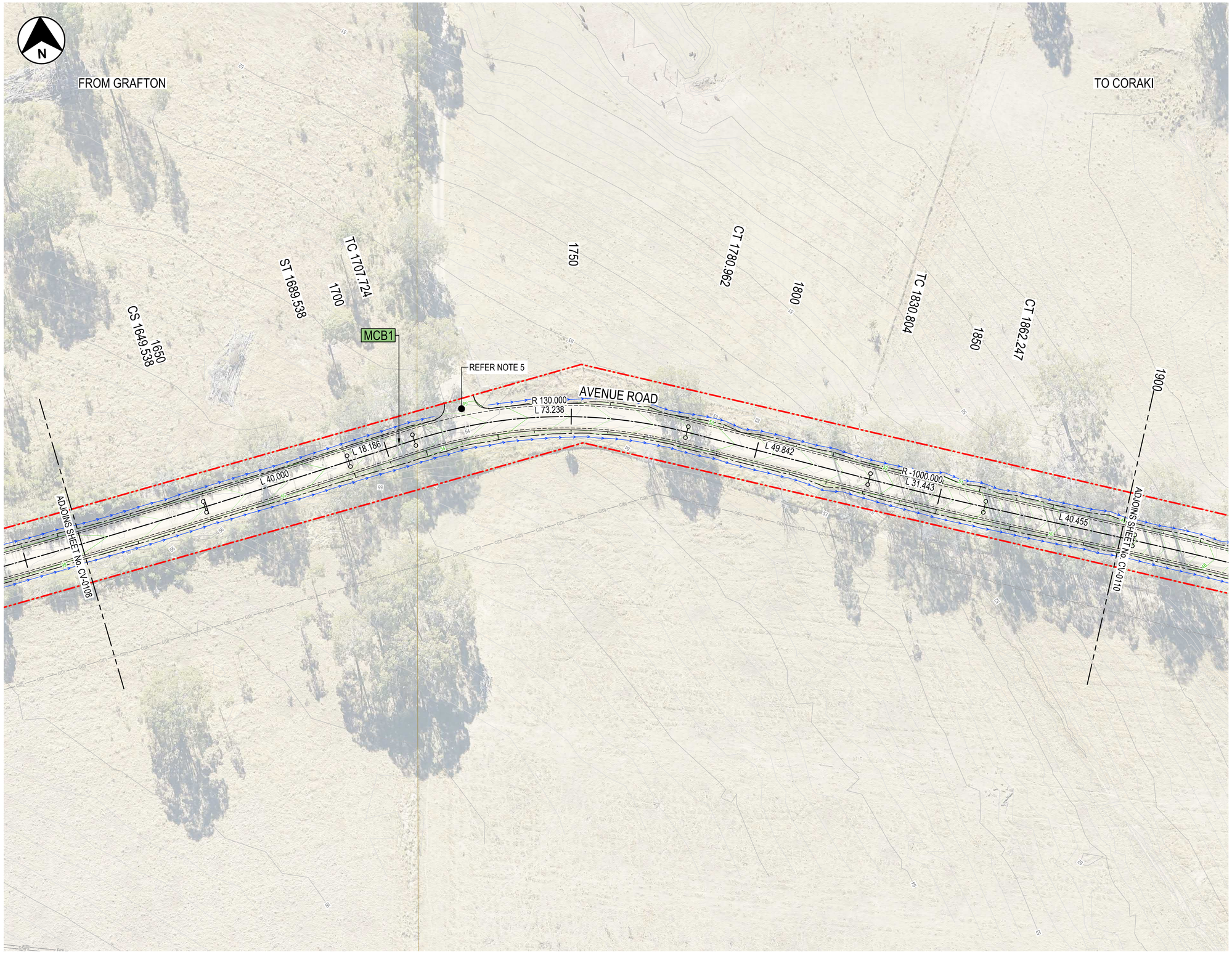
DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 8 OF 21

DRAWING NUMBER 0426-CV-0108

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0108
ISSUE: A



LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- 38 — MAJOR CONTOUR
- MINOR CONTOUR
- 38 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) C(D) C(D) — EXISTING COMMUNICATIONS
- E(D) E(D) E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
3. EXISTING CULVERTS TO BE RETAINED BY LOCALLY ADJUSTING THE ROAD FORMATION.
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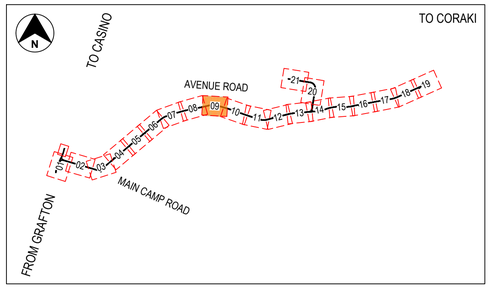

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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:55:49 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

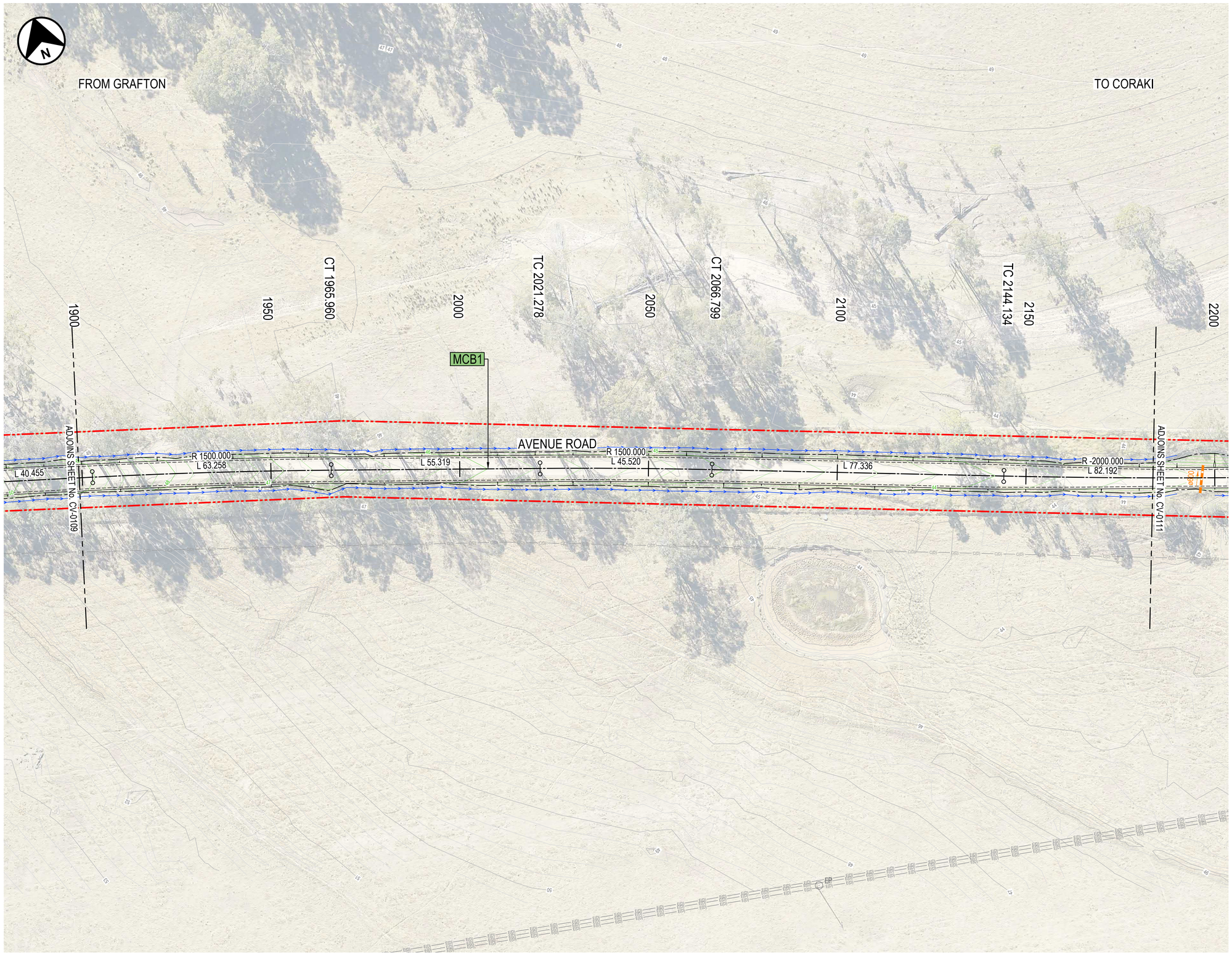
DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 9 OF 21

DRAWING NUMBER: 0426-CV-0109

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0109
ISSUE: A



LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
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UTILITIES

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NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
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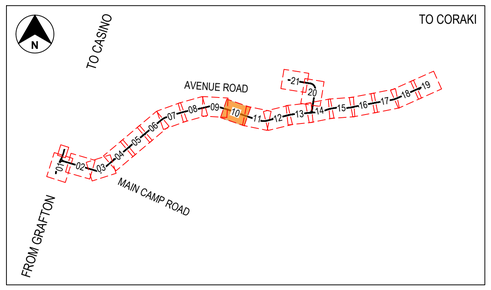

KEY PLAN

NOT FOR CONSTRUCTION

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EXTERNAL REFERENCE FILES
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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
0 5 10 15 20 25
SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:56:06 PM
PLOT BY: SamThorne

	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

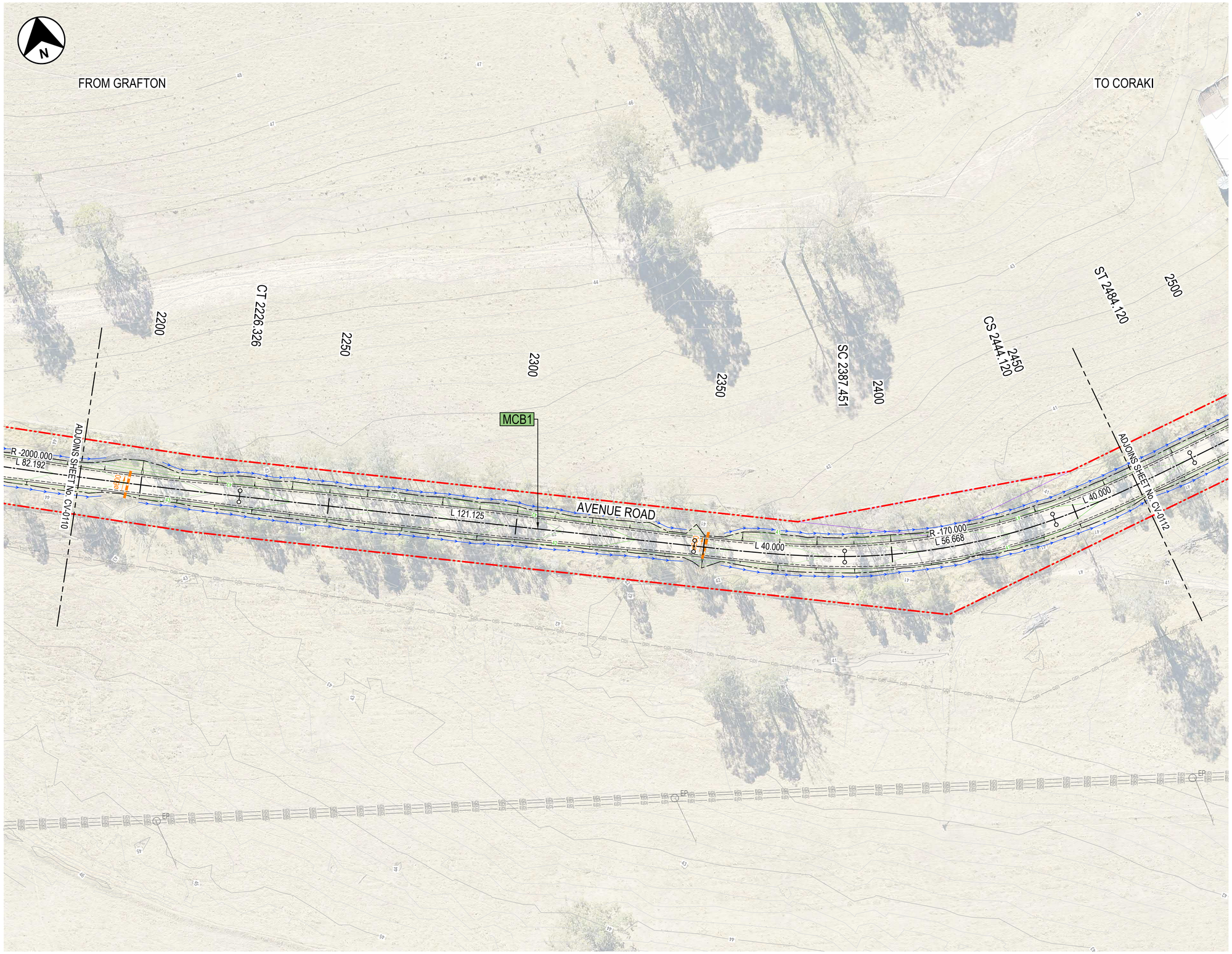
DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 10 OF 21

DRAWING NUMBER: 0426-CV-0110

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0110
ISSUE: A



LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- 38 — MAJOR CONTOUR
- MINOR CONTOUR
- 38 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) C(D) C(D) — EXISTING COMMUNICATIONS
- E(D) E(D) E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
3. EXISTING CULVERTS TO BE RETAINED BY LOCALLY ADJUSTING THE ROAD FORMATION.
4. TABLE DRAINS ARE INDICATIVE BASED ON LIDAR AND DASH CAM FOOTAGE. LOCATION OF TABLE DRAINS TO BE VERIFIED THROUGH DETAILED SURVEY AND SITE INSPECTION IN SUBSEQUENT DESIGN STAGES.
5. REQUIREMENT FOR CULVERT UNDERNEATH PROPERTY ACCESS IN ACCORDANCE WITH NORTHERN RIVERS LOCAL GOVERNMENT STANDARD DRAWING R-14 REV D TO BE CONFIRMED IN SUBSEQUENT DESIGN STAGES.

KEY PLAN

NOT FOR CONSTRUCTION

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X-0426-00-SU-AERIAL-FADED

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:56:20 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
A1
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT
SHEET 11 OF 21

DRAWING NUMBER 0426-CV-0111

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0111
ISSUE: A

FROM GRAFTON

TO CORAKI

CS 2444.120

ST 2484.120

2450

2500

2550

2600

2650

2700

TC 2734.945

2750

MCB1

REFER NOTE 5

ø375

AVENUE ROAD

L 40.000

L 250.826

REFER NOTE 5

ADJOINS SHEET No. CV-0111

ADJOINS SHEET No. CV-0113

EP

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

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- MCXX — CONTROL LINE LABEL

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UTILITIES

- C(D) C(D) C(D) — EXISTING COMMUNICATIONS
- E(D) E(D) E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

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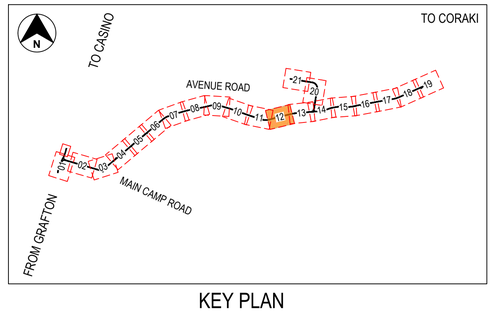

KEY PLAN

NOT FOR CONSTRUCTION

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X-0426-00-SU-AERIAL-FADED

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
0 5 10 15 20 25
SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:56:34 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT
A1
SHEET 12 OF 21

DRAWING NUMBER: 0426-CV-0112

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0112
ISSUE: A

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- CONTROL LINE AND CHAINAGE
- MCXX CONTROL LINE LABEL

STORMWATER MANAGEMENT

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- MAJOR CONTOUR
- MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- EXISTING COMMUNICATIONS
- EXISTING ELECTRICAL
- EXISTING ELECTRICAL POLE

NOTES

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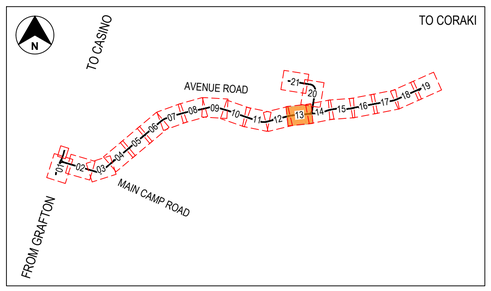

KEY PLAN

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
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X-0426-00-SU-AERIAL-GREY
X-0426-00-SU-AERIAL-FADED

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:56:46 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 13 OF 21

DRAWING NUMBER: 0426-CV-0113

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0113
ISSUE: A

FROM GRAFTON

TO CORAKI

ADJOINS SHEET No. CV-0120

ADJOINS SHEET No. CV-0113

ADJOINS SHEET No. CV-0115

5 CV-0052

4 CV-0052

INTERNAL ACCESS ROAD

AVENUE ROAD

VERTICAL ALIGNMENT OF PROPOSED INTERNAL ACCESS ROAD DETERMINED BY FLOOD IMMUNITY REQUIREMENTS

ACQUISITION BOUNDARY TO BE REVIEWED

(15x1200x225

CT 3062.537

TC 3136.713

CT 3208.867

TS 3217.699

SC 3257.699

CS 3288.232

MCB1

L 74.176

2x ø600

R -240.000

L 72.154

L 8.832

L 40.000

R 350.000

L 30.533

L 40.000

0 50 100 3000 3050 3100 3150 3200 3250 3300

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 CONTROL LINE AND CHAINAGE
- MCXX CONTROL LINE LABEL

STORMWATER MANAGEMENT

- ø600 EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- 38 MAJOR CONTOUR
- MINOR CONTOUR
- 38 EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) EXISTING COMMUNICATIONS
- E(D) EXISTING ELECTRICAL
- EP EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
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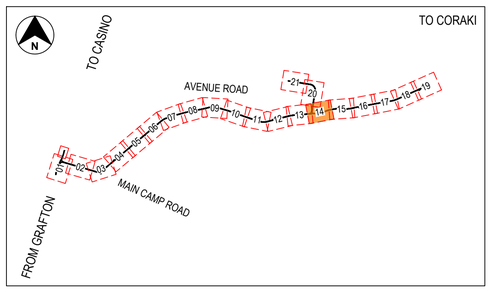

KEY PLAN

NOT FOR CONSTRUCTION

DRAWING FILE LOCATION / NAME
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X-0426-00-UT-EXISTING UTILITIES
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X-0426-00-RW-ANNO_BDY
X-0426-00-SU-AERIAL-FADED

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW
B	10.05.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
0 5 10 15 20 25
SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 10 May 2024 01:39:56 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	10.05.24
DRG CHECK	B.EVANS	10.05.24
DESIGN	M.GAPPER	10.05.24
DESIGN CHECK	R.POTTS	10.05.24
DESIGN MNGR	W.WEBB	10.05.24
PROJECT MNGR	W.WEBB	10.05.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 14 OF 21

DRAWING NUMBER 0426-CV-0114

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0114
ISSUE: B

FROM GRAFTON

TO CORAKI

ST 3328.232

TS 3366.317

SC 3406.317

CT 3441.645

TC 3466.318

CT 3556.830

3300

3350

3400

3450

3500

3550

3600

MCB1

AVENUE ROAD

L 40.000

L 38.085

L 40.000

R 180.000

L 35.328

L 24.673

R -270.000

L 90.512

L 80.032

ADJOINS SHEET No. CV-0114

ADJOINS SHEET No. CV-0116

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- CONTROL LINE AND CHAINAGE (50)
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
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- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
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UTILITIES

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NOTES

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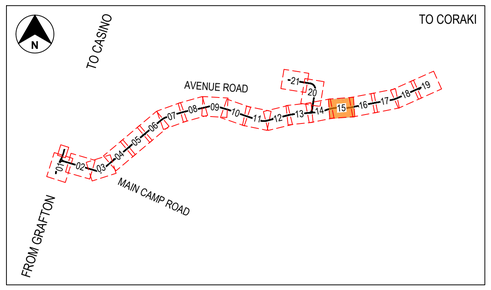

KEY PLAN

NOT FOR CONSTRUCTION

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PLOT DATE / TIME: 12 April 2024 03:57:13 PM
PLOT BY: SamThorne

EXTERNAL REFERENCE FILES:
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X-0426-00-UT-EXISTING-UTILITIES
X-0426-00-RW-ANNO
X-0426-00-RW-ANNO-BDY
X-0426-00-SU-AERIAL-FADED

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
0 5 10 15 20 25
SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

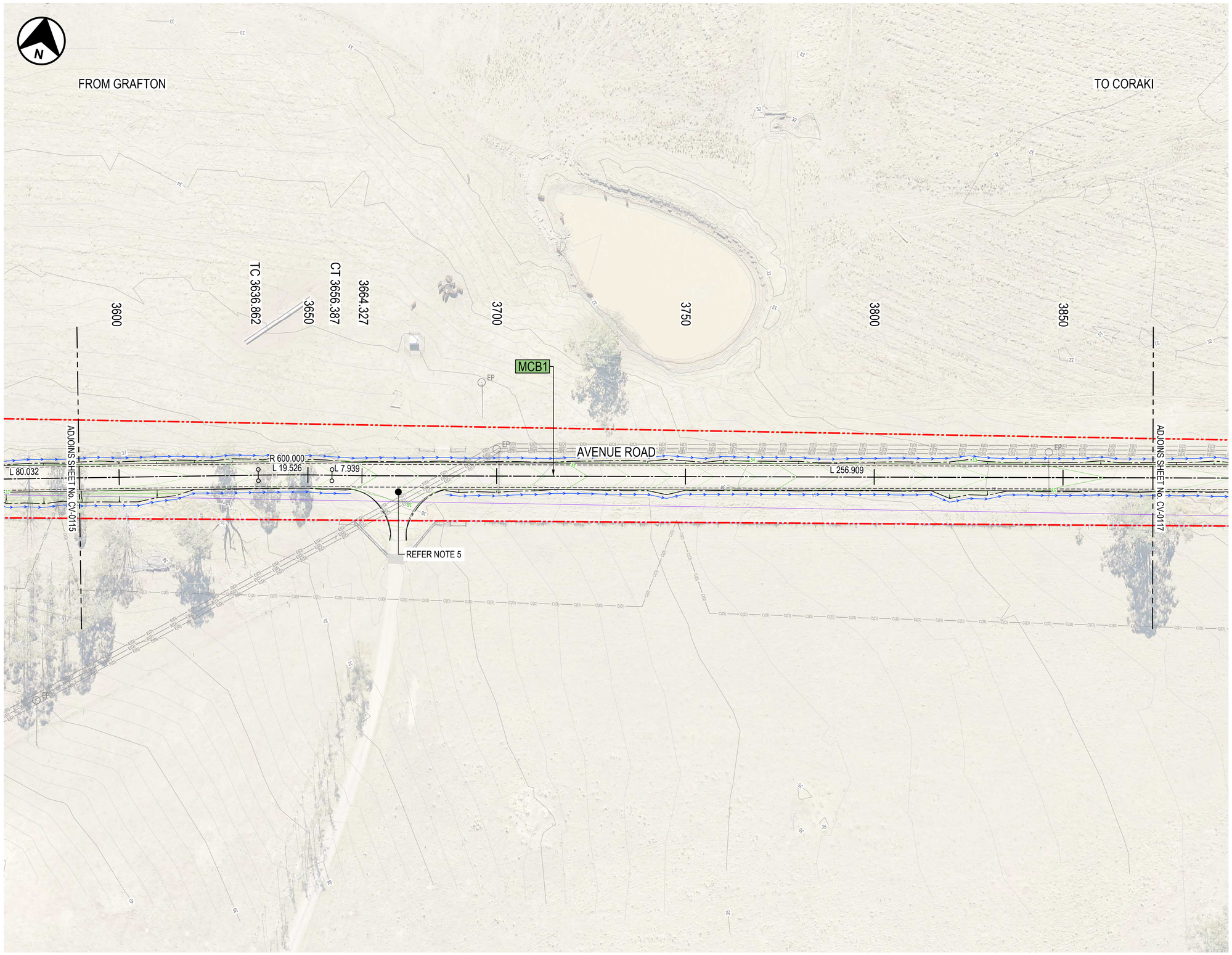
DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 15 OF 21

DRAWING NUMBER: 0426-CV-0115

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0115
ISSUE: A



LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
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ROAD ALIGNMENT

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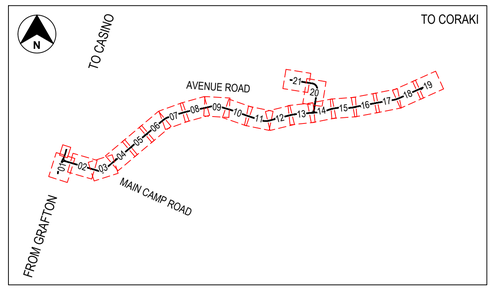

KEY PLAN

NOT FOR CONSTRUCTION

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CO-ORDINATE SYSTEM	HEIGHT DATUM
MGA ZONE 56 (GDA2020)	AHD

PLOT DATE / TIME: 12 April 2024 03:57:27 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 16 OF 21

DRAWING NUMBER 0426-CV-0116

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0116
ISSUE: A

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- 38 — MAJOR CONTOUR
- MINOR CONTOUR
- 38 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) — EXISTING COMMUNICATIONS
- E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
2. SAFETY BARRIER REQUIREMENTS FOR OBJECTS WITHIN CLEAR ZONE TO BE ASSESSED AT SUBSEQUENT DESIGN STAGES.
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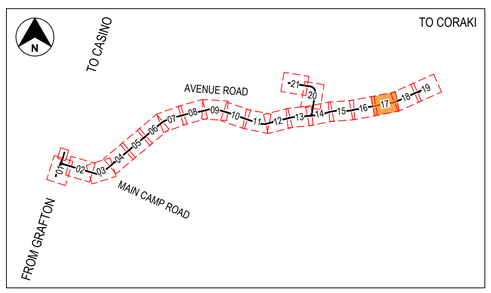
5. REQUIREMENT FOR CULVERT UNDERNEATH PROPERTY ACCESS IN ACCORDANCE WITH NORTHERN RIVERS LOCAL GOVERNMENT STANDARD DRAWING R-14 REV D TO BE CONFIRMED IN SUBSEQUENT DESIGN STAGES.



KEY PLAN

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X-0426-00-UT-EXISTING-UTILITIES
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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020) HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:57:42 PM PLOT BY: SamThorne

TITLE	NAME	DATE
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DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

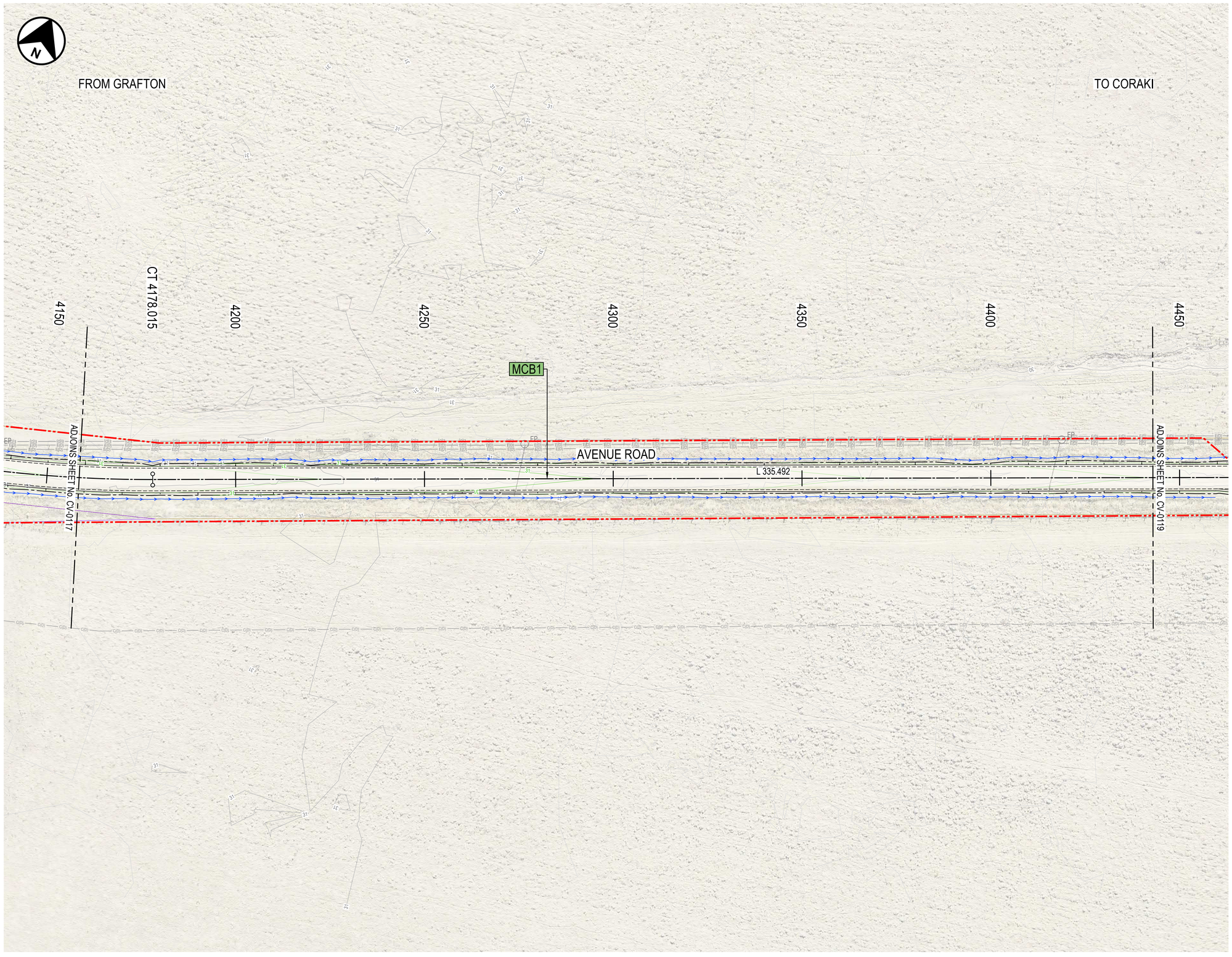
DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 17 OF 21

DRAWING NUMBER 0426-CV-0117

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0117
ISSUE: A



LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

- 50 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

STORMWATER MANAGEMENT

- ø600 — EXISTING STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- 1200x225 — STORMWATER DRAINAGE PIPE, SIZE AND FLOW
- PROPOSED TABLE DRAIN (INDICATIVE ONLY)
- 38 — MAJOR CONTOUR
- MINOR CONTOUR
- 38 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR

UTILITIES

- C(D) — EXISTING COMMUNICATIONS
- E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

1. FOR GENERAL NOTES REFER SHEET No. CV-0011.
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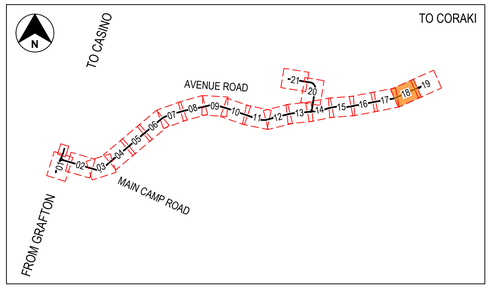

KEY PLAN

NOT FOR CONSTRUCTION

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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:58:04 PM
PLOT BY: SamThorne

	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 18 OF 21

DRAWING NUMBER: 0426-CV-0118

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0118
ISSUE: A

FROM GRAFTON

TO CORAKI

4450

4500

4513.507

MCB1

AVENUE ROAD

ADJOINS SHEET No. CV-0118

LIMIT OF WORKS

REFER NOTE 5

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
- ARK SUPPLIED PROJECT BOUNDARY
- ROAD DESIGN

ROAD ALIGNMENT

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- MCXX — CONTROL LINE LABEL

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UTILITIES

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- E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

NOTES

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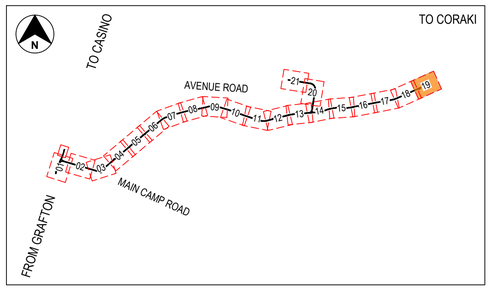

KEY PLAN

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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:58:25 PM
PLOT BY: SamThorne

	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 19 OF 21

DRAWING NUMBER 0426-CV-0119

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0119
ISSUE: A

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
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UTILITIES

- C(D) C(D) C(D) — EXISTING COMMUNICATIONS
- E(D) E(D) E(D) — EXISTING ELECTRICAL
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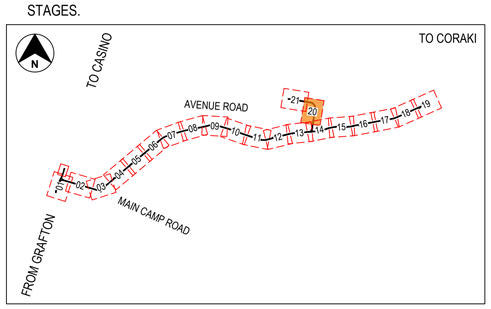

KEY PLAN

NOT FOR CONSTRUCTION

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X-0426-00-SU-CONTOURS
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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:58:40 PM
PLOT BY: SamThorne

	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT
ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 20 OF 21
DRAWING NUMBER 0426-CV-0120
ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0120
ISSUE: A

LEGEND

GENERAL

- SIX MAPS CADASTRAL BOUNDARY
- EXISTING CADASTRAL BOUNDARY
- PROPOSED ROAD REALIGNMENT CADASTRAL BOUNDARY
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- EXISTING MINOR CONTOUR

UTILITIES

- C(D) C(D) C(D) — EXISTING COMMUNICATIONS
- E(D) E(D) E(D) — EXISTING ELECTRICAL
- EP — EXISTING ELECTRICAL POLE

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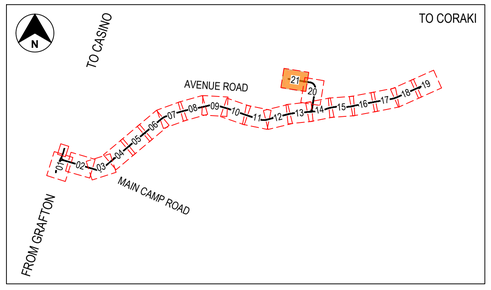

KEY PLAN

NOT FOR CONSTRUCTION

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X-0426-00-ON-TRANS
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X-0426-00-SN-KEY-PLAN
X-0426-00-SN-LABELS
X-0426-SU-CAD-CADASTRAL
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X-0426-00-SU-CONTOURS
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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	12.04.24	CONCEPT DESIGN		WW

SCALES ON A1 SIZE DRAWING
0 5 10 15 20 25
SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 12 April 2024 03:58:53 PM
PLOT BY: SamThorne

TITLE	NAME	DATE
DRAWN	S.THORNE	12.04.24
DRG CHECK	B.EVANS	12.04.24
DESIGN	M.GAPPER	12.04.24
DESIGN CHECK	R.POTTS	12.04.24
DESIGN MNGR	W.WEBB	12.04.24
PROJECT MNGR	W.WEBB	12.04.24

DRAWINGS / DESIGN PREPARED BY
DESIGNER: turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT: ARK ENERGY

DRAWING TITLE
RICHMOND VALLEY SOLAR FARM CONCEPT DESIGN
ARK ENERGY
CIVIL WORKS
GENERAL ARRANGEMENT

A1
SHEET 21 OF 21

DRAWING NUMBER: 0426-CV-0121

ISSUE STATUS: CONCEPT DESIGN
SHEET No.: CV-0121
ISSUE: A

Appendix I – School Bus Setdown Area Concept

PRELIMINARY

NORTHBOUND SCHOOL BUS SETDOWN AREA AS PER FIGURE 20.5b TMR RPDM CHAPTER 20

SUMMERLAND WAY

SUMMERLAND WAY

25.0m

15.0m

15.0m

5.0m

LONG RIGID BUS
AUSTROADS 2013 (AU)

15.0m

15.0m

5.0m

SOUTHBOUND SCHOOL BUS SETDOWN AREA AS PER FIGURE 20.5a TMR RPDM CHAPTER 20

MAIN CAMP ROAD

FOR INFORMATION ONLY

DRAWING LOCATION: C:\ACCESSTRAFFIC\PROJECTS\2023\UMW0123-0074. TECHNICAL\2. LAYOUT\UMW0123-007_RVSF_SUMMERLAND WAY IS CONCEPT_V5R1.DWG

PLOT DATE:

DRAWING No.	REFERENCE DRAWING TITLE	REV	DATE	REVISION DESCRIPTION	DFT	DFT CHK	DES	DES CHK
		A	26/02/2024	PRELIMINARY ONLY	AJB		AJB	

SURVEYOR

ADDRESS:

CO-ORDINATE DATUM

HEIGHT DATUM

	BY	DATE
REVIEWED	AJB	26/02/2024
RPEQ ENG	AJB	26/02/2024

RPEQ No: 12801

CLIENT

ARK ENERGY

SCALE: 1:500 @ A3

PREPARED BY UMW0123-007

ACCESS TRAFFIC CONSULTING

Address: 10 Cascade Close FRENCHVILLE QLD 4701
Mobile: 0402 180 902
Postal: PO BOX 9864, FRENCHVILLE QLD 4701
E-mail: admin@accesstraffic.com.au

CLIENT CAPE BONEVISTA PTY LTD

PROJECT RICHMOND VALLEY SOLAR FARM

TITLE

SUMMERLAND WAY / MAIN CAMP ROAD INTERSECTION

CONCEPT INTERSECTION UPGRADE

INTERSECTION SCHOOL BUS (14.5m RIGID BUS) SET DOWN AREAS

A1

DRAWING NUMBER UMW123-007_SK006

REVISION A

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